Pi ZZ Alpha 1 Antitrypsin Deficiency

Introduction
This leaflet is written for people with alpha 1 antitrypsin deficiency (α1AD) of the Pi ZZ type.

What is α1 antitrypsin (α1AT)?
α1AT is a chemical made in the liver that circulates in your bloodstream.

Why is α1AT important?
α1AT protects lung tissue from an enzyme (elastase) released by white blood cells. Elastase fights infection in the lungs. However if not tightly controlled by α1AT, elastase can attack healthy lung tissue.

What is α1AD?
Individuals with α1AD have very low levels of α1AT in their bloodstream.

What causes α1AD?
Our ability to make α1AT is inherited through genes passes on by both parents. One of these genes is known as Protease Inhibitor (Pi). It is this gene that makes the α1AT.

How is it inherited?
We all have two Pi genes. We inherited one gene from our mother and the other gene from our father. When a couple has a child they each pass on one of their Pi genes.

What are the different genetic types?
There are more than 100 different variants of the Pi gene. Most variants result in normal levels of α1AT in the blood, but some result in reduced levels or no α1AT. The most common variants are called M, S and Z.

Most people have two copies of type M variant (written as PiMM) and have normal levels of α1AT in the bloodstream.

Pi ZZ
Type Z results in low levels of α1AT in the bloodstream. Someone with two Z variants (Pi ZZ) has α1AD.

What are the effects of having α1AD?
The effects of the deficiency are varied: some people remain entirely healthy.

Lung disease: Adults are at increased risk of developing breathing difficulties from disorders such as emphysema and chronic obstructive pulmonary disease (COPD), particularly if they smoke. Some symptoms include shortness of breath, wheezing and recurrent chest infections. It is recommended that everyone in the UK with COPD is tested for α1AD.

Liver problems: α1AT is made in the liver. In people with Pi ZZ the α1AT accumulates in the liver

and can cause problems, however most people do not develop serious liver problems. Some newborns with Pi ZZ develop jaundice or cholestasis and the vast majority recover. A smaller number of people develop liver problems after the age of 18.

Skin problems: α1AT can also cause a rare skin problem, panniculitis, associated with painful red lumps and patches on the skin which can be treated with steroids.

What can people with α1AT do to look after their health?

1. Avoid smoking and passive smoking. Smoking attracts white blood cells to the lungs, and speeds up the development of lung disease. Other lung irritants e.g. dust particles and certain chemicals should be avoided where possible

2. Be referred to a specialist centre for α1AD for regular monitoring. See your GP for early treatment of lung infections or breathing problems or if you are concerned about any symptoms mentioned in this leaflet

3. Drink alcohol only in moderation and exercise regularly

How common is α1AD?

Around 1 in 2500 people in the UK have α1AD.
Most people with α1AD have two Z variants (Pi ZZ). Around 1 in 10 people are carriers for the S or Z variant (4% (1 in 25) of Northern European population carry Z and 6% (1 in 17) carry S).

Is there a treatment for α1AT deficiency?

General measures: If you have lung problems, your doctor may prescribe medicine to help your lungs function such as inhalers. If you have asthma, it is especially important to control it.

You should call your doctor at the first sign of a chest cold or other chest infection, since white blood cells come into the lungs to fight these infections. Your doctor may want to vaccinate you against influenza, COVID and pneumonia.

Your doctor may want to recommend an exercise plan, or pulmonary rehabilitation (support to help you breath). Many people are helped by involvement with support groups, such as the one at The Queen Elizabeth Hospital Birmingham.

Special treatment: Augmentation therapy is now possible, which boosts the level of α1AT in your blood. While this treatment is potentially exciting, is not yet available on the NHS.

Augmentation must be given directly into a vein at regular intervals. Research continues to carry out careful clinical studies to determine whether or not augmentation is important in treatment.

What is augmentation?

Augmentation is a concentrated form of AAT purified from human blood. It is normally given once a week. It increases the AAT in your blood to levels that may help to protect your lungs. There is no form of the product that you can take by mouth.

Augmentation is not a cure, and it cannot reverse the lung damage that already exists. It does not treat or prevent liver problems.

The safety record with administration of augmentation has been excellent. In particular, there have been no reports of getting an infection from it. The part of the blood used to make

augmentation has been rigorously tested to ensure that there is no risk from viruses such as hepatitis B.

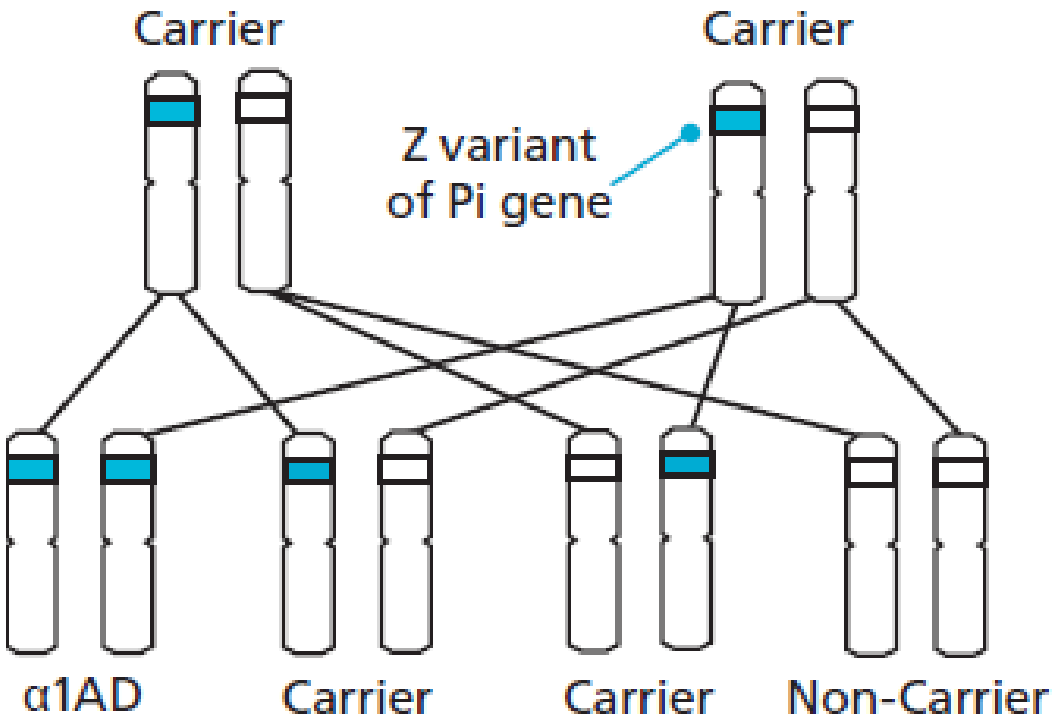
There are no exact alternatives to augmentation but non-specific treatments such as inhalers or (if necessary) lung transplant can be considered for any patient with emphysema (long term lung disease).

Will my children have α1AD if I am a carrier?

If your partner is not a carrier you will not have a child with α1AD. Your children will each have a 50% chance of being a carrier.

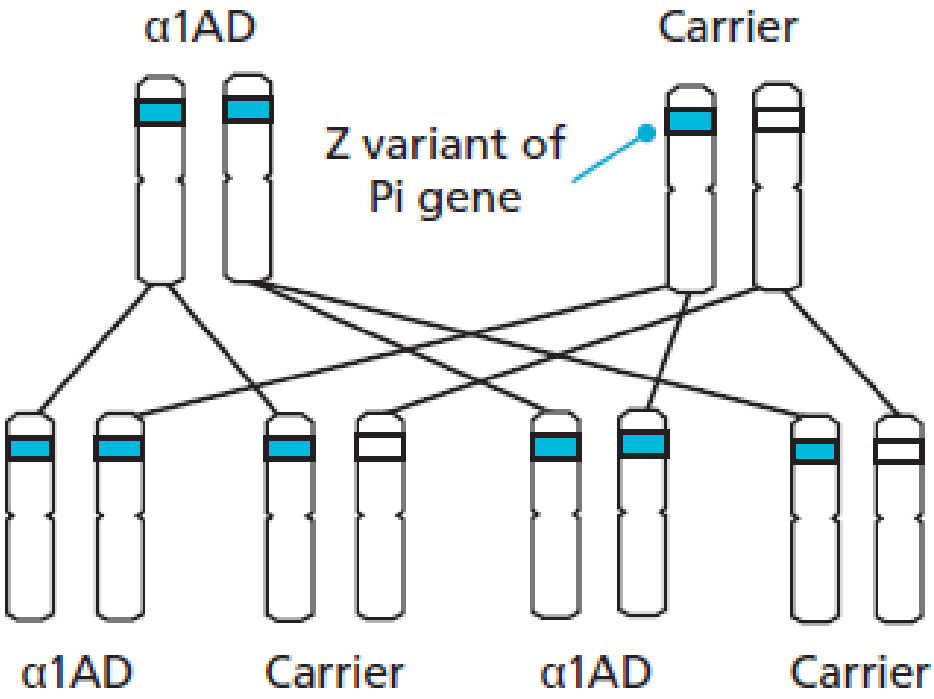
If your partner is also a carrier (Pi MZ) there will be three possible outcomes in each pregnancy.

1. 1 in 4 (25%) chance you will both pass on the Z variant so your child will have α1AD
2. 1 in 2 (50%) chance one of you will pass the Z type and the other will pass the normal variant so the child will be a carrier of α1AD
3. 1 in 4 (25%) chance neither of you will pass on the Z variant so your child will not be a carrier of α1AD



Will my children have α1AD if I have it?

If your partner is not a carrier you will not have a child with α1AD. All your children will be carriers. If your partner is a carrier your children will have a 50% chance of being a carrier and a 50% chance of having α1AD.



Not everyone with low levels of α1AD will develop significant health problems. Genetic testing will not indicate whether or not liver or lung problems will develop in the future.

Further information

Alpha-1 UK Support Group
Email: **info@alpha1.org.uk**
Web: **www.alpha1.org.uk**

Alpha-1 Awareness UK
www.facebook.com/groups/alpha1awareness.uk

*With thanks to the Clinical Genetics Unit,
Birmingham Women's NHS Foundation Trust

If you need more advice about alpha 1 antitrypsin deficiency please contact:

Alpha-1 Specialist NHS Service/ADAPT Project
Lung Function and Sleep Department
Level 0, Outpatients Area 3
Queen Elizabeth Hospital Birmingham
Mindelsohn Way, Edgbaston
Birmingham B15 2GW

Tel: 0121 371 3885
Email: ADAPT@uhb.nhs.uk
Website: www.uhb.nhs.uk/services/respiratory-medicine/alpha-1-antitrypsin-deficiency-aatd.htm

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