

Welcome to **GENETIC COPD 101**



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- — **What is Genetic COPD/Alpha-1 Antitrypsin Deficiency?**
- — **Pathophysiology**
- — **Clinical Presentation**
- — **Early Detection, Screening, and Diagnosis**
- — **Treatment and Management of Genetic COPD**
- — **My Role as a Health Care Provider**

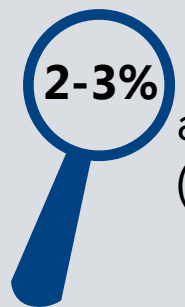
COPD AND ALPHA-1 ANTITRYPSIN DEFICIENCY



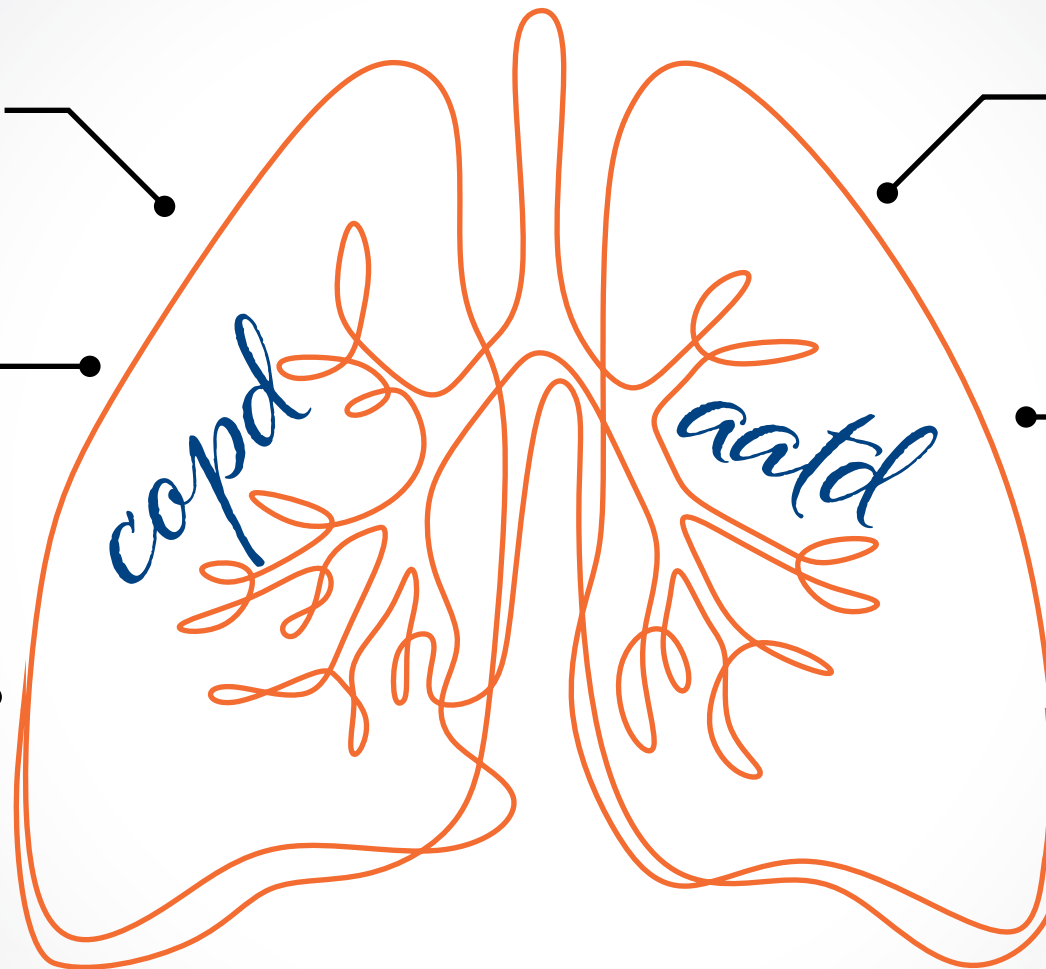
COPD is the third leading cause of death worldwide; 3.2 million deaths annually.²



As many as 53% of individuals with severe COPD go undiagnosed or are misdiagnosed.³



2-3% of those with COPD have alpha-1 antitrypsin deficiency (AATD).⁶



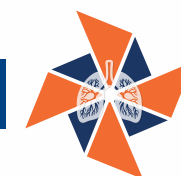
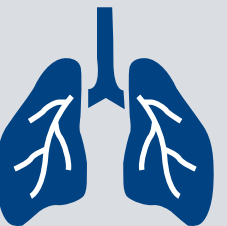
AATD is the most prevalent known genetic condition associated with the development of COPD.⁴



Approximately 90% of individuals with AATD remain undiagnosed.³



AATD is one of the most common, serious single-gene hereditary diseases worldwide. Among 4.4 billion people surveyed in 58 countries, ~116 million are carriers, and ~3.4 million have severe AAT deficiency).¹



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What is Genetic COPD?

Alpha-1 Antitrypsin Deficiency



What is Genetic COPD?⁶



- AAT: protein produced primarily in the liver, protects tissues against proteolytic enzymes during inflammation.
- AATD: inherited genetic condition characterized by low levels of AAT protein in the bloodstream.
- AATD: characterized by clinical manifestations primarily in the liver and lungs.

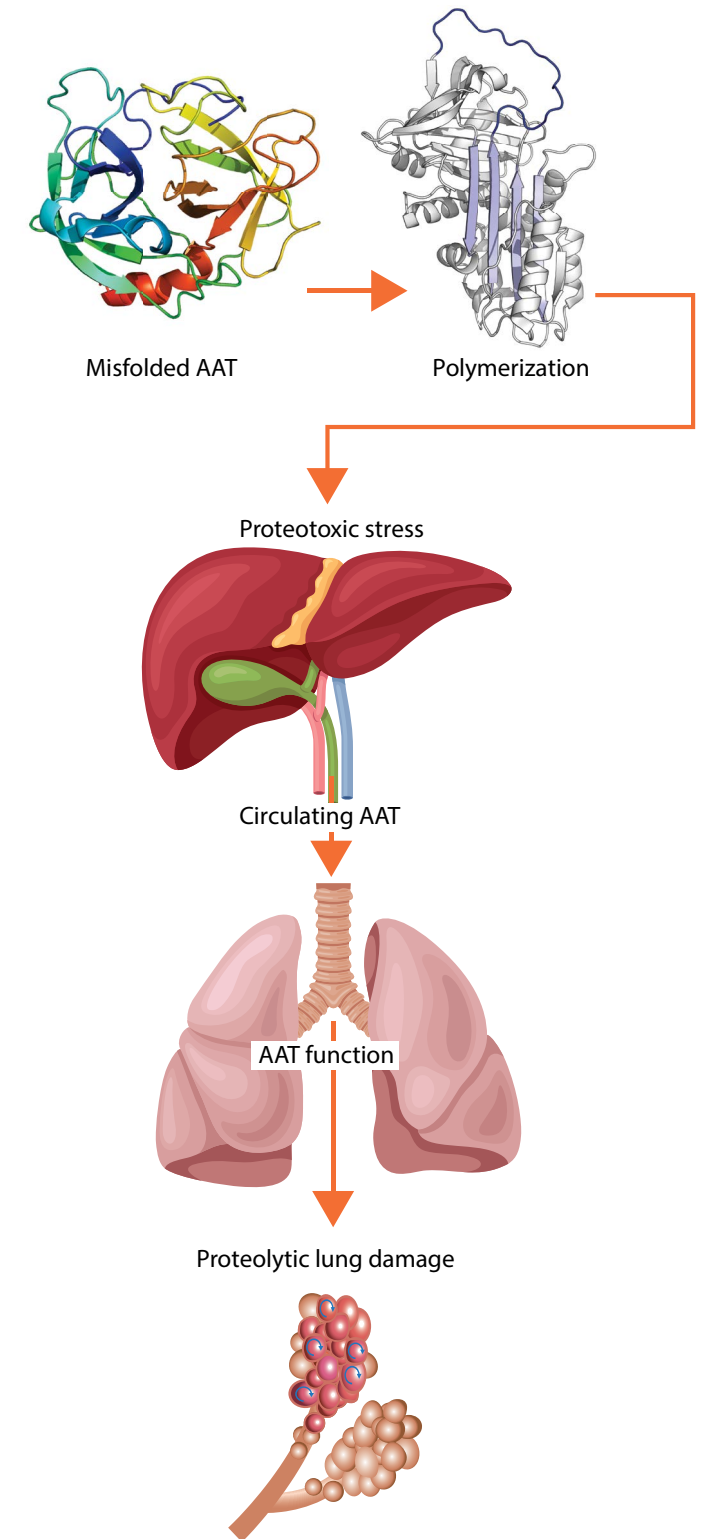


Pathophysiology

The background of the slide is a complex, abstract composition. On the right side, a prominent, three-dimensional DNA double helix is rendered in a metallic blue color, spiraling upwards. The background is filled with a pattern of semi-transparent hexagons in various shades of blue and green. Overlaid on this are several glowing, curved lines in orange and yellow, which create a sense of dynamic movement and energy. The overall aesthetic is scientific and modern.

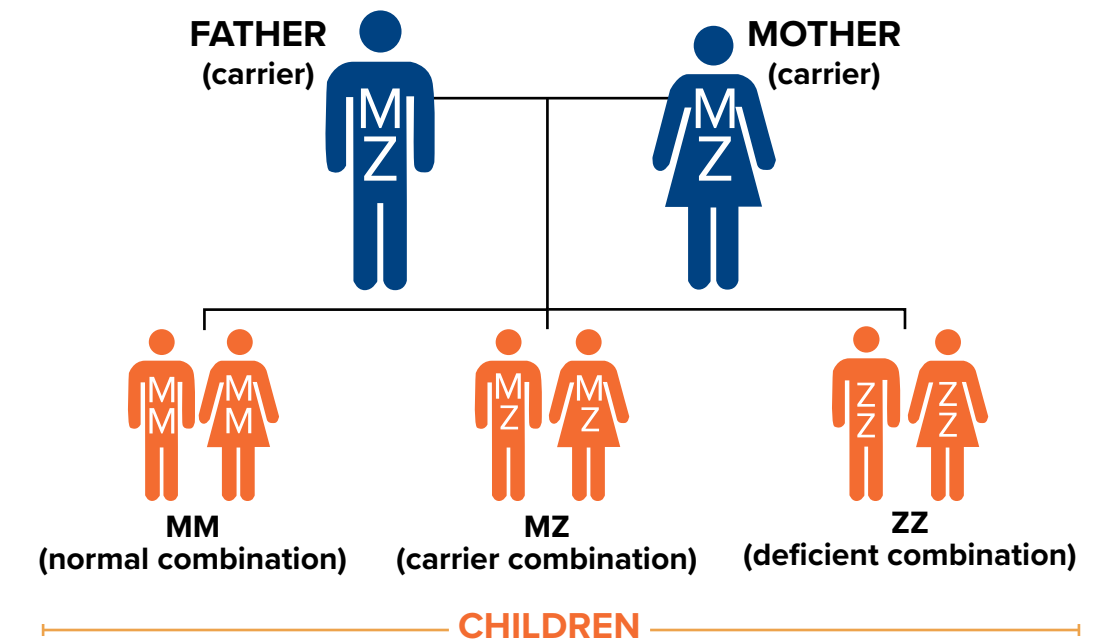
Pathophysiology of Genetic COPD

- AAT protects lung tissue from the proteolytic effects of proteases (especially neutrophil elastase and proteinase) released by activated neutrophils.
- The SERPINA-1 gene encodes AAT protein; mutations on this gene can lead to misfolded AAT proteins.
- Misfolded AAT proteins cannot leave the liver, resulting in build-up and causing damage.
- The resulting protease/antiprotease imbalance found in AATD may result in early-onset COPD and emphysema progression in adults.⁴



Pathophysiology of Genetic COPD

- Normal phenotype: “M” allele of SERPINA-1 on chromosome 14, which encodes AAT.
- “S” and “Z” are the most common alleles that lead to AATD. However, there are several other alleles associated with AATD. For example, the “null” allele may lead to no detectable AAT in the plasma.¹⁰
- >90% of people with AATD carry the “PiZZ” genotype, resulting in severe deficiency.^{4,5,11}



Normal (MM): No disease indication, no altered AAT genes, produces healthy protein.

Carrier (M/Z or M/S): Normally results in mild to moderate deficiency, one altered AAT gene, may develop disease symptoms.

Deficient (SS): Two altered AAT genes, no significant increased risk for disease.

Deficient (SZ or ZZ): Normally results in moderate to severe deficiency, increased risk for disease, two altered AAT genes.

Null: Can lead to no detectable AAT in the plasma.

Used with permission and adapted from: Alpha-1: Alpha-1 Foundation. (2019). Alpha-1 Antitrypsin Deficiency Healthcare Providers Guide. Coral Gables, FL. Retrieved 2022, from <https://www.alpha1.org/Alpha1/wp-content/uploads/2019/09/HealthcareProvidersBrochure.pdf>.

Clinical Presentation

The background of the slide is a complex, abstract composition. On the right side, a prominent, three-dimensional DNA double helix is rendered in a metallic blue color, spiraling upwards. The background is a gradient of light blue and white, overlaid with a pattern of semi-transparent hexagons. Several glowing, curved lines in shades of orange and yellow sweep across the lower half of the image, creating a sense of dynamic movement and energy.

Clinical Presentation of AATD

Symptoms can develop **at any age**. Clinical presentation alone cannot rule out or diagnose AATD; laboratory testing is needed.

Lung-related clinical presentations include:

- Shortness of breath/wheezing
- Chronic bronchitis
- Emphysema
- Recurring respiratory infections
- Reduced exercise tolerance
- Non-reversible airway obstruction
- Bronchiectasis
- Fatigue



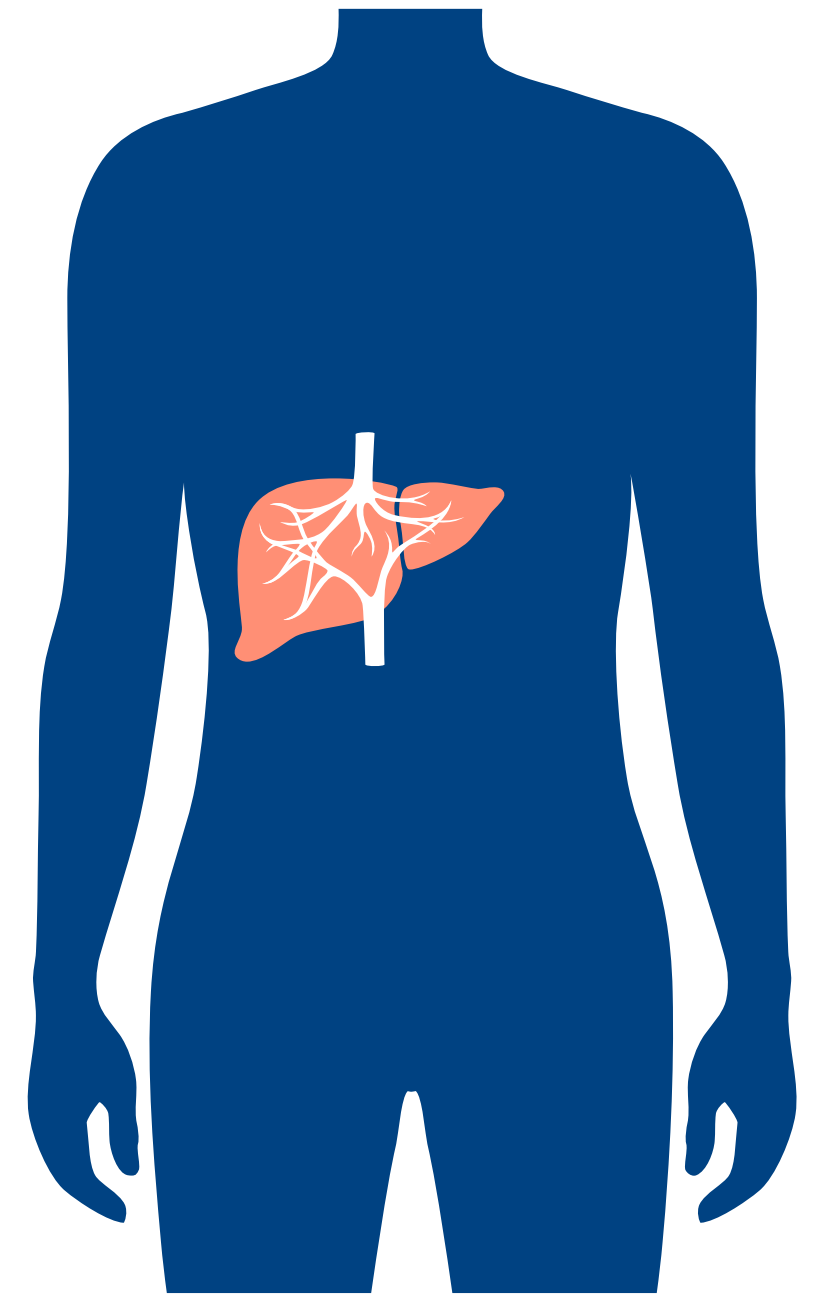
Clinical Presentation of AATD

Liver-related presentations include:

- Unexplained liver disease
- Jaundice (yellowing of skin/whites of the eyes)
- Ascites (swelling of the abdomen)
- Lower extremity edema (swelling)
- Hematemesis (vomiting blood)
- Unintentional weight loss

Other manifestations include:

- Panniculitis (painful bumps/nodules on the skin)
- Granulomatosis with polyangiitis

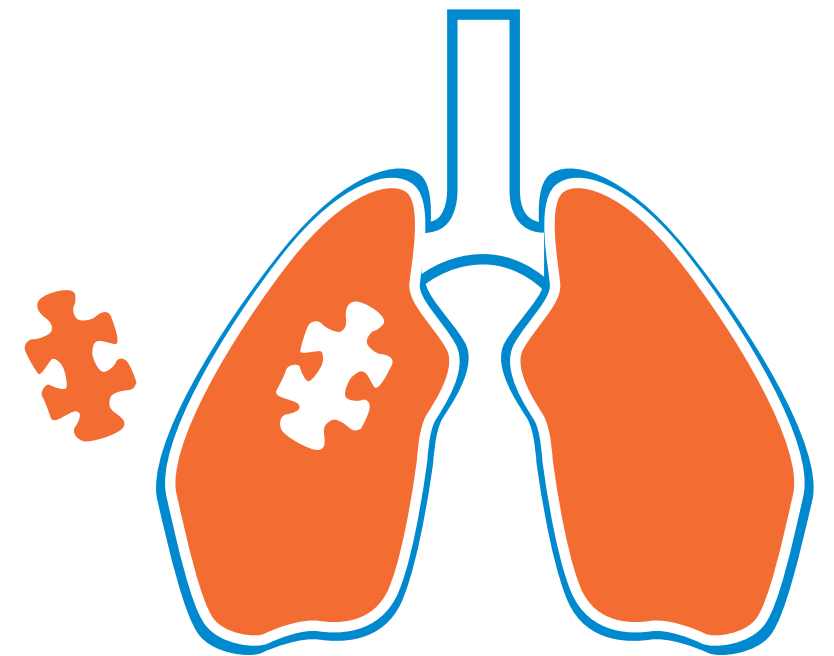


Early Detection, Screening, & Diagnosis

The background features a large, stylized DNA double helix on the right side, rendered in blue and green with a metallic sheen. The helix is set against a backdrop of glowing hexagonal patterns in blue and yellow. Several curved, glowing lines in blue, orange, and yellow sweep across the image, creating a sense of motion and scientific exploration.

Early Detection and Diagnosis of AATD

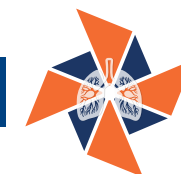
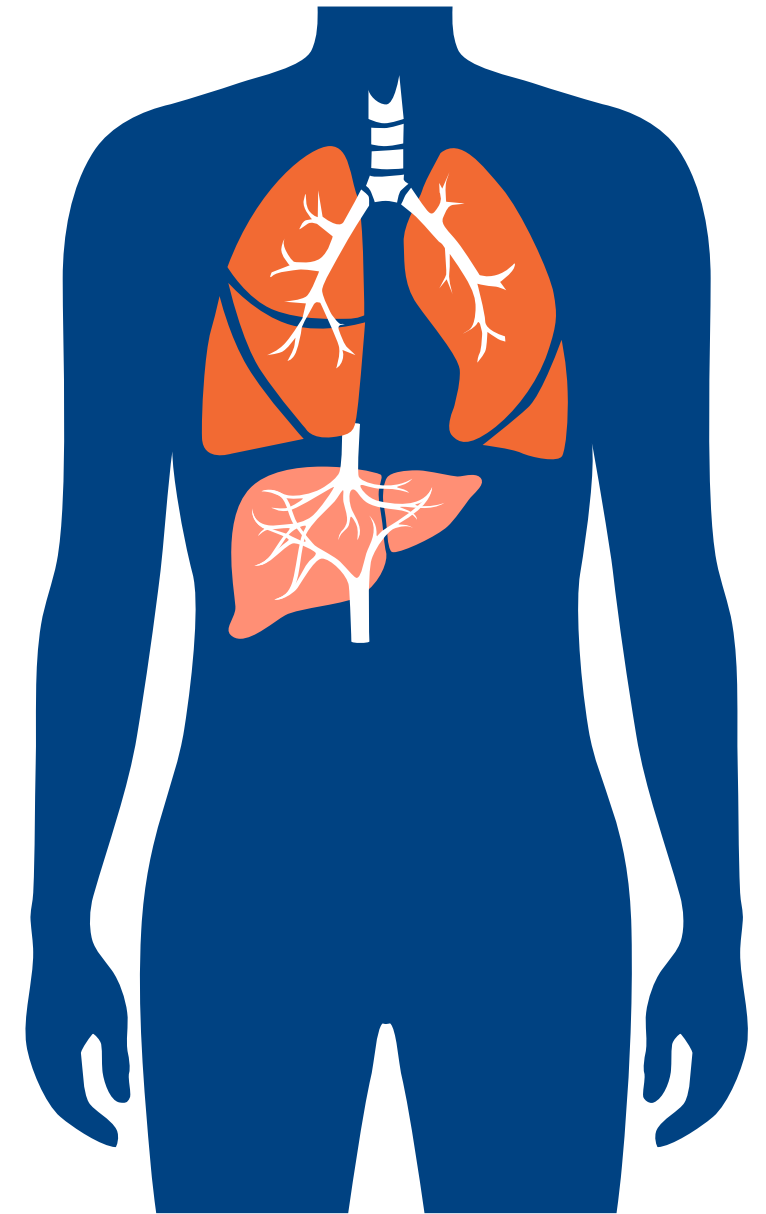
- Average time from symptom onset to diagnosis of AATD is 5-8 years.³
- Early screening, diagnosis, and treatment may lead to better patient outcomes.
- Those with COPD should be screened for AATD regardless of smoking history. **1 in 4 individuals with COPD have never smoked.**⁹



Who Should Be Tested?

Test **ALL INDIVIDUALS** with:⁷

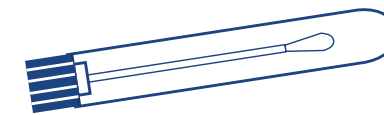
- COPD.
- Unexplained liver disease.
- Emphysema who are <50 years of age.
- Family history of AATD.
- Asthma without complete reversibility.
- Necrotizing panniculitis or granulomatosis with polyangiitis.
- Unexplained bronchiectasis.³
- Multiple family members with obstructive disease who lack typical risk factors.⁵
- Chest x-rays showing prominent basilar patterns.
- Obstructive airway disease, regardless of smoking history.



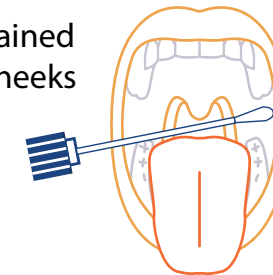
Diagnosis and Testing

- AATD cannot be diagnosed by clinical examination alone.
- Laboratory testing is required to obtain an accurate diagnosis of AATD.
- Individuals can be tested for AATD using a blood test or a cheek swab.
- You can order free test kits at www.alphaID.com

1 HCP provides sample swab kit



2 Saliva is obtained from both cheeks



3



Swab is sent via USPS to an independent lab

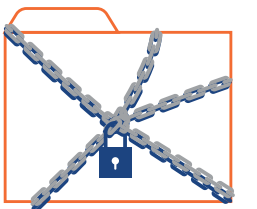
4

AlphaID tests for the 14 most common mutations leading to genetic COPD



5

Results are securely and confidentially reported to ordering clinician



6

Screening kits are free to your practice at www.alphaID.com!



The receipt of this free testing service does not create any expectation or obligation on your part to purchase or use any product or service offered by any manufacturer.



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Treatment & Management of Genetic COPD

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Disease Management/Treatment Options

For all individuals with a severe deficiency of AAT and clinical evidence of emphysema:

- Augmentation therapy – a weekly intravenous infusion of AAT protein from human blood plasma

In individuals with lung presentation:

- Medications: Long-acting bronchodilators, inhaled corticosteroids if indicated
- Oxygen therapy
- Pulmonary rehabilitation
- Volume reduction procedures: Lung volume reduction surgery, endobronchial valves

In individuals with liver presentation:

- Medications for symptom control
- Shunt
- Transplant (for severe disease)
- Avoidance of alcohol

In all individuals:

- Preventive vaccinations: Flu, pneumonia, COVID-19, hepatitis

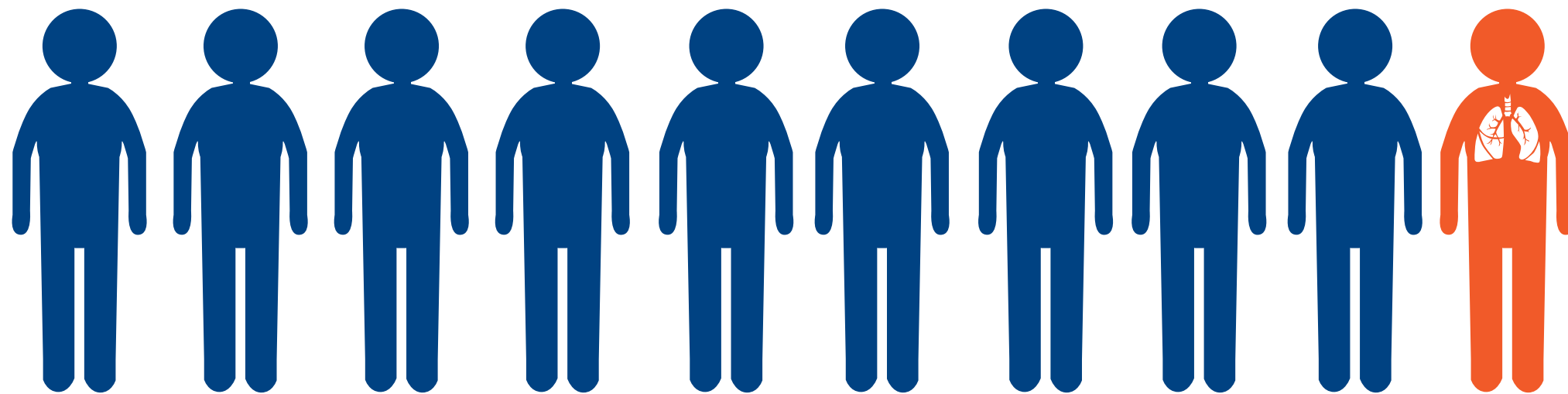
My Role as a Health Care Provider

The background of the slide is a complex, abstract composition. On the right side, a prominent, three-dimensional DNA double helix is rendered in a metallic blue color, spiraling upwards. The background is filled with a pattern of semi-transparent hexagons in various shades of blue and green. Sweeping across the scene are several glowing, curved lines in orange and yellow, creating a sense of dynamic movement and energy. The overall aesthetic is high-tech and scientific, typical of a presentation related to healthcare or biotechnology.

What is My Role as a Health Care Provider?

**Make AATD testing part of your initial COPD evaluation;
help find the missing 90%!**

Educate yourself and your staff about AATD! Increasing HCP awareness of AATD, symptoms, and treatments may help to improve patient outcomes, lead to faster diagnosis, and reduce health care costs.

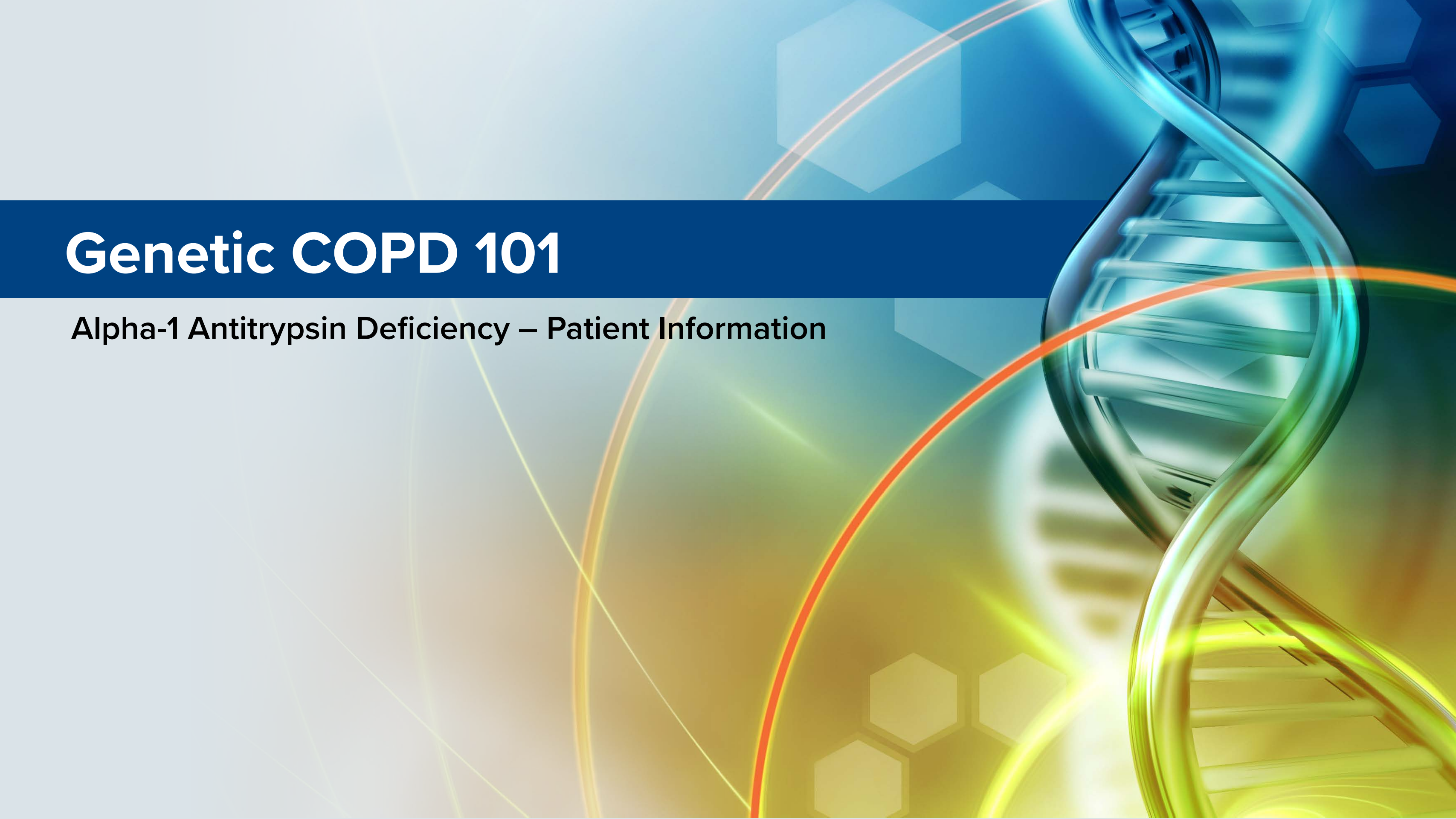


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Genetic COPD 101

Alpha-1 Antitrypsin Deficiency – Patient Information



Could My Lung Issues Be Passed Down To My Family?

Alpha-1 antitrypsin deficiency (AATD), sometimes called genetic COPD, is an often-underdiagnosed condition that is passed down in families. People with AATD have low levels of something called AAT (a protein) in their blood.

As many as 3% of all people with COPD may also have AATD and not know it.⁶

AATD is the most common hereditary (passed down) condition putting you at risk for emphysema and COPD.

Approximately 90% of individuals with AATD remain undiagnosed.³

Could I have Alpha-1 Antitrypsin Deficiency?



AATD symptoms are similar to COPD and can develop at any age; however, individuals with AATD often begin showing symptoms between ages 20 and 50.

Talk to your health care provider if you are experiencing:

Lung-related symptoms and conditions^{6,7}:

- Shortness of breath
- Wheezing
- Coughing
- Chronic bronchitis
- Emphysema
- Repeated respiratory infections, such as colds
- Reduced ability to exercise
- Fatigue (extreme tiredness)



Could I have Alpha-1 Antitrypsin Deficiency?

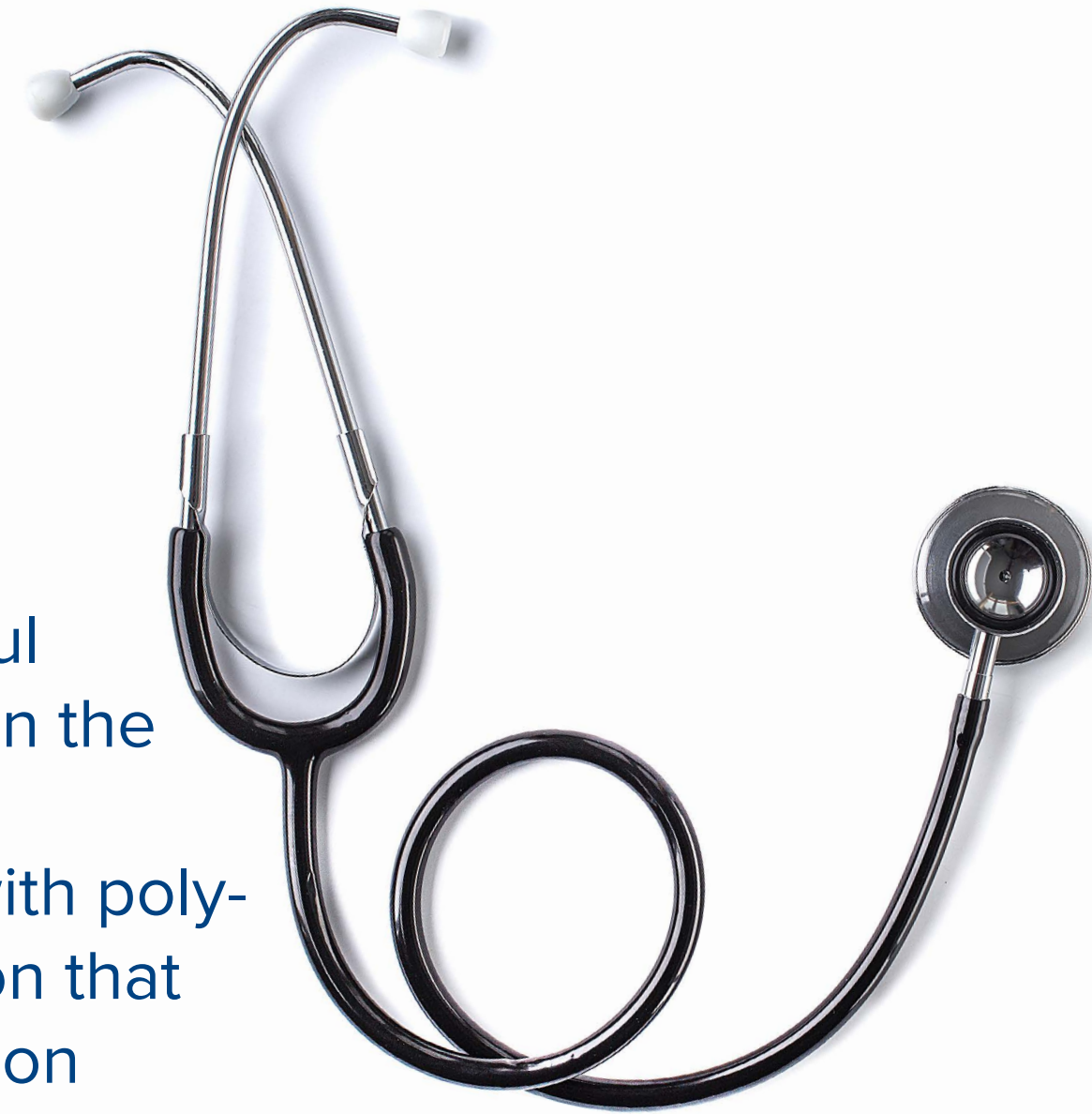
Talk to your health care provider about AATD if you have^{6,7}:

Liver-related conditions:

- Unexplained liver disease
- Jaundice (yellowing of skin/whites of the eyes)
- Ascites (swollen abdomen)
- Swelling of the legs and feet
- Vomiting blood
- Unplanned weight loss

Other conditions:

- Panniculitis (painful bumps, nodules on the skin)
- Granulomatosis with polyangiitis (a condition that causes inflammation of the blood vessels)



Who Should Be Tested For Alpha-1 Antitrypsin Deficiency?



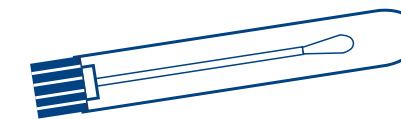
ALL people⁷:

- With a diagnosis of COPD or other airway diseases, such as bronchiectasis.
- With unexplained liver disease, regardless of age.
- With a family history of AATD.
- With non-reversible asthma (AATD is often diagnosed as asthma without proper testing).
- With necrotizing panniculitis or granulomatosis with polyangiitis.

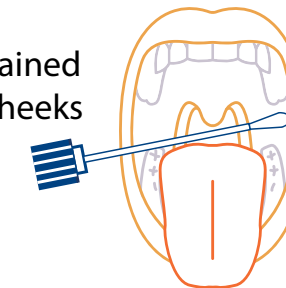
How Do I Get Tested?

- Your doctor cannot diagnose AATD just by doing a physical exam.
- Laboratory testing is necessary to get an accurate diagnosis of AATD.
- Doctors test for AATD using a cheek swab and/or a blood test.
- Patients can order test kits at www.AlphaIDAtHome.com and providers can order kits at www.alphaID.com.
- Contact your doctor's office to discuss insurance coverage and testing options that are best for you.

1 Administer sample swab kit



2 Saliva is obtained from both cheeks



3



Swab is sent via USPS to an independent lab

4

AlphaID tests for the 14 most common mutations leading to genetic COPD



5

Results are securely & confidently reported



6

Screening kits are free to patients and providers at www.alphaID.com!



I Have A Diagnosis of Alpha-1 Antitrypsin Deficiency. Now What?



Lifestyle changes may help reduce the symptoms of AATD and help you to stay healthy:

- Stop smoking and stay away from secondhand smoke, dust, and chemical fumes.
- Eat well, exercise regularly, and get 8 hours of sleep each night.
- Read labels for over-the-counter medications.
- Limit products containing alcohol and acetaminophen and talk to your health care provider about any vitamins or supplements that you are taking.

As with any new diagnosis, you may feel anger, fear, and anxiety. These are normal feelings. Speak to your health care provider about support group options in your area or other resources to help you stay healthy in mind and body.



I Have A Diagnosis of Alpha-1 Antitrypsin Deficiency. Now What?



While there is currently no cure for AATD, treatment is available.

General treatment measures^{6,7}:

- Tobacco cessation and prevention
- COPD management, including inhalers and patient education
- Oxygen
- Pulmonary rehabilitation (exercise training and health education)
- Medications
- Preventive vaccinations

In certain situations, augmentation therapy (IV delivery of AAT protein) is indicated. You will work with your health care provider to determine the best treatment options for you.



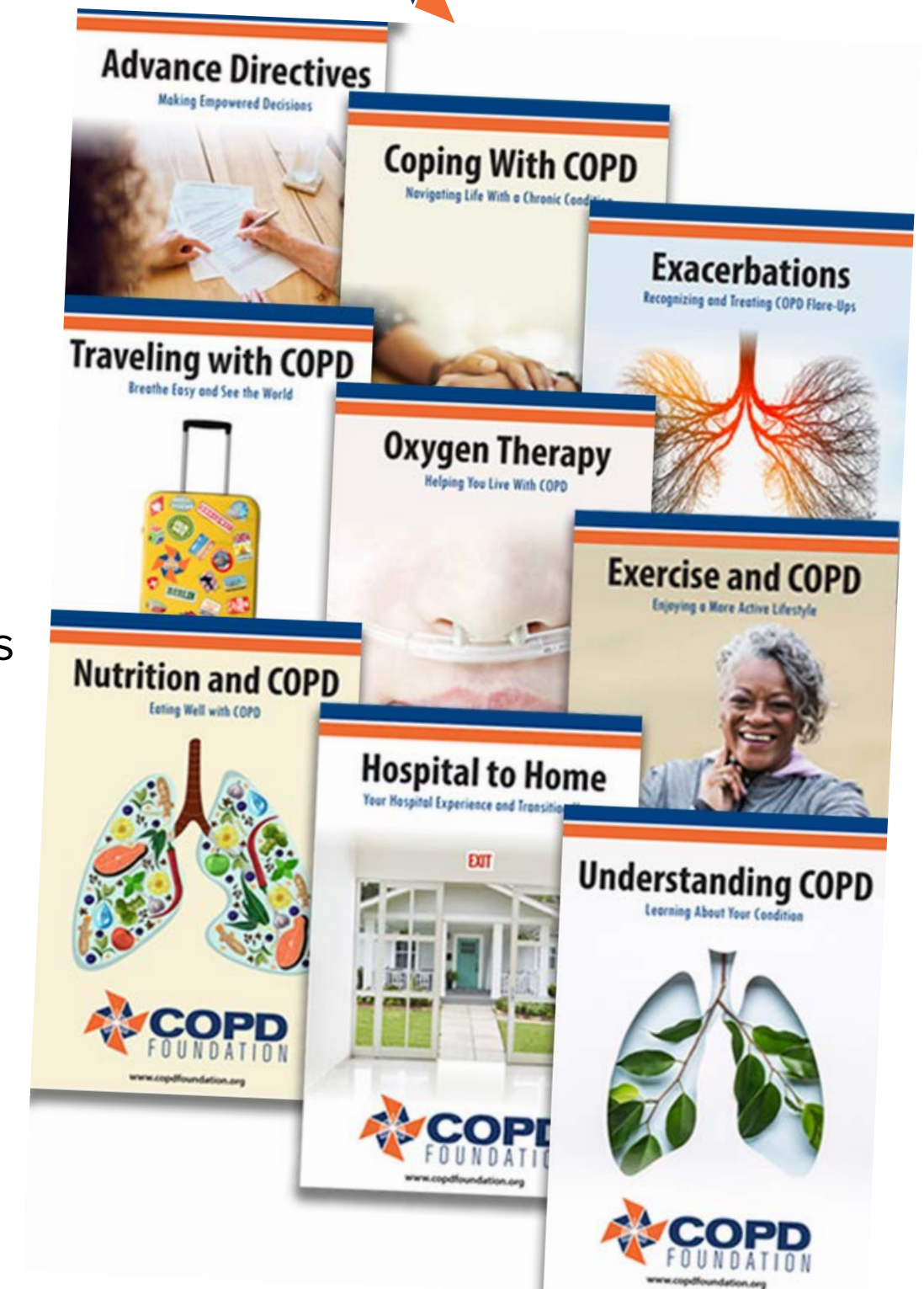
Additional Resources

The COPD Foundation invites you to check out our resources to help you learn more about COPD!

Guides for Better Living: Learn about different aspects about COPD, including how to cope with symptoms, therapies to improve your quality of life, and how to recognize flare-ups. <http://copdf.co/education-materials>

COPD360social: Connect with others on the COPD journey, share thoughts and ideas, and ask questions to both peers and clinical experts in our specialized online community. <http://copdf.co/COPD360social>

Download our COPD Pocket Consultant Guide app (free for both [Android](#) and [iOS](#)) to develop an individual COPD action plan, get prompts and reminders for your next office visit, and much more.



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