

Annex 6B

Controlled studies of the effects of exposure to nitrogen dioxide in normal and asthmatic/bronchitic subjects

Authors	Pollutant concentration $\mu\text{g}/\text{m}^3$	Ppb	Duration of exposure and activity	Number of subjects	Change in lung function with NO_2	Change in reactivity	Change in symptoms
von Nieding et al 1973 ⁷	940-9400	500-5000	15 mins	55 normal 84 chronic bronchitic	Small fall in TLCO in normal subjects with 5000 ppb. Increase in Raw after 1500 ppb	Not tested	Not described
Kerr et al 1979 ¹³	0, 940	0, 500	2 hours	10 normal 7 chronic bronchitic 13 asthmatic	Fall in static lung compliance and functional residual capacity in patients (and compliance in normal subjects). No changes in most measurements including resistance	Not tested	7 out of 13 asthmatic subjects had symptoms such as chest tightness
Hazucha et al 1983 ¹⁵	188	100	1 hour at rest	15 normal 15 asthmatic (atopics)	None in either group	None (methacholine)	None
Bylin et al 1985 ²	0, 230, 460, 910	0, 122, 245, 484	20 mins	8 normal 8 asthma	Raw increased in non-asthmatics at 245 ppb and fell after 484 ppb	Increased in asthmatics after 484 ppb (histamine)	None
Linn et al 1985 ¹¹	7520	4000	75 mins including light and heavy exercise	25 normal 23 asthmatic	No effect on sRaw, heart rate or skin conductance. Small fall in blood pressure in both groups	Not tested	None
Linn et al 1985 ¹¹	0, 940, 1880, 3760	0, 500, 1000, 2000	1 hour	22 COPD	No changes in most tests	Not tested	None
Koenig et al 1987 ¹⁶	226 338	120 180	30 mins rest + 10 mins exercise	10 normal 10 asthmatic	None (small change with O_3 in same study)	Not tested	None
Morrow et al 1992 ²⁰	0, 564	0, 300	4 hours (Ex)	20 older subjects (mean ages 60) 20 COPD	Equival reduction in FEV ₁ & VC in NO_2 compared to air in COPD; in elderly subjects fall in FEV ₁ & FVC greater in smokers. COPD responses greater than in non-smoking elderly		No difference in COPD patients
Rasmussen et al 1990 ¹⁹	188-1500	100-800	2 hours (Ex)	20 asthma 20 normal	None	No change	None

Reactivity tests were carried out during or immediately after exposure except in the studies of Bylin et al (1985) and Hazucha et al (1983) (both 20 mins after exposure).

For abbreviations see the footnotes to Annex 6A

1 ppb NO_2 = 1.88 $\mu\text{g}/\text{m}^3$