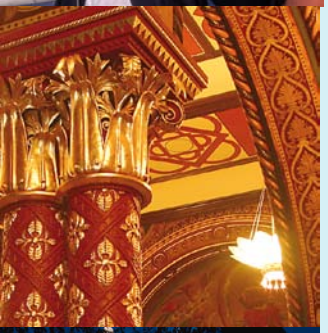

KING'S College LONDON

How big is the effect?

How big is the effect?(i)

- Assumptions: 38.7% of children with asthma have bronchitic symptoms (from McConnell et al 2003).
- Background rate of 0.387 implies an odds of 0.387/(1-0.387)=0.631
- With an odds ratio of 1.07 per ppb NO_2 new odds is 1.07x0.631=0.675
- As probability 0.675/(1+0.675)= 0.403 i.e. With a 1ppb yearly deviation from 4 year mean, rate is now 40.3%, an increase of 1.6%.

How big is the effect? (ii)

- Children 5-14 E & W 2005 6,537,100
- Asthmatic children 20% of 6,537,100 = 1,307,420
- Additional number with bronchitic symptoms 1.6% x 1,307,420 = 20,919. Same for 1ppb decrease?
- $PM_{2.5}$ OR 1.09 gives 2.1% of 1,307,420 = 26,814 for a 1 $\mu g/m^3$ change.

Actual pollutant levels

- Table 2 McConnell et al 2003 Mean yearly deviation from 4 year average NO_2 4.9ppb; $PM_{2.5}$ 3.9 µg/m^3
- (0.07 x 4.9) + ln 0.631 = ln (new odds); new odds 0.89; new rate 0.471; new change 8.4% gives 109,405 children affected for NO_2; 112,146 for $PM_{2.5}$
- Total (unlikely), 221,551; some of both range 109,405 to 221,551. Might be enough information to rule a policy out or in.
- Could we use mp models to help?
- Ratio of NO_2 to $PM_{2.5}$ different for specific policies.

Some other predictions

- Predict an additional 60.7% of asthmatic children for an increase from 20 to 100 ppb would have bronchitic symptoms. If due to repeated short term effects, should see in a chamber study. (Might need to assume it applies to adults). Compare with particles.
- Exposure reduction of 1.5 $\mu g/m^3$ would deliver a decrease of 41,837 asthmatic children with bronchitic symptoms. If NO_2 having effects would need a reduction of 1.9 ppb to give the same benefit. Use this to set precautionary exposure reduction for NO_2?