

Climate change and respiratory disease

What the European Respiratory Society, ERS, says
needs to happen in an era of climate change



UN expert appeals for an opportunity to be seized

“The link between climate change and human health has become even clearer over the last two to three years. Rising temperatures and ozone will lead to an increase in the burden of disease ranging from airway injury and inflammation to acutely decreased lung function.

Without significantly increased action on climate change [these] effects will worsen... but there is still a window of opportunity for concerted action that will prevent the most catastrophic impacts.”

From the statement by Yvo de Boer, Executive Secretary of the United Nations Framework Convention on Climate Change on accepting the prestigious “ELF award” at the ERS annual congress, Vienna 2009

Respiratory diseases – a leading cause of death in Europe

Respiratory diseases are second to cardiovascular conditions in terms of mortality, incidence, prevalence and costs. The biggest contributors to respiratory death in Europe are lung cancer, pneumonia and chronic obstructive pulmonary disease (COPD). Worldwide hundreds of millions of people suffer every day from chronic respiratory ill-health. According to WHO global estimates, 300 million people have asthma, 210 million people have COPD while millions more have allergic rhinitis and other, often under-diagnosed, chronic respiratory conditions.

Climate change is likely to have mostly adverse effects on health. These findings have been well described by the International Panel on Climate Change (IPCC) and the World Health Organization (WHO). In Europe, as elsewhere, deaths from chronic respiratory and lung conditions are expected to increase in the future if adequate policy responses to climate change are not taken.

Climate change and respiratory disease

Future health threats arising from climate change in Europe are likely to be substantial. The Earth's climate will change due to a rising atmospheric concentration of greenhouse gases (GHG) and this will affect human respiratory health through:

- 1. An increased number of deaths and acute morbidity especially among respiratory patients due to heat waves**

For every one degree Celsius rise in temperature, the risk of premature death among respiratory patients is up to six times higher than in the rest of the population.
- 2. An increased frequency of cardio-respiratory attacks due to higher concentrations of ground-level ozone**

Ozone is a powerful oxidant that has been associated with persistent structural airway and lung tissue damage, as well as contributing to more severe symptoms of asthma and an increase in respiratory hospital admissions and deaths in Europe and the USA. It is estimated that there will be 1,500 more annual ozone associated deaths by the year 2020 in the UK alone.
- 3. Changes in the frequency of respiratory disease due to transboundary long-range air pollution**

Desertification and higher frequency of forest fires may increase transboundary transport of particles which is linked to increased symptoms and reduced lung function in asthmatic children, and higher mortality in adults including lung cancer deaths.
- 4. Altered distribution of allergens and some infectious disease vectors**

An increased pollen season will result in increased respiratory allergic reactions in sensitised individuals, and plant habitat changes will expose previously unexposed populations meaning that some individuals will be newly sensitised.

Protecting citizens from the health impacts of climate change

The ERS Position Statement on climate change and respiratory disease was published in the European Respiratory Journal, ERJ, see: <http://erj.ersjournals.com/cgi/content/full/34/2/295>

The ERS key findings and recommendations on climate change effects on respiratory health are:

Extreme temperature events

In Europe, an increase in frequency and intensity of summer heat waves is expected. These will contribute to the burden of disease and premature deaths, particularly in population subgroups such as the elderly and patients with chronic obstructive pulmonary disease (COPD).

SUGGESTED ACTIONS

- Expand capacity to manage the increase in frequency of extreme temperature events, e.g. by changing the building design and introducing alternative energy-efficient approaches to heating and cooling indoor air, as well as behavioural changes at home.
- Expand capacity to manage the expected longer term changes through better disease surveillance and warning systems.
- Strive to provide locally-appropriate, early warnings and information campaigns targeted at vulnerable groups (people suffering from lung disease, the elderly etc.)

Air pollution

Increases in air pollution (ozone, particles, and compounding effects of air pollution and temperature) will have significant public health consequences. Climate change is expected to alter the concentration and distribution of pollutants in the atmosphere. Most projections have focused on changes in ground-level ozone, which could have important health consequences, especially for those suffering from chronic respiratory diseases.

SUGGESTED ACTIONS

- Evaluate climate change mitigation and adaptation strategies with regard to their impact on air quality. Evidence is emerging that increasing temperature can amplify the adverse effects of poor air quality.
- Step up advance warnings of adverse weather conditions to strengthen the capacity of health systems.
- EU air quality standards and legislation should be based on the international WHO Air Quality Guidelines (2006).



Allergens and allergic responses

Increased temperatures in more northerly latitudes will permit the spread of certain plant species to larger areas, thus exposing new populations to novel allergens. A combination of an increase in allergens together with rising ozone levels will result in more severe symptoms in asthma and allergic rhinitis patients. Climate change is likely to bring an increase in thunderstorms, which are known to be associated with outbreaks of asthma caused by allergen exposure.

SUGGESTED ACTIONS

- Collect prospective data relevant to how changes in pollen distribution and resulting allergen sensitisation are affected by climate change.
- Provide regular, updated information about the spread of allergens, and timely alerts to populations at risk.

Respiratory infections

The geographical occurrence of some respiratory infections may increase. For example, while Chikungunya insect borne virus infection had been identified only in tropical areas, recent outbreaks in Italy may have been influenced by higher temperatures that permitted the vector to thrive. There are many gaps in this knowledge, many of which will only truly become clear as climate change advances, which may be too late for some situations.

SUGGESTED ACTIONS

- Promote alerts on any increasing susceptibility to infections that may be due to climate change.

The above factors show that the human health effects of climate change such as those from respiratory disease must be taken into account in any legislation or policy on climate change.



Future research needs

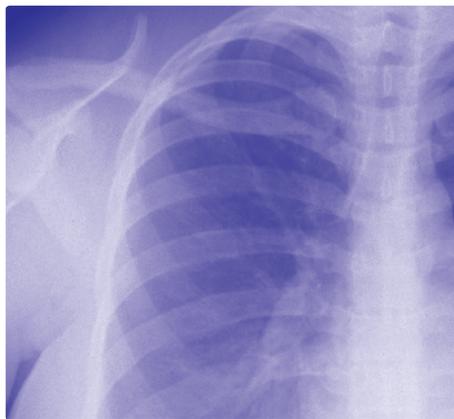
More quantitative research on how climate change affects respiratory health is needed. The complexity of the issues surrounding climate change and respiratory health requires coordination and collaboration across research disciplines.

- **Research is needed into the improvement of predictive models** supplemented by continuous prospective measurement and assessment on health and climate change.
- **Systems to monitor changes in allergen concentrations in the air** and how they might affect susceptibility.
- **The need for long-term data sets on the incidence and prevalence of respiratory diseases** as well as social and environmental factors.

ERS role in fighting climate change

Respiratory doctors have a distinguished history in combating major public health concerns, such as air pollution, tobacco use and exposure, as well as occupational health hazards, e.g. asbestos. They are well placed to play an important role to:

- Ensure that respiratory health effects of climate change are considered in all discussions and recommended actions at EU-level to protect the health of children, the elderly, and other vulnerable populations such as those with chronic respiratory diseases.
- Support sustainable policy changes that could reduce GHG emissions.
- Emphasise the links between climate change and air quality and support ongoing review of current ambient air quality standards.
- Educate healthcare professionals and patients on the impact of climate change on respiratory health.
- Support the need for more evidence-based research in the field of respiratory health and climate change.
- Disseminate best practice in tackling the effects of extreme weather events on respiratory health.



The ERS is a not-for-profit, international and medical organisation with more than 9000 members in over 100 countries representing medical and scientific experts in the field of respiratory science and medicine. Its mission is to promote lung health through research, knowledge sharing, medical and public education.

More info at: www.ersnet.org

*Shaping the future of Respiratory Medicine
– from Europe to the world*

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