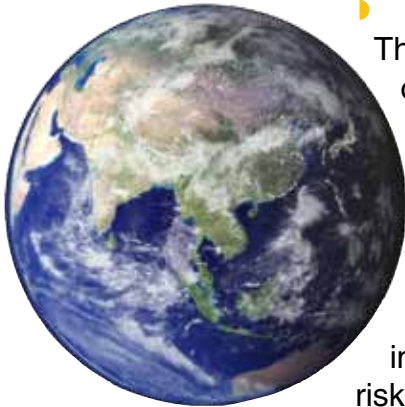




## Climate change and the lungs

*“Are you ready for climate change? Remember that hotter temperatures will mean that allergy seasons start earlier and last longer. Some very hot days will produce unpleasant peaks in pollution, especially for anyone with a lung problem. This factsheet aims to help you prepare for climate change and suggests simple actions to help moderate its worst effects.”*



### What is known about climate change?

The world's leading scientists are clear that the global temperature on Earth is gradually rising. If action isn't taken, temperatures are expected to increase by 1.8 – 4.0°C by 2100.

European governments are now taking action to try to ensure that temperatures do not increase by more than 2°C. However, even if efforts are effective, a certain amount of climate change is unavoidable. We must be prepared for the effects, which may include: extreme weather conditions, increased air pollution, greater risk of flooding, higher temperatures and changes in the seasons.

### What causes climate change?

The natural 'greenhouse effect' of certain gases in the lower atmosphere traps heat from the sun and warms our planet enabling it to support life. Global 'greenhouse gas' emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) have grown since pre-industrial times, with an increase of 70% between 1970 and 2004. This is very likely to be the cause of an increasing greenhouse effect and increases in global temperature since the mid-20th century. We all add to the concentration of greenhouse gases by:



1. Burning fossil fuels to generate electricity



2. Driving vehicles



3. Disposing of waste inappropriately

### Will climate change affect my health?

The World Health Organization (WHO) has warned that *“There is now a strong scientific consensus that global warming will affect, in profoundly adverse ways, some of the most fundamental determinants of health: food, air and water”*. Climate change will affect people in different ways. In Europe, the most vulnerable regions are the Arctic mountain areas, coastal zones and the Mediterranean. The WHO has already identified the effects that higher temperatures, rising sea levels and further melting of ice, snow and frozen ground will have on health. Extreme weather events will become more common and are expected to affect food productivity, water quantity and quality, air quality, and the distribution of plants and animals. These harmful effects are not necessarily new, but climate change is expected to make them much worse. It is the most vulnerable people who will suffer, in particular children, the elderly, the poor and, most importantly, those already suffering from illness and those who do not have access to healthcare systems.

**▶ The effects of climate change:**

- Increased heat-wave-related health impacts and exposure to UV radiation.
- Continued cold-related health effects, due to disrupted energy supplies.
- Increased flood-related health impacts, such as drowning, respiratory diseases, mental health effects, water-borne and food-borne diseases as water and sanitation supplies are disrupted.
- Drought-related health effects, such as malnutrition as crop production decreases.
- Changing food-borne disease patterns, as food contamination is more likely with increasing temperatures.
- Increase of infectious diseases and their changing distribution, with tropical and subtropical diseases becoming more common in Europe.
- Increased waterborne diseases, where water, sanitation and personal hygiene standards are low.
- Increased respiratory diseases and allergies, due to higher concentrations of ground-level ozone, particulate matter and changes in pollen distribution.

**▶ Will climate change affect my lungs?**

The main lung conditions that may be affected by climate change include:

- asthma
- chronic obstructive pulmonary disease (COPD)
- rhinosinusitis
- respiratory tract infections

	Effects of climate change	How will this affect the lungs?	What can we do about it?
<b>Extreme temperatures</b>	<p>Summer heat waves</p> <p>Fewer cold spells</p> <p>For extreme weather warnings see: <a href="http://www.meteoalarm.eu">www.meteoalarm.eu</a></p>	<p>Increased hospital admissions and deaths in COPD patients, the elderly and those who live in poor housing conditions.</p> <p>Milder winters may actually see fewer deaths from lung diseases. However, rare extremely cold spells may encourage lung infections and worsening COPD symptoms.</p>	<p>Doctors should offer advice on care and how to change medication during hot weather.</p> <p>During hot spells, people will need to change their daily routine and make sure that they drink more fluids.</p> <p>Buildings can be designed to be cooler. However, systems such as air conditioning contribute to global warming and so other alternatives should be investigated.</p>
<b>Changes in air pollution</b>	<p>Air pollution changes depending on the weather. Increased temperatures will cause higher ozone levels.</p> <p>Forest fires will increase particles known as polycyclic aromatic hydrocarbons (PAH) and other toxins in the air.</p> <p>For air pollution warnings see: <a href="http://www.knowyourairforhealth.eu">www.knowyourairforhealth.eu</a></p>	<p>Higher levels of ozone and fine particles will make it more difficult to breathe and wheezing is likely. Acute asthma attacks may rise.</p> <p>Higher levels of pollutants are likely to cause more respiratory symptoms and reduced lung function, particularly in asthmatics, the elderly, children and individuals with chronic respiratory conditions.</p> <p>Respiratory death will occur more often in adults. A total of 350,000 deaths per year in the EU have already been attributed to air pollution.</p>	<p>To avoid heat and pollution, people, particularly vulnerable groups, will need to spend less time outside.</p>

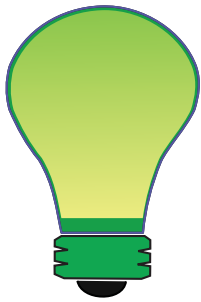
<p><b>More rain and flooding</b></p>	<p>More flooding will mean that people will have to evacuate their homes more often. This may mean moving into worse living conditions, with poor water quality, poor nutrition and limited access to medical care.</p> <p>More rain and flooding will mean that housing will be damper and that house dust mites and moulds will grow more quickly.</p> <p>For flood warnings see: <a href="http://www.meteoalarm.eu">www.meteoalarm.eu</a></p>	<p>Respiratory infections such as pneumonia will be more likely to occur in temporary living conditions.</p> <p>Damp conditions cause coughing and wheezing and have been related to asthma. Mould spores cause or aggravate asthma and rhinitis.</p> <p>Dust mites are more likely to thrive in altered indoor conditions and can cause asthma and allergies.</p>	<p>People should try to take precautions and protect their homes as much as possible against flood damage.</p> <p>Dust mite populations and moulds can be controlled by improved hygiene, housing design and by incorporating environmental control.</p>
<p><b>Higher temperatures and more thunderstorms</b></p>	<p>Higher temperatures will mean that plants will grow in different areas, leading to a change in pollens. Levels of outdoor mould are also likely to increase.</p> <p>During thunderstorms there is usually a sudden drop in temperature and an increase in ozone levels.</p> <p>For pollen warnings see: <a href="http://www.polleninfo.org">www.polleninfo.org</a></p>	<p>People will be exposed to different allergens, e.g. increased outdoor moulds, grass pollen and wet air fungal spores from thunderstorms, which may cause more asthma and allergic rhinitis (hayfever).</p> <p>Epidemics of asthma have been linked to thunderstorms. Droplets of water (rain) which carry the pollen are split into smaller droplets that can be inhaled.</p>	<p>People's activities will need to change. For example to avoid heat and pollution, people, particularly vulnerable groups, will need to spend less time outside.</p>
<p><b>Changes in seasons</b></p>	<p>Increasing temperatures will result in hotter summers and warmer, shorter winters.</p> <p>Droughts will be more common.</p> <p>For infectious disease warnings see: <a href="http://www.ecdc.eu.int">www.ecdc.eu.int</a></p>	<p>The frequency of some lung infections will change:</p> <ul style="list-style-type: none"> <li>• Tropical infections may be seen in Europe.</li> <li>• The spread of bird flu may be affected in unpredictable ways as bird migration changes.</li> <li>• Some respiratory infections seen in the winter months may decrease.</li> </ul>	<p>The changes in infections need to be monitored and appropriate actions taken at the global level.</p> <p>More than just the vulnerable groups will be at risk.</p>

## What is needed in the future?

Most of the information provided in this factsheet is based on the limited information currently available. Much research is needed to assess the impact that climate change will have on lung health and health in general, so that people can be prepared. Other actions that can be taken include:

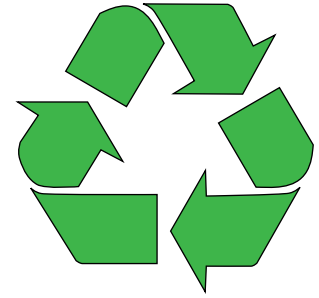
- Advanced warnings of poor air quality.
- Educate doctors and nurses on the risks that climate change has on the lungs so they can advise patients what to do in the event of extreme temperatures.
- Doctors should set a general example by trying to reduce their carbon footprint. This will encourage others to do the same (<http://actonco2.direct.gov.uk/>).
- Organisations should address the implications of global climate change and inform citizens.





## How can you help?

1. Improve insulation in your home and keep your house well ventilated to prevent mould.
2. Use low-energy light bulbs and switch them off when leaving the room.
3. Turn off computers, TVs and other appliances when not in use.
4. Reduce your carbon footprint: walk or cycle more - use the car less! Use public transport more often and fly less frequently.
5. Use air conditioning and water coolers less.
6. Share lifts to school with friends and neighbours.
7. Implement the "Three Rs principle": Reduce, Recycle, Re-use!



The impact of climate change on people with lung diseases will vary depending on how much temperatures rise relative to today, the risk of flooding and excessive rainfall, as well as the impact of those changes on other health-relevant factors such as air pollution, allergens and moulds. Planning for the long term is vital. People must learn to adapt far beyond just responding to extreme events. Consequently, diagnostic tools and clinical treatments need to be adjusted with time and clinicians need to be made aware of changing patterns of disease that will occur in response to changing environmental conditions. This requires better disease surveillance and warning systems.

## Useful links

1. The Health and Environment Alliance - [www.env-health.org](http://www.env-health.org)
2. World Health Organization - [www.who.int/globalchange/climate/en](http://www.who.int/globalchange/climate/en)
3. Know Your Air for Health (including early warning systems) - [www.knowyourairforhealth.eu](http://www.knowyourairforhealth.eu)
4. European Commission Climate Change - [http://ec.europa.eu/environment/climat/home\\_en.htm](http://ec.europa.eu/environment/climat/home_en.htm)
5. CO<sub>2</sub> calculator, make simple changes to help tackle climate change - <http://actonco2.direct.gov.uk>
6. The Intergovernmental Panel on Climate Change - [www.ipcc.ch](http://www.ipcc.ch)

## Information source

The information in this factsheet has been based on a Climate Change position paper produced by the ERS Environment committee. Some of the information about climate change has been taken from the World Health Organization (WHO) website.

Co-funding, and production and content support for this publication have been provided by the Health and Environment Alliance (HEAL; <http://www.env-health.org/>), through DG Environment, European Commission.