

US Environment Protection Agency Feb 2006.

### **Air Quality Criteria for Ozone and Related Photochemical Oxidants**

The report provides a review of the known health effects of exposure to low levels of ozone. People with asthma are vulnerable to increases in symptoms. People with other respiratory disease are less affected. Ozone also does damage to property.

The report summarises the evidence reviewed when revising the national ambient air quality standards. It includes a summary of the health effects of ozone (O<sub>3</sub>).

General effects of low level exposure (>0.08 ppm for 8 hours) are:

- decreased inspiratory capacity (measured by a reduced Forced Vital Capacity (FVC)),
- mild bronchoconstriction (measured by a reduced Forced Expiratory Volume in one second (FEV<sub>1</sub>); typically reduced by 6%),
- shallow breathing pattern during exercise and
- cough and pain on deep inspiration.

These effects usually reverse within 4 hours of cessation of exposure unless the inflammatory response was unusually severe.

Exposure also results in airway hyper responsiveness (a characteristic of asthma).

After several days of exposure these effects are reduced but this tolerance is lost after a week without exposure.

Asthmatics have slightly larger responses to exposure and these responses increase with disease severity. These responses also decrease with habituation. Full recovery in asthmatics can take up to 48 hours after cessation of exposure.

*Possibly due to patient age, O<sub>3</sub> exposure does not appear to cause significant pulmonary function impairment or evidence of cardiovascular strain in patients with cardiovascular disease or chronic obstructive pulmonary disease relative to healthy subjects.*

But:

*the overall body of evidence is highly suggestive that O<sub>3</sub> directly or indirectly contributes to non-accidental and cardiopulmonary-related mortality,*

The report finds that the evidence does not support the proposal that ambient ozone is a pulmonary carcinogen.

#### Comment

The need to protect asthmatics more carefully than healthy people is highlighted by the findings of this report. The lung function of those with pre-existing lung or heart disease appears not to be significantly affected by ozone at typical ambient levels. However, high ambient ozone levels are associated with increased mortality rates in this cohort.

Ozone accelerates the decomposition of man-made materials e.g. car tyres and textiles and may damage pigments. High value items e.g. artwork, and safety critical materials e.g. car tyres, may need to be protected and inspected more often in urban environments.

Full sunshine and urban pollution may generate levels of ozone as high as 0.17 ppm for up to 8 hours a day. Levels are usually much lower indoors than outdoors; ozone is efficiently eliminated on contact with indoor surfaces. Those who employ asthmatics as out door workers may need to assess the risks on high ozone days.

There is no 8 hour exposure limit in the UK. The 15 minute exposure limit is 0.2 ppm.

