

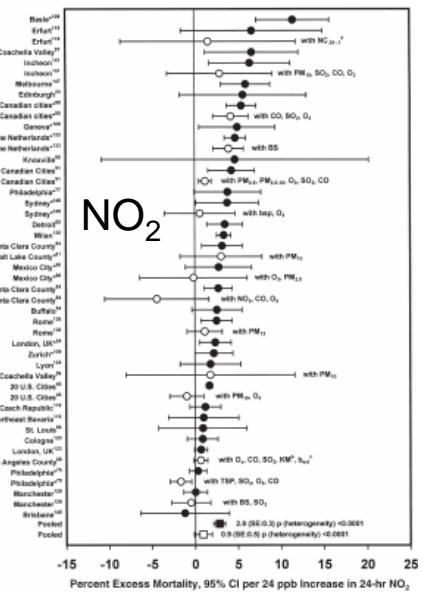
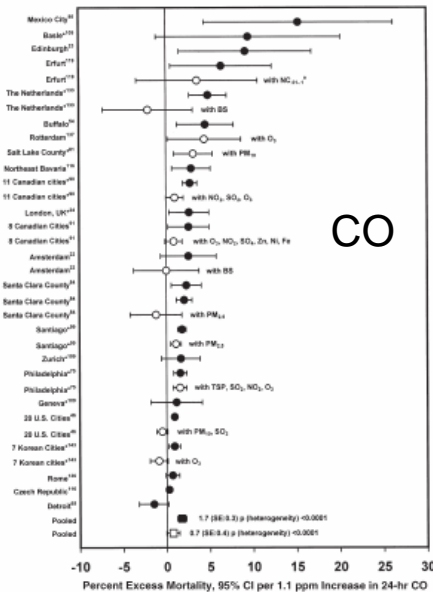
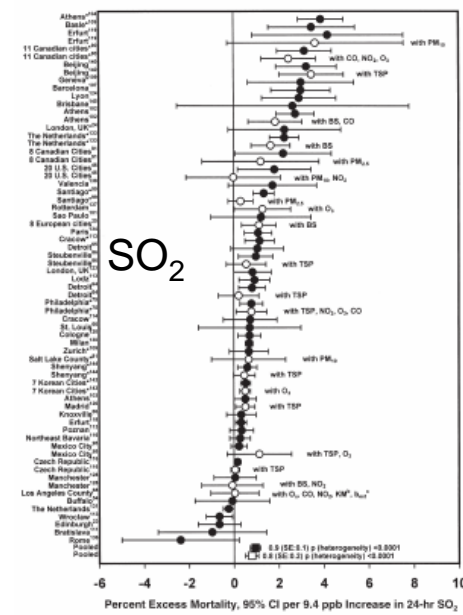
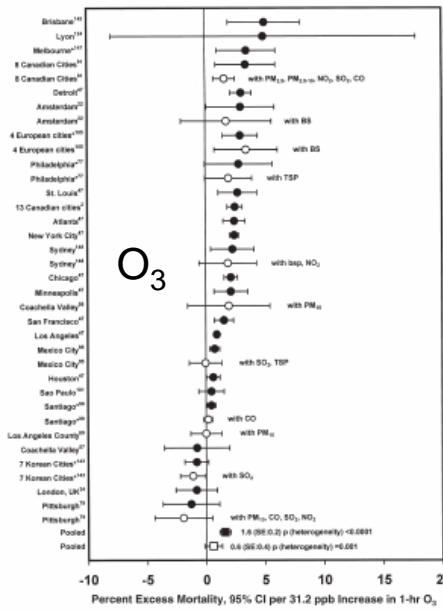
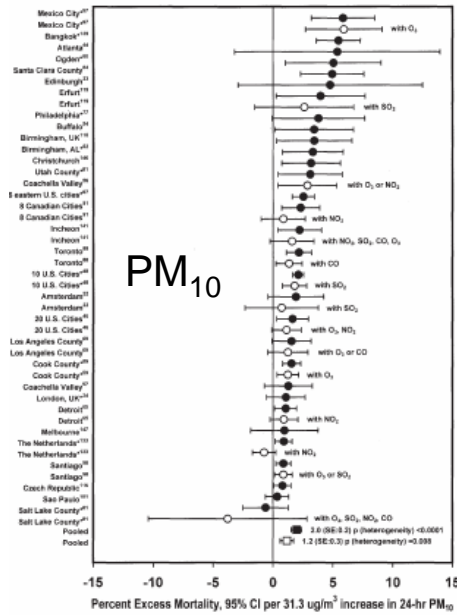
thoughts on time series studies

- cause & effect in time series studies
- “exposure” specificity (or non-specificity)
- what is it with NO₂?
- high (and low) concentration effects
- endpoint specificity

cause & effect in time series studies

- the “new” and powerful study design
 - eg, for cities with 30 deaths/day, detects increases of < 0.15 deaths/day
- the critical role of experimental studies generally (eg, PM)
- a role for natural experiments?

exposure specificity (or non-specificity)



“exposure” specificity (or non-specificity)

- issue highlighted as the focus has moved to NO_x
- two cases
 - benzene (and the light from the lamppost is extending further with PM speciation and more air toxics data)
 - CO – maybe it’s the real thing (ie, not just a surrogate) after all
- what we really want to know is whether reducing concentrations of something will reduce mortality risk - and time series studies don’t show this (or more correctly, we don’t know when they do and don’t)

what is it with NO₂?

- Europe, Canada, and now Asia, vs. USA
 - what could explain the differences?

high (and low) concentration effects

- when high concentration effects are:
 - the same as moderate/low concentration effects?
(eg, PM_{2.5}: 150 ⇒ 160 μg/m³ = 10 ⇒ 20 μg/m³)
 - smaller than moderate concentration effects?
 - ⇒ nonlinear concentration-response relationship
 - ⇒ proportionality of effects (comparable effects for a fixed % concentration increase)?
- effects at low concentrations

endpoint specificity

- effects on non-cardiopulmonary mortality
 - an indication of cause-of-death coding inaccuracy?
 - an argument against causation?