



MONITORING VAZDUHA

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AEROZAGAĐENJE ZATVORENIH PROSTORA





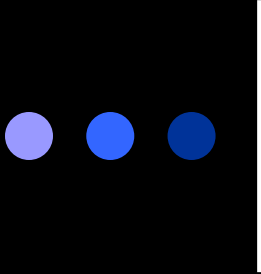
Aerozagadenje zatvorenih prostora

- Nepravedno zapostavljena oblast
- Evropljani provode do 90 % vremena u zatvorenom prostoru
- kuća, kancelarije, hoteli, restorani, fabrike, prevozna sredstva



Aerozagađenje zatvorenih prostora

- “microenvironment” → potiče i od “outdoor and indoor sources”
- više doprinosi izloženosti polutantima nego ambijetalno zagađenje



Kvalitet životne sredine u zatvorenom prostoru zavisi od

- ambijentalnog vazduha;
građevinskih materijala i kućnog
nameštaja; održavanja ventilacije i
rashladnih uređaja; potrošačkih
proizvoda; duvanski dim;
sagorevanje čvrstih goriva...



Aerozagađenje u zatvorenim prostorima

- Velike razlike u zemljama u razvoju i razvijenim zemljama
- U tesnoj vezi sa sociološko-ekonomskim razvojem
- Više od polovine populacije na zemlji oslanja se na tradicionalna goriva



Aerozagađenje u zatvorenim prostorima

- Korišćenje čvrstih goriva → loša ventilacija
- Začarani krug - zdravstveni problemi
- Visoka koncentracija gasova i PM
- 10–20 x viša od međunarodnih direktiva



Aerozagađenje u zatvorenim prostorima - POLUTANTI

- **Gasovi: CO, SO₂, NO₂**
- **Metali (olovo, živa), čestice, azbest, duvanski dim**
- **Razne vrste mikroba, alergena, insekata, gljivica, grinja**
- **Radioaktivni polutant – Radon**
- **VOC – formaldehid, benzen**

Izvori zagađenja

SOURCES OF INDOOR POLLUTANTS

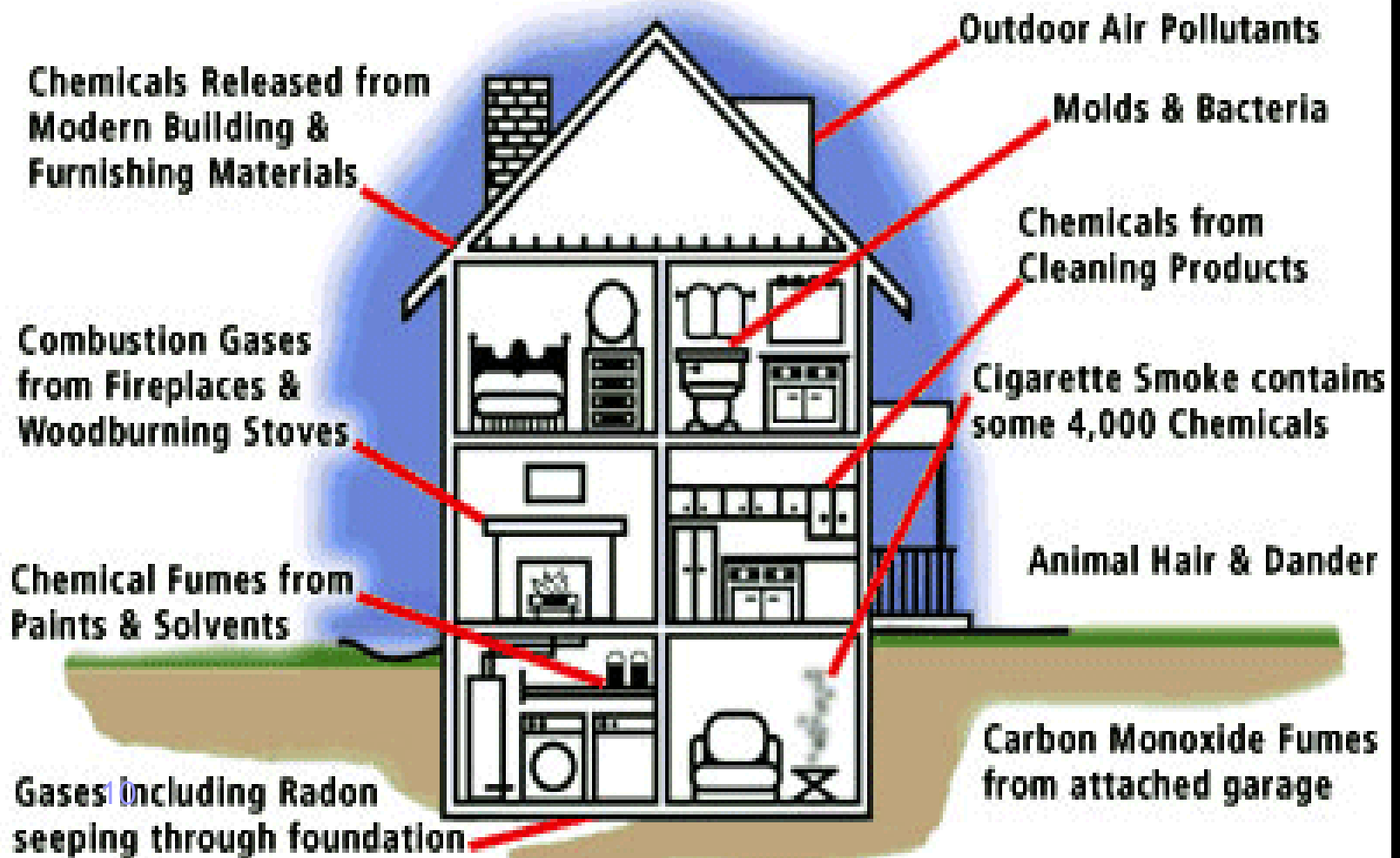


Table 1. Major health-damaging pollutants generated from indoor sources

Pollutant	Major Indoor sources
Fine particles	Fuel/tobacco combustion, cleaning operations, cooking
Carbon monoxide	Fuel/tobacco combustion
Polycyclic aromatic hydrocarbons	Fuel/tobacco combustion, cooking
Nitrogen oxides	Fuel combustion
Sulfur oxides	Coal combustion
Arsenic and fluorine	Coal combustion
Volatile and semi-volatile organic compounds	Fuel/tobacco combustion, consumer products, furnishings, construction materials, cooking
Aldehydes	Furnishings, construction materials, cooking
Pesticides	Consumer products, dust from outside
Asbestos	Remodelling/demolition of construction materials
Lead	Remodelling/demolition of painted surfaces
Biological pollutants	Damp materials/furnishings, components of climate control systems, occupants, outdoor air, pets
Radon	Soil under buildings, construction materials
Free radicals and other short-lived, highly reactive compounds	Indoor chemistry

Source: Zhang & Smith (1).

Table 2. Toxic pollutants from biomass combustion and potential for toxicity

Pollutant	Known toxicological characteristics
Particulates (PM ₁₀ , PM _{2.5})	Bronchial irritation, inflammation, increased reactivity, reduced mucociliary clearance, reduced macrophage response
Carbon monoxide	Reduced oxygen delivery to tissues owing to formation of carboxyhaemoglobin
Nitrogen dioxide (relatively small amounts from low-temperature combustion)	Bronchial reactivity, increased susceptibility to bacterial and viral lung infections
Sulfur dioxide (relatively small amounts from most biofuels)	Bronchial reactivity (other toxic end-points common to particulate fractions)

Organic air pollutants

formaldehyde	Carcinogenicity
1,3-butadiene	Co-carcinogenicity
benzene	Mucus coagulation, cilia toxicity
acetaldehyde	Increased allergic sensitization
phenols	Increased airway reactivity
pyrene	
benzo[a]pyrene	
dibenzopyrenes	
dibenzocarbazoles	
cresols	



Aerozagađenje u zatvorenim prostorima-problemi

- Nisu lako razblaženi
- Konc. mnogo veća nego u spoljnjem prostoru
- Stepen rizika zavisi od provetrenosti kao i tipa/vrste, mešavine i količine polutanta



Aerozagađenje u zatvorenim prostorima-**problemi**

- Ventilacija: nepropisno dizajnirana
- Sindrom "**bolesti zgrada**"

- Ušteda energije → gušće strukture, proizvodi i materijali koji emituju različita jedinjenja → utiče na kvalitet vazduha u zgradama

- **Indoor Air Pollution: An Introduction for Health Professionals**

