by Rachel R. Belew, MS

Indoor air quality

Aging adults more vulnerable to health complications

At a glance...
Indoor air is two to 10 times more polluted than the air outside. It is imperative that long-term care facilities measure internal air quality to ensure residents' health and wellness

It is often thought that indoor environments are among the healthiest and safest places for people to be—particularly for aging adults, who can have unique health needs and environmental sensitivities.

Unfortunately, indoor air is two to 10 times more polluted than the air outside, according to the U.S. Environmental Protection Agency (EPA), and up to 1,000 times more polluted following new construction or renovation. Even worse, indoor air pollution is known to cause or aggravate myriad health problems, including asthma, upper respiratory complications, eye irritation, cognitive impairment, nausea, nosebleeds, and even cancer. For residents of continuing care retirement communities (CCRCs), assisted living facilities, and nursing homes, indoor air pollution is especially concerning.

"Aging adults, particularly the elderly, can have weakened immune systems and age-related health problems, which make them more vulnerable to health complications associated with indoor air pollution," says Gail Vittori, co-director of the Center for Maximum Potential Building Systems (**www.cmpbs.org**) and co-coordinator of the Green Guide for Health Care (**www.gghc.org**), a best practices guide for healthy, sustainable hospitals. "That makes enhanced indoor air quality a critical contributor to their health and wellness at long-term living facilities."

Experts agree that the most effective way to combat indoor air pollution is through source control.

What is IAQ?

Indoor air quality (IAQ) refers to the healthfulness of the air that people breathe inside their homes, offices, and other buildings. Studies consistently show that good IAQ helps improve cognition, boosts productivity, and contributes to better overall health. Conversely, polluted indoor air can trigger or exacerbate a variety of symptoms and/or illnesses—some of which can be life-threatening.


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Poor IAQ is caused by air pollutants such as volatile organic compounds (VOCs), which are chemicals that emit from common products and materials. Mattresses, furniture, cabinetry, ceiling tiles, wallcoverings, cleaning products, deodorizers, and nearly all furnishings and maintenance products release VOCs into the air. Some VOCs are malodorous (such as those that emit from paints, adhesives, and vinyl products); some smell pleasant (such as air fresheners and laundry detergents); and others are odor-free. Many VOCs are toxic, especially in large concentrations.

"Products that off-gas can emit hundreds of VOCs into the air at the same time, creating an airborne 'cocktail' of potent chemicals," says Dr. Marilyn Black, a global expert on indoor air pollution and founder of the GREENGUARD Environmental Institute (GEI), a third-party, industry-independent certifier of low-emitting products and materials. "Mix in mold spores and animal allergens, respirable particles, heavy metals, carbon monoxide, and ozone—all of which are frighteningly common in buildings—and you've got a potentially lethal combination of pollutants in your midst," she warns.

Poor IAQ and aging adults

The risk of health complications resulting from poor IAQ is even greater among older adults than

Additional Tips for Improving IAQ

- Allow wet materials such as paints and adhesives to dry/cure thoroughly before occupying an indoor space.
- Open windows regularly to allow ventilation with outdoor air, especially when cleaning or painting.
- Avoid cleaning agents and solvents with strong odors or fragrances.
- Clean at night or when building rooms are unoccupied, but keep the ventilation system operating.
- Use furnishing and decorative items with washable surfaces.
- Regularly check to ensure that the building's mechanical ventilation system is clean and in proper working order.
- Repair all water leaks promptly.
- If mold grows on any porous materials such as drywall, discard immediately and replace.
- Keep relative humidity levels below 60%, using dehumidifiers if necessary.
- Use high-efficiency particulate air (HEPA) vacuum cleaners with disposable bags and microfiber cloths for surface dust removal.
- If using an electrostatic/ionic air cleaner, be sure that it meets UL Ozone Standard 867 and that it is certified by the State of California for minimal ozone release.

Common Sources of Indoor Air Pollution in Long-Term Care Facilities

- mattresses/bedding
- wallcoverings
- window treatments/blinds
- cabinetry
- tables, chairs, shelving, sofas
- flooring (wood, rubber, carpet)
- ceiling tile
- insulation
- paints/adhesives/sealants
- cleaning products/disinfectants
- air fresheners/deodorizers
- vinyl furnishings
- electronic equipment

among young or middle-aged adults. "As people age, they often spend more time indoors and are challenged by weakened immune systems and vital organ function," Vittori says.

Consequently, the elderly are more susceptible to debilitating health conditions, including asthma, chronic obstructive pulmonary disease (COPD), and cancer—which, in turn, make them more susceptible to a host of other complications associated with the inhalation of airborne pollutants. In fact, a 2003 study in the *European Respiratory Journal* showed that elderly people who were exposed to airborne particles suffered from acute respiratory symptoms and reduced lung function.

Other IAQ victims

Of course, the health effects of indoor air pollution do not discriminate. Facility staff, providers, and administrators are also at risk for complications related to poor IAQ. This could lead to reduced employee productivity and billions of dollars in losses each year.

Complicating matters is that the air in healthcare facilities is often contaminated with biological pollutants. For example, a 2009 study in the *International Journal of Indoor Environment and Health* showed a link between asthma and respiratory complications among healthcare facility employees and an abundance of airborne microbial contaminants inside the facility—including bacteria and mold.

Energy-efficient buildings can also contribute to poor IAQ, despite their reputation for being "green" and "environmentally friendly." These buildings are, by design, very tightly sealed, or weatherized, to reduce energy consumption. Unfortunately, these "airtight" buildings can also promote the buildup of VOCs and other airborne contaminants, creating an interior space that's brimming with potential toxins. Without fresh-air ventilation, chemicals and other pollutants get trapped inside.

"The irony is that we are committed to preserving our environment, protecting our natural resources, and reducing our carbon footprint through the use of 'green' practices," Black says. "But, unless we take the proper steps beforehand to minimize our exposure to indoor chemicals and other toxins, we may be doing more harm than good for human health. After all, most people spend over 85% of their time indoors."

The solution

Experts agree that the most effective way to combat indoor air pollution is through source control; that is, replacing as many high-emitting, potentially toxic products and materials with as many low-emitting, nontoxic products and materials as possible.

To ensure that a product is low-emitting, look for certification by a third-party, industry-independent organization, such as the GREENGUARD Environmental Institute. (Visit **www.greenguard.org** for a free listing of certified products.) Also, be wary of any product that claims to be "green," "all-natural," or "environmentally preferred."

"Unfortunately, many of these claims are not based on scientific data," Black says. "When it comes to human health—especially the health of sensitive groups like the elderly—we simply can't take any chances. We have to rely on objective science. And that's what third-party certification guarantees." ■

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