INDOOR AIR QUALITY

Internal deliberative pre-decisional - FOR USE BY 2024 PRESIDENT-ELECT TRANSITION TEAM MEMBERS ONLY

ISSUE SUMMARY: INDOOR AIR QUALITY

Everyone in the U.S. is impacted by indoor air quality (IAQ). People in the US spend about 90% of their time indoors on average -- the average person who lives to be 79 will have spent about 70 of those years indoors, breathing more than 2,000 gallons of air per day. That air can contain a wide variety of pollutants that originate from both indoor and outdoor sources. Each of the National Ambient Air Quality Standards (NAAQS) Criteria Air Pollutants are found indoors. Other pollutants found indoors and known to cause adverse health effects include radon, benzene, naphthalene, trichloroethylene, multiple pesticides, and chemicals from consumer products, paints, and cleaners. Biological contaminants are ubiquitous indoors and include mold, viruses (e.g., COVID-19 and influenza), bacteria, dust mites, pests, pets, pollen, plants and debris or by-products from these organisms. Indoor air pollution in homes has been estimated to account for about 10% of the annual non-psychiatric, non-communicable disease burden in the U.S.

The Office of Air and Radiation serves in a leadership role on indoor air. OAR's indoor air program is non-regulatory, statutorily authorized, and conducts research, guidance, technical and financial assistance, public information and outreach to reduce exposure to indoor contaminants in homes, schools and workplaces. Indoor air interventions are highly cost-effective (e.g., low cost-per-life-saved; ER visits avoided), preventative of disease and associated medical costs and address one of the highest human health risk issues in EPA's portfolio. EPA's authorizing legislation for indoor air provides broad authority in the areas of research and non-regulatory public guidance, technical assistance, and information (SARA Title IV, TSCA Title III).

KEY POINTS:

Scale and scope of environmental issue:

- Indoor air pollution is among the top environmental risks to the public.
- Indoor pollutant levels can often be 2-5 times higher than outdoors; people spend 90% of their time indoors in their homes, schools, workplaces, and other buildings.
- Radon is the second leading cause of lung cancer, causing about 21,000 lung cancer deaths every year.
- Asthma is a serious, life-threatening respiratory disease that affects almost 25 million Americans, including more than 4.6 million children. Poor and minority children suffer a greater burden of the disease. Asthma is estimated to cost more than \$81B annually in direct medical costs and lost productivity. Indoor environmental determinants of health (IEDOH) are modifiable environmental factors indoors—such as household air pollution, the presence of pests, mold and moisture, chemicals and irritants—that influence risk and experience of chronic disease like asthma.
- Indoor PM health impacts are extensive. There is strong evidence that exposure to PM_{2.5} indoors causes adverse health effects, particularly to the respiratory and cardiovascular systems, and possibly other organ systems. Indoor PM can be of indoor or outdoor origin. The bulk of human exposure to PM_{2.5}, including from outdoor sources, occurs indoors. This is because on average, about half of PM concentrations outdoors infiltrate buildings and people spend 90% of their time indoors in buildings. In addition to outdoor sources, PM is generated indoors by combustion appliances, cooking, smoking, cleaning, hobbies, and other routine activities.
- Indoor air contains multiple volatile organic compounds (VOCs). Many potentially toxic and/or irritating VOCs are found at higher levels indoors than outdoors since their main sources are indoors (e.g., formaldehyde). Children and adults living in homes with higher concentrations of some VOCs have shown increases in adverse respiratory and allergic health effects. Activities such as cleaning and painting will increase VOC levels indoors.
- Environmental tobacco smoke (ETS) causes cardiovascular disease and is also the third leading cause of lung cancer, after smoking and indoor radon. ETS can also cause asthma, bronchitis, pneumonia, and ear infections in children.

- Some diseases can be spread by airborne transmission of the virus indoors. EPA's guidance addresses straightforward steps that can be taken to reduce airborne transmission of viruses and infectious diseases like COVID-19.
- Improving IAQ by increasing ventilation can result in increased work performance, reduced absenteeism, and reduced illness. Measures to increase ventilation can be highly cost effective, with substantial net benefits. Estimates of the US economic costs associated with adverse health and productivity effects of poor IAQ fall between \$13.2 and \$32.1 billion annually.
- Internationally, indoor air pollution from unvented biomass cooking and heating results in 3.2M premature deaths annually – 2.2M from exposure indoors. About 2% of global CO₂ emissions come from household energy use, -- on par with CO2 emissions from aviation or shipping.

External Engagement:

- EPA's Indoor Air Quality website is among the most visited EPA websites and is continuously updated to reflect emerging and evolving issues important to the public and public health.
- A wide array of external stakeholders rely heavily on EPA's IAQ guidance.
- EPA's indoor air technical expertise is highly regarded and frequently requested.
- Coordination with key Federal agencies -- HUD, DOE, HHS (CDC, NIH, NHLBI, NIOSH), DoED, USAID, NIST, industry, non-profit health, public health, building, and environmental organizations and other stakeholders is ongoing.

Major challenges, concerns, and sensitivities:

- While general awareness of the importance of healthy indoor air grew significantly during the COVID-19 pandemic, insufficient public awareness of IAQ remains a key challenge; not often recognized as a top concern for the public.
- Some stakeholders (e.g., tenants) have limited control over their indoor environments at home and/or at work. For those stakeholders, some mitigation measures to reduce exposure to indoor contaminants are not attainable.
- Some effective interventions to reduce exposure to indoor contaminants, such as radon mitigation, higher efficiency air filters, or portable air cleaners, are often not currently within the financial reach of some stakeholders.
- Wildfire smoke and water damage from hurricanes, floods and other natural disasters can result in widespread degradation of IAQ with limited public resources to address the problem.
- The lack of a large federal or private sector investment in IAQ and public health presents a challenge.

ONGOING/UPCOMING REVIEWS FOR FY2025:

- Implement new Radon Credentialing Criteria to help align and encourage consistency across radon industry credentialing programs.
- Oversee new grants and technical assistance to improve school IAQ and reduce greenhouse gas emissions, with a focus on schools serving low income, disadvantaged and Tribal communities.
- Manage a grant competition to enhance wildfire smoke preparedness in community buildings that serve the public, and that serve disadvantaged communities or vulnerable populations.
- Launch Version 2 of the Indoor airPLUS Program (IAP), a voluntary partnership and labeling program that provides builders with an opportunity to earn home certification for enhanced IAQ features.

KEY EXTERNAL STAKEHOLDERS:					
🛛 Congress	🛛 Industry	⊠States	🛛 Tribes	🛛 Media	🛛 Other Federal Agency
🛛 NGO	oxtimes Local Governments		🛛 Public		

MOVING FORWARD:

IED will continue to work to meet increased public interest in and scientific understanding of the importance of indoor air quality where Americans live, work and learn.