Find out how this EU project is using computer models to improve the treatment of airway diseases.
What problems are currently faced by people with asthma and COPD?

Airway diseases affect the lives of over 500 million people around the world. Diseases such as asthma and chronic obstructive pulmonary disease (COPD) can cause symptoms such as wheezing, coughing and breathlessness.

Current methods to treat these diseases do not always take into account the characteristics that make a person unique. New treatments are frequently being introduced, which makes it even harder for doctors to select the best treatment to meet an individual’s need.

Introducing AirPROM

The AirPROM project is working to help doctors choose which therapies will be most effective for each individual.

By developing digital models of the lungs, the project will help scientists look at how air flows through the airways in people with asthma and COPD. They will be able to use these models to test new treatments to see how the airways of different people respond to each treatment.

The overall aim of the project is to develop more personalised treatments to help improve the lives of people with asthma and COPD.

How will they do this?

Researchers will carry out a range of investigations including: blood tests to look at DNA; gathering information from cells in the airways using a special camera known as a bronchoscope; lung function tests; and CT and MRI scans to take pictures of the lungs to help make models of the airways. These results will be combined to generate digital models of the lungs.
How is AirPROM unique?

The topic of personalised, or tailored, medicine is increasingly becoming a key area for researchers to focus on. The AirPROM project is part of this field of research but it is also unique in both its approach to collecting data and the large amount of data that will be used.

It is common for research studies to categorise patients by simply looking at the positive and negative results of particular tests they have taken such as blood tests and breathing tests. The AirPROM project is using a new mathematical process to group patients by linking together results from a number of different tests. These tests provide researchers with detailed information on a range of elements such as the person’s genes, tissues and proteins, which builds up a picture of the whole person.

In addition to using this technique, the AirPROM project combines several different areas of analysis, including imaging and genetic analysis, to help look at a person as a whole.

What will this mean for people with airway conditions?

John Green, who has severe asthma and has taken part in the AirPROM, says:

“The AirPROM project has the potential to make a tremendous difference to people with airway diseases. By gaining a full understanding of how asthma affects each person, the findings have the potential to give people a better quality of life by providing the best treatment for that person. When the results of the AirPROM study are put into practice, people will be able to understand their asthma better and therefore be in a better position to decide which treatments will be most beneficial for them. They will also find it easier to work out coping strategies, for example through exercise. When people receive the best treatment and are able to combine that with a positive attitude, they can more easily achieve their goals, despite their condition.”
Meet the project lead

Professor Chris Brightling is Wellcome Senior Research Fellow and Clinical Professor in Respiratory Medicine at the University of Leicester in the UK.

In addition to carrying out clinical research, Professor Brightling spends time in the laboratory working to understand the underlying biology of different airway diseases.

“Current treatments for COPD and asthma adopt a ‘one size fits all’ approach. People with these respiratory diseases are therefore missing out on the right treatment to help them manage their condition.

“When you are working on a disease topic in a laboratory, it can often be difficult to see how each discovery fits the bigger picture of the disease. It’s similar to finding pieces of a jigsaw but not seeing the whole picture. The AirPROM project is aiming to bring all the pieces of a jigsaw together. As project lead, I am overseeing a range of experts working on different areas of the project from genetics, to physics, to IT specialists; all working on different elements of data collection and analysis to enable us to test new treatments and improve the quality of life for people with airway diseases.

“By using these novel approaches to research we can develop new patient-specific digital models that will enable us to monitor a disease and how it progresses. Now is the time to bring together medicine and technology to change the way we diagnose patients.”

Further information

For more information on the EU-funded AirPROM (Airway Disease Predicting Outcomes through Patient Specific Computational Modelling) project, visit the website and watch the video: www.airprom.eu