

## The Impact of Indoor Air Quality on Vulnerable Persons and Patients

Indoor air quality (IAQ) is an important determinant of human health, with significant implications for vulnerable persons and patients. While indoor environments are often perceived as safe “shelters” from outdoor pollutants, they can harbour a multitude of contaminants that pose health risks, particularly to individuals with pre-existing health conditions or compromised immune systems. Understanding the impact of IAQ on vulnerable populations is essential for developing effective strategies to mitigate risks and promote healthier indoor environments.

Vulnerable persons encompass a broad spectrum of individuals who may be more susceptible to the adverse effects of poor IAQ. This includes children, older people, pregnant women, individuals with chronic respiratory conditions such as asthma or COPD, those with weakened immune systems, and individuals with cardiovascular diseases or other underlying health issues <sup>1</sup>. For these individuals, exposure to indoor air pollutants such as volatile organic compounds (VOCs), particulate matter (PM), allergens, and microbial contaminants can exacerbate existing health conditions, trigger allergic reactions, and increase the risk of respiratory infections.

Among vulnerable populations, patients in healthcare settings represent a particularly at-risk group. Hospitals and healthcare facilities are unique environments with specific IAQ challenges, including the presence of airborne pathogens, exposure to medical gases and volatile chemicals, and the potential for nosocomial infections <sup>2</sup>. Patients with compromised immune systems, such as those undergoing chemotherapy or organ transplant recipients, are especially vulnerable to IAQ-related health risks. Poor IAQ in healthcare settings can prolong hospital stays, increase the risk of post-operative complications, and contribute to the spread of infectious diseases.

The impact of IAQ on vulnerable persons and patients is multifaceted and can manifest in various ways. Respiratory health is particularly susceptible to the effects of indoor air pollutants, with studies linking exposure to indoor pollutants to increased asthma symptoms, respiratory infections, and exacerbations of chronic obstructive pulmonary disease (COPD)<sup>3</sup>. Additionally, poor IAQ has been associated with cardiovascular effects <sup>4</sup>, including increased risk of heart attacks, strokes, and hypertension, particularly among individuals with pre-existing cardiovascular conditions.

Furthermore, IAQ can influence cognitive function and mental well-being <sup>5</sup>, with studies suggesting a link between indoor air pollutants and impaired cognitive performance, increased stress levels, and decreased productivity. For vulnerable populations such as children and older

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<sup>1</sup> <https://doi.org/10.3390/ijerph19148752>

<sup>2</sup> <https://doi.org/10.1016/j.scs.2015.04.002>

<sup>3</sup> <https://doi.org/10.1016/j.cdtm.2018.03.003>

<sup>4</sup> <https://doi.org/10.4103/1947-2714.117290>

<sup>5</sup> <https://doi.org/10.1016/j.buildenv.2021.107647>



people, who spend a significant amount of time indoors, the quality of indoor air can have profound implications for their overall health and quality of life.

Addressing IAQ-related health risks among vulnerable populations requires a multifaceted approach that encompasses both preventive measures and intervention strategies. This includes implementing effective ventilation systems, using air filtration devices, reducing indoor sources of pollution, and promoting awareness and education about IAQ among healthcare providers, patients, and caregivers. Additionally, healthcare facilities must adhere to stringent IAQ standards and guidelines to ensure the safety and well-being of patients and staff.

In conclusion, indoor air quality plays a critical role in determining the health outcomes of vulnerable persons and patients. Poor IAQ can exacerbate existing health conditions, increase the risk of respiratory infections, and impact cognitive function and mental well-being. Addressing IAQ-related health risks requires a concerted effort from policymakers, healthcare providers, and individuals to promote healthier indoor environments and protect the health of vulnerable populations. By prioritizing IAQ management and implementing evidence-based interventions, we can mitigate the adverse effects of indoor air pollutants and create safer, healthier indoor spaces for all.