Indoor Air and Health

Lidia Morawska
Queensland University of Technology
Indoor air is a **dynamic mix** of pollutants, with complex physical, chemical and microbiological properties. Strongly depending on the type of indoor environment.
Factors affecting concentrations of indoor pollutants

Outdoor pollution
Meteorological conditions
Ventilation rates
Air mixing
Indoor pollutant sinks
Indoor air sources
The way they are used
Air cleaners

Some of them also relate to energy
World Health Organization: Indoor Air Guidelines

1. Selected pollutants (2010):
   - Benzene
   - Carbon monoxide
   - Formaldehyde
   - Naphthalene
   - Nitrogen dioxide
   - PAHs
   - Radon
   - Trichloroethylene
   - Tetrachloroethylene

2. Dampness and Mould (2009)
   Only qualitative!
   - Reference levels of fungi/other bioaerosols?
   - Exposure - response relationship?

Ventilation and infection risk

Role of ventilation in airborne transmission of infectious agents in the built environment – a multidisciplinary systematic review

Commemorating 20 Years of Indoor Air

Ventilation rates and health: multidisciplinary review of the scientific literature

Abstract The scientific literature through 2005 on the effects of ventilation rates on health in indoor environments has been reviewed by a multidisciplinary group. The group judged 27 papers published in peer-reviewed scientific journals as providing sufficient information on both ventilation rates and health effects to inform the relationship. Consistency was found across multiple investigations and different epidemiologic designs for different populations. Multiple health endpoints show similar relationships with ventilation rate. There is biological plausibility for an association of health outcomes with ventilation rates, although the literature does not provide clear evidence on particular agent(s) for the effects. Higher ventilation rates in offices, up to about 25 l/s per person, are
IAQ associated DALYs in 26 European Countries (2005+/-5 years)

DALY – Disability Adjusted Life Years
BoD – Burden of Disease

Blue: national BoD in DALY (year*million from indoor exposure to pollution originating from outdoor air.

Red: contributing from all indoor sources

IAQ associated BoD attributed to the key sources of exposure

IAQ associated BoD attributed to the key exposure agents

Not enough data on VOCs!