

Indoor Air Quality Concerns in Closed Environments



As winter tightens its grip across North America, workplaces naturally respond by sealing doors, closing windows, and relying heavily on heating systems. While these measures keep workers warm, they also create a less visible risk that can quietly undermine health, safety, and productivity: poor indoor air quality (IAQ).

When workers spend more time indoors, especially in tightly sealed buildings, airborne contaminants accumulate more easily. Ventilation rates often drop, humidity fluctuates, and heating systems circulate air that may already be compromised. For OHS managers, winter is one of the most critical periods for proactive indoor air quality management.

Why Indoor Air Quality Matters More in Cold Weather

Indoor air quality refers to the condition of the air within buildings as it relates to occupant health, comfort, and safety. During colder months, several factors combine to elevate risk:

- Reduced fresh air intake due to closed windows and doors.
- Increased reliance on HVAC systems that may be poorly maintained.

- Higher occupancy density as workers remain indoors.
- Greater circulation of viruses and bacteria.
- Lower humidity levels that dry out respiratory systems.

Poor IAQ is linked to headaches, fatigue, eye and throat irritation, respiratory symptoms, and increased illness rates. In safety-sensitive workplaces, these symptoms can also impair concentration, reaction time, and decision-making.

Common Indoor Air Quality Hazards in Winter

Cold weather introduces or amplifies several IAQ risks:

Insufficient Ventilation

Energy conservation efforts often reduce fresh air exchange. Without adequate ventilation, carbon dioxide levels rise and contaminants accumulate.

Biological Contaminants

Viruses, bacteria, and mold thrive in stagnant air. Dry indoor conditions can increase virus survival while irritating airways, making workers more susceptible to infection.

Combustion Byproducts

Furnaces, heaters, forklifts, and other combustion sources can release carbon monoxide and nitrogen dioxide if systems are malfunctioning or poorly vented.

Particulates and Dust

Construction dust, warehouse particulates, or manufacturing byproducts can build up indoors when air circulation is limited.

Off-Gassing

Cleaning products, adhesives, furnishings, and equipment may release volatile organic compounds (VOCs), which can become more concentrated in closed environments.

Health, Safety, and Productivity Impacts

The effects of poor IAQ are often gradual, which makes them easy to overlook. However, their impact is real:

- Increased absenteeism due to colds, flu, and respiratory illness.
- Higher rates of headaches, fatigue, and difficulty concentrating.
- Exacerbation of asthma and other chronic conditions.
- Increased error rates and near misses in safety-critical tasks.
- Reduced morale and complaints related to comfort.

In North America, regulators increasingly expect employers to manage indoor environmental conditions as part of general duty obligations. Failure to address known IAQ issues can expose organizations to complaints, claims, and reputational risk.

Indoor Air Quality Best Practices for Winter

Effective IAQ management does not require overhauling entire systems. It requires intentional monitoring, maintenance, and communication.

Key best practices include:

Maintain and Inspect HVAC Systems

Ensure heating and ventilation systems are serviced regularly. Filters should be changed according to manufacturer recommendations, and outdoor air intakes must remain unobstructed by snow or debris.

Balance Warmth and Ventilation

Keeping workers warm should not come at the expense of fresh air. Modern HVAC systems can maintain thermal comfort while meeting ventilation requirements. Avoid shutting off or disabling ventilation to save energy.

Monitor Air Quality Indicators

Carbon dioxide monitoring can provide a practical proxy for ventilation effectiveness. Elevated CO₂ levels often indicate insufficient fresh air.

Manage Humidity Levels

Aim for indoor relative humidity between 30 and 50 percent. Air that is too dry increases illness risk and discomfort, while excessive humidity encourages mold growth.

Control Sources of Contamination

Limit idling of combustion equipment indoors, store chemicals properly, and use low-emission cleaning products where possible.

Housekeeping and Dust Control

Regular cleaning reduces particulates that accumulate in closed environments, particularly in industrial and warehouse settings.

Keeping Workers Warm Without Increasing Illness Risk

Cold stress and poor air quality often intersect. Workers may block vents, use unauthorized space heaters, or seal off areas in ways that worsen IAQ.

OHS managers can help by:

- Ensuring heating systems provide consistent, even warmth.
- Prohibiting unapproved heating devices that pose fire or air quality risks.
- Providing appropriate cold-weather PPE and layered clothing options.
- Educating workers on why vents and air returns must remain clear.

Clear communication is essential. When workers understand that

ventilation protects their health, they are more likely to cooperate with controls.

Sectors Most Affected by Winter IAQ Issues

While all indoor workplaces are affected, some sectors face elevated risk:

Office and Administrative Workplaces

High occupancy density, sealed buildings, and prolonged screen work increase sensitivity to poor air quality.

Healthcare and Long-Term Care

Vulnerable populations, infection control requirements, and continuous occupancy demand robust IAQ management.

Manufacturing and Industrial Facilities

Heating large spaces while managing dust, fumes, and combustion sources is a complex challenge.

Warehousing and Logistics

Vehicle exhaust, particulate matter, and temperature fluctuations can compromise air quality.

Education and Childcare

Crowded spaces and developing immune systems make IAQ critical for illness prevention.

Retail and Hospitality

High foot traffic and prolonged indoor exposure increase transmission and comfort concerns.

Each sector requires tailored controls, but the underlying principles remain consistent.

The Role of OHS Managers

OHS managers play a central role in recognizing IAQ as a

seasonal risk and ensuring it is addressed proactively. This includes:

- Incorporating IAQ into winter hazard assessments.
- Coordinating with facilities and maintenance teams.
- Responding promptly to complaints and symptoms.
- Documenting inspections, maintenance, and corrective actions.
- Communicating expectations to supervisors and workers.

Indoor air quality is one of the few hazards that affects everyone at once. Addressing it early reduces illness, improves comfort, and supports safer work performance.