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The Future of Patient Organisations

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NATIONAL INSTITUTE FOR HEALTH AND WELFARE

EnVIE – Risks – Exposures - Sources

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Reality checks: Housing in Europe

- 200 million residences with 700 million rooms
- their constructions, technologies and materials represent the local histories, cultures, economies and ecologies of past 200 years
- 300 000 Europeans share one room with 5 or more other occupants
- 5 million Europeans occupy 6 or more rooms only for themselves
- country averages are, therefore, meaningless for estimating IAQ and related health and welfare issues in any particular location



European indoor exposure data

- National surveys:
 - German Environmental Survey (GerES I...IV), 1985-2006
 - French IAQ Observatory (OQAI), 2003-05
- EU new data projects:
 - EC FP-3, Audit study, 1993-94
 - EC FP-4, EXPOLIS, 1996-98
 - EC/JRC, Macbeth, 1998; People, 2002-04; AirMex, 2003-07
- EU data surveys and assessments:
 - DG-SANCO: THADE, 2002-03
 - DG-SANCO/JRC: IndEx, 2002-04
 - EC FP-5, EnVIE WP-2 (Exposure), 2004 -08
 - JRC: Radon mapping (EUR RADON 2005)



European IAQ summary

Agent	WHO long term (I)AQG ($\mu\text{g}/\text{m}^3$)	Typical IA levels ($\mu\text{g}/\text{m}^3$)	Indoor source contribution (%)	High end IA levels ($\mu\text{g}/\text{m}^3$)	Indoor source contribution at high end (%)
PM _{2.5} (PM _{10/2})	10	10 – 40	- 30	100...300	> 90
CO (*)	10	1 – 4	0	100...200	> 99
NO ₂	40	10 – 50	- 20	100...200	> 75
Formaldehyde	30 (**)	20 – 80	> 90	200...800	> 99
Benzene	5	2 – 15	...40	...50	> 75
Naphthalene	10	1 – 3	...30	...000	> 99.9
Radon (Bq/m ³)(***)	200	20 – 100	> 90	...100 000	> 99.9

*) mg/m³ **) refers to short term, 30 min, peak concentrations ***) main source is the soil beneath the building

For 4 out of these 7 indoor contaminants a large proportion of indoor air exposure concentrations exceed the WHO as well as IndEx proposed guidelines

For PM_{2.5} and NO₂ indoor air levels are usually lower than outdoor air levels

For formaldehyde and radon the role of outdoor air is always marginal

For 4 out of these 7 the high end indoor air exposure concentrations – with high individual risks – originate only from indoor sources





The EnVIE Concept: from health impacts to policies

2. Exposures

1. Health impacts

- Allergy & asthma symptoms
- Lung cancer
- Obstructive pulmonary lung disease
- Airborne respiratory infections
- Cardiac morbidity and mortality
- Sick building syndrome, irritation

Tobacco
 Combustion particles
 CO
 Radon
 Moisture, molds, dust mites
 (S)VOCs

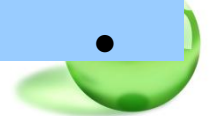
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3. Sources

- Outdoor air
- Building/Equipment/Ventilation
- Consumer products
- Occupant behaviour & maintenance

4. Policies

	•	•		•	•
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Burden of Disease (BoD): unit = DALY, Disability adjusted life years

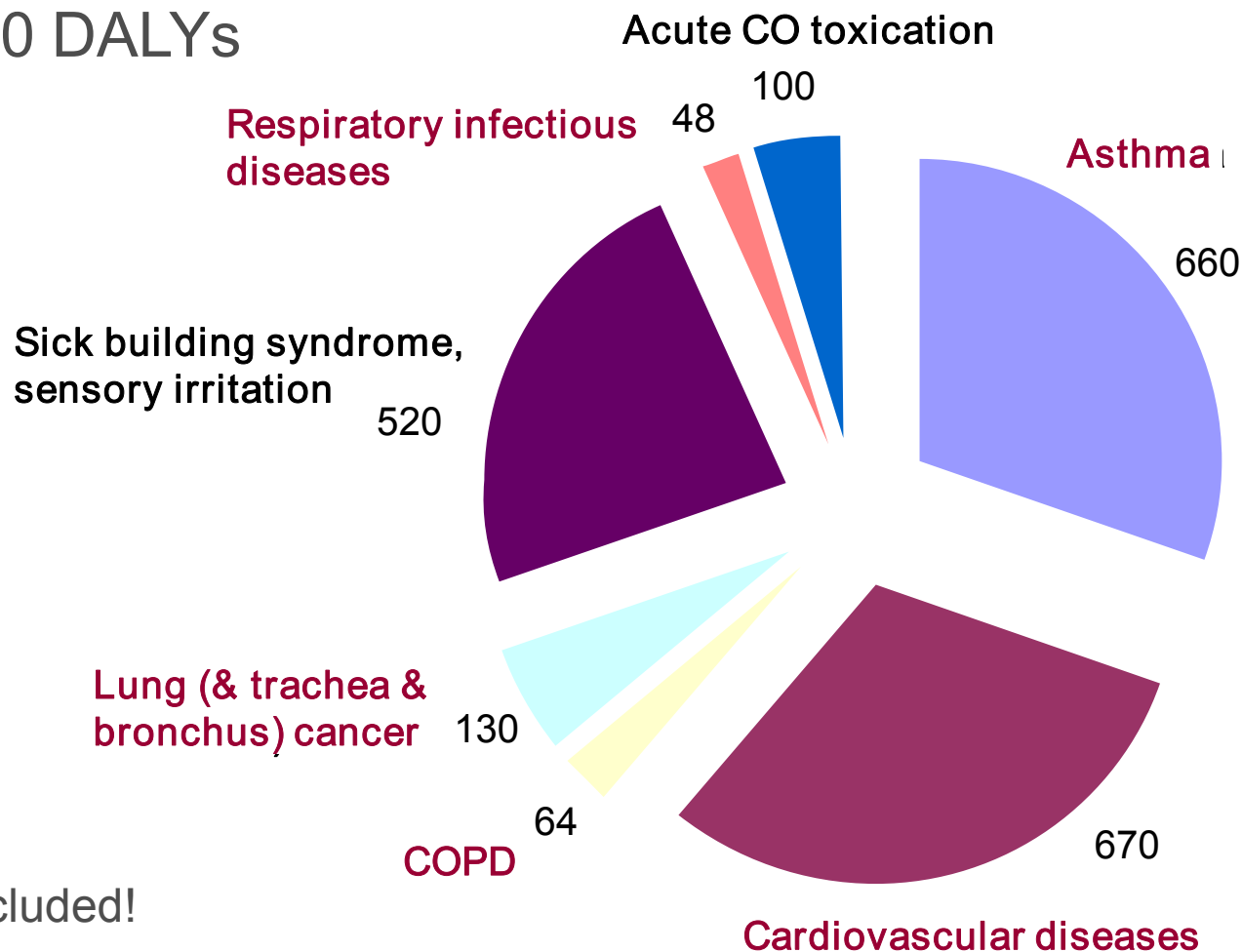
- Developed by WHO and applied as common metric for different – severity and duration – health outcomes
 - 1.00 = one year in full health
 - 0.00 = one year lost due to premature death (in comparison to population life expectancy)
- Morbidity accounted for using disease specific severity weights between 0.01 and 0.99
- Usual counts are DALYs lost due to given disease





BoD by disease attributable to indoor air contaminants in EU-27. $\Sigma = 2.2$ million DALY/y!

By disease/symptom
in 1000 DALYs



ETS excluded!



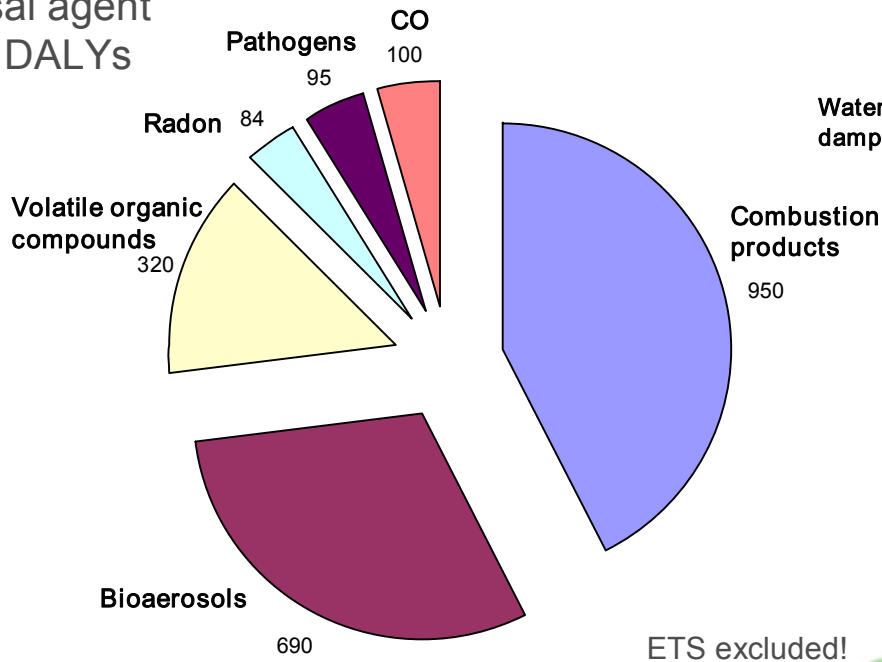
Some notes about the uncertainties

- The contributions of indoor air contaminants on cardiovascular mortality (primary combustion particles, mostly outdoor sources) and lung cancer from Radon are the least uncertain of these estimates.
- Asthma/allergies and COPD: The relative contributions of indoor air contaminants are still quite poorly evaluated in most of the 27 EU countries.
- Acute mortality from CO is certainly underestimated and morbidity even more so.
- The BoD from SBS is highly uncertain due to all assessment parameters: frequency, severity and duration of the symptoms

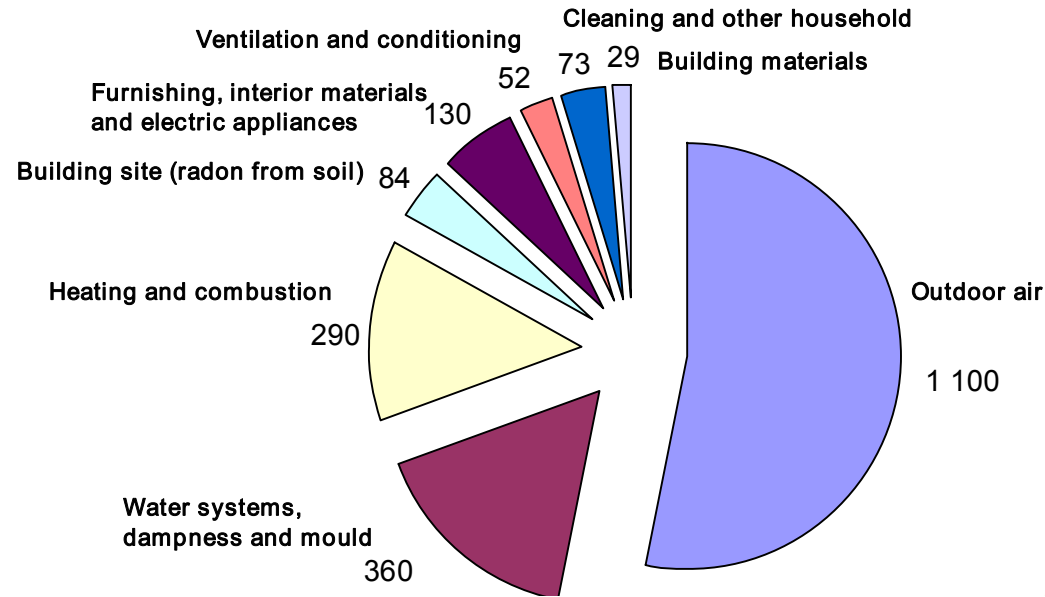


BoD by exposure to and sources of indoor air contaminants in EU-27

By causal agent
in 1000 DALYs



By source in 1000 DALYs



Tobacco?!

Children's exposure to ETS ?

WHO/ENHIS Factsheet

BoD from unrestricted smoking is comparable to all other indoor air pollution combined

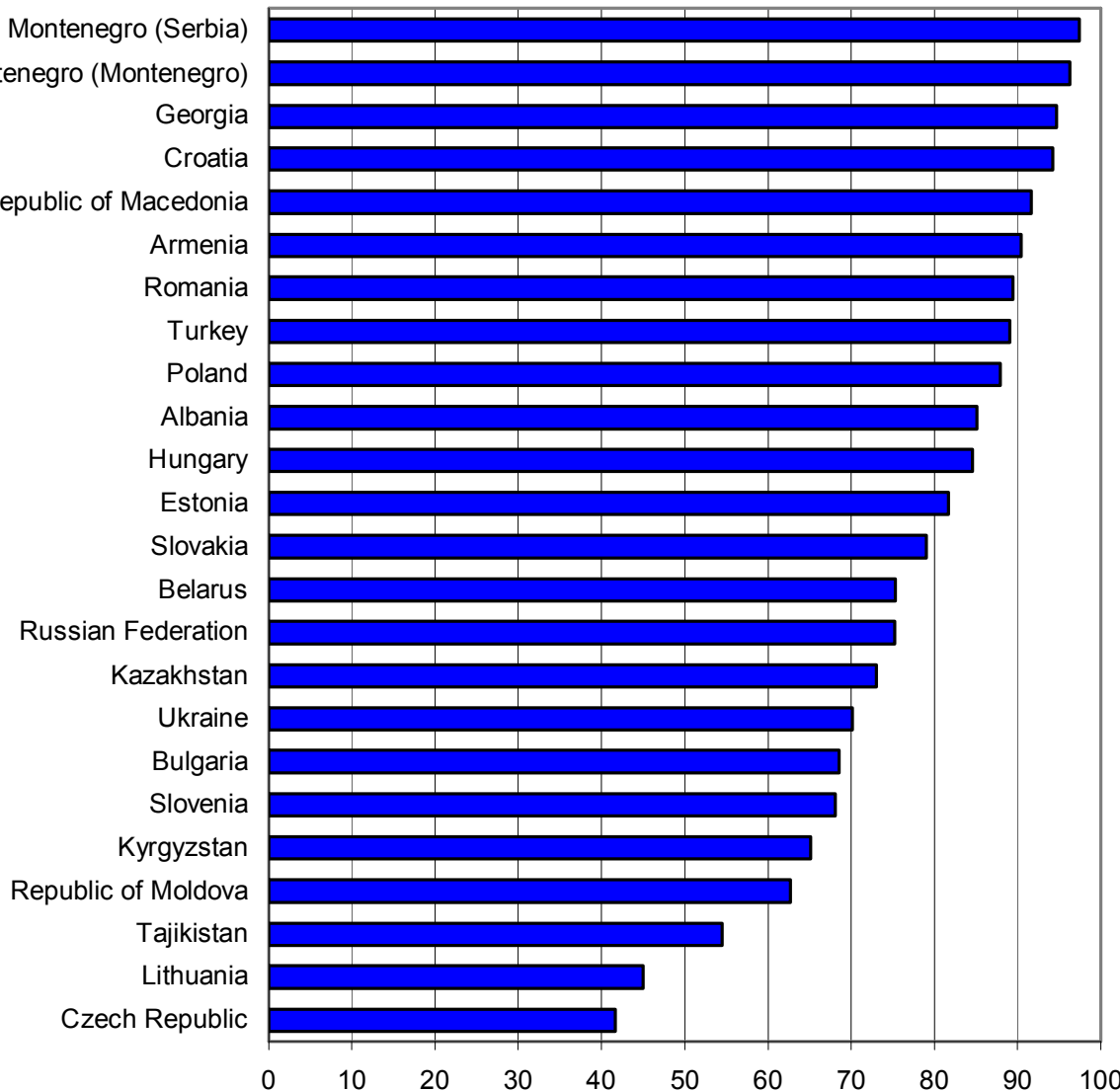
Increasing number of countries have already banned smoking in

- workplaces
- schools
- public transportation
- restaurants

Currently children of smokers in their own homes are provided the least protection

(sic!)

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Conclusions – exposure and risk

- Most of the indoor air health risks are caused by
 - tobacco smoke - where still allowed,
 - outdoor air pollutants which penetrate into indoor air,
 - building dampness and mould, and
 - indoor combustion sources.
- All man made chemicals together are responsible for 8-20% of all indoor air health risks.
- The upcoming WHO IAQ Guidelines will – again - be a valuable source of information for risk identification and management.
- Half of the IAQ disease burden, ca. 1 million DALYs per year, is due to asthma and airways diseases, over $\frac{3}{4}$ to diseases with strong European patient organisations (EFA, ECPC, ECCO, EHN, etc.)



Thanks a lot for inviting me to talk here in Roma

Greetings from the other end of Europe, Kuopio, FINLAND

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Indoor [related] European policies

- EU:
 - Construction Products Directive (CPD), 89/106/EEC EC
 - General Product Safety Directive (GPSD), 2001/95/EC
 - Energy Performance of Buildings Directive (EPBD), 2002/91/EC
 - Regulation concerning Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), 1907/2006
- WHO:
 - WHO Framework Convention on Tobacco Control, WHO FCTC, 2005 and related EC Green Paper: Towards a Europe free from tobacco smoke: policy options at EU level, COM (2007)27
 - IAQ Guidelines update is under development (Dampness & Mould available in 2009)

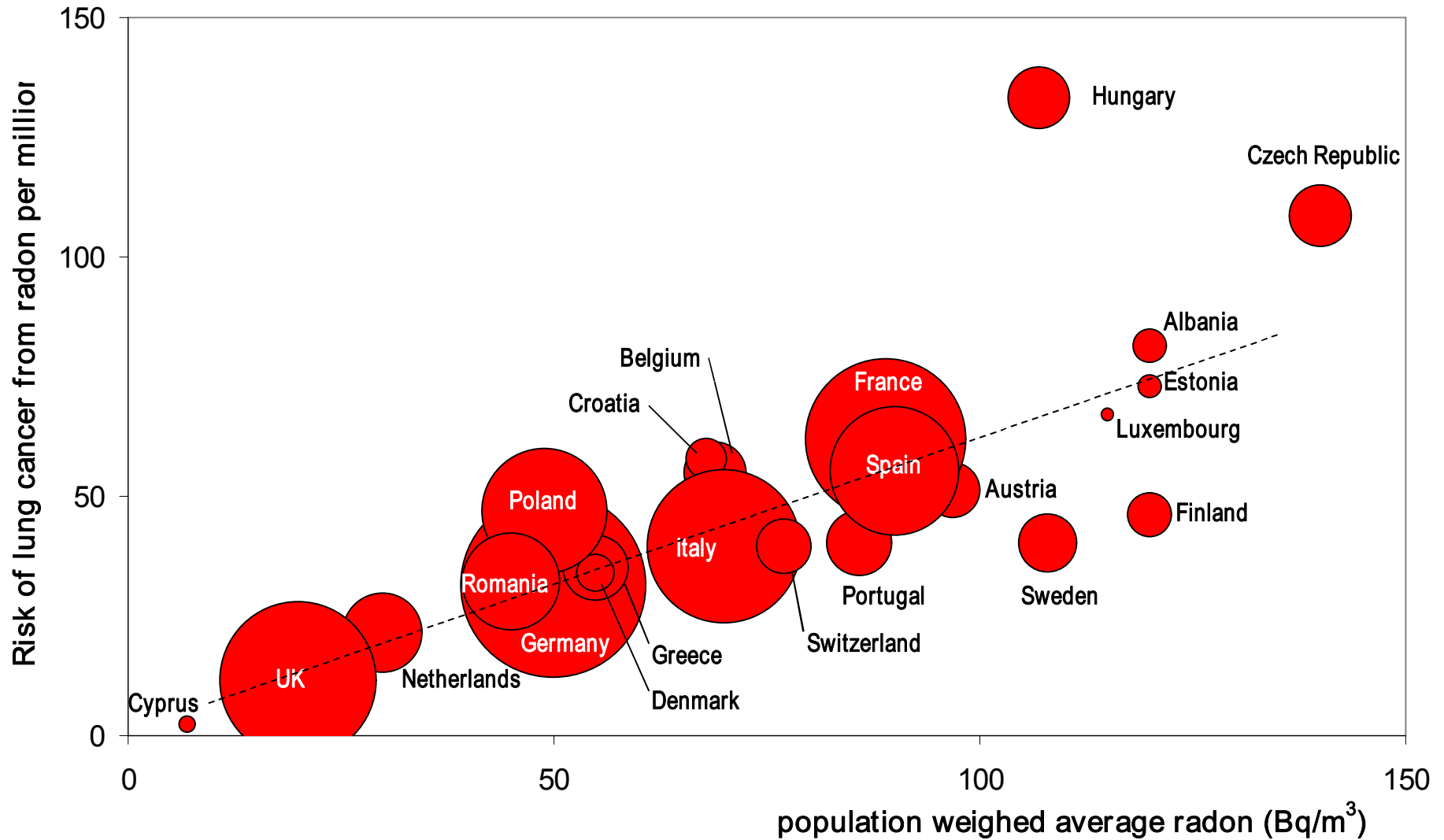
The policy orientation is usually action (measurement, reporting, restriction)
not result (health improvement)



Ongoing European activities

Project	Health effects	Exposures	Sources
HITEA	respiratory diseases	microbes, PM _{2.5} , NO _x microbial toxins	moisture damage, dampness, mould
EnVIE	asthma, respiratory allergies and infections, lung cancer, COPD, CV mortality, sensory irritation	[combustion] PM, CO, Rn, bioaerosols, VOCs	outdoor air & soil, building materials/equipment/ventilation consumer products, occupant activities
Heimtsa- IAQ	Respiratory cancers, asthma, CV mortality	Rn, naphthalene, formaldehyde, ETS	soil, dampness, heating & cooking, smoking
IAQ expert group			soil, building materials, ventilation, heating, cooking, cleaning
IndEx		NO ₂ , CO, PM, naphthalene, form- aldehyde, benzene,	
IAQ Guidelines		Group A: 24 agents Group B: biologicals	Group C: solid fuel use
Inadequate housing and health	asthma, COPD, respiratory infections, tuberculosis	formaldehyde, ETS CO, PM, Pb, noise	dampness, mould, crowding, solid fuel use, traffic

Estimated risk of lung cancer from indoor air radon in European countries



Highest risk indoor air chemicals

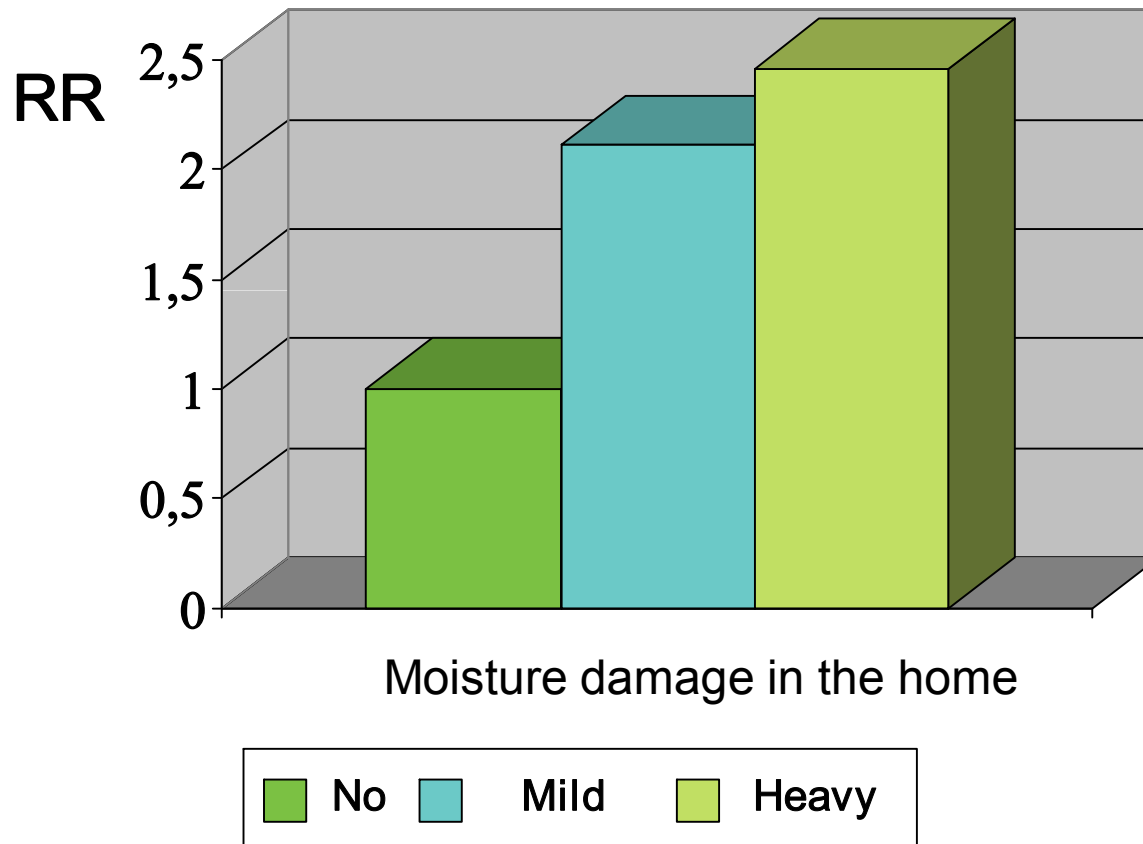
- Five assessments prioritised indoor air chemicals according to health risks at existing concentrations
- All ended up with the same priority chemicals

STUDY	I Benzene	II Naphthalene	III Formaldehyd.	IV Acetaldehyd.	V Hexane
De Hollander et al. 1999 (1)	Red	White	White	White	White
Loh & Bennet, IA 2005 (2)	Red	Red	Red	White	White
JRC, IndEx, 2005 (3)	Red	Red	Red	White	White
Jantunen, HB-2006	Red	Red	Red	White	Red
Levin et al. HB-2006	Red	Red	Red	Red	Red

- 1) Assessed and ranked 13 major environmental health risks
- 2) Not restricted to indoor sources, therefore included also 1,3 butadiene
- 3) Not restricted to organic chemicals, therefore included also NO₂ and CO



Moisture damage and children's new asthma



Mouldy/damp buildings

- Investigations of and interventions in schools have demonstrated that:
 - Building dampness leads always to mould growth and consequently to indoor air contamination, and
 - if exposure continues, to increasing health problems among the occupants, and
 - **Fixing the cause of dampness heals the symptoms**

