

# Preventing Indoor Air Quality Hazards during the Holidays

## Introduction

In the U.S. Environmental Protection Agency's 1989 report to congress on indoor air quality, it was conveyed that Americans, on average, spend approximately 90 percent of their time indoors (USEPA, 1989). We can expect during the cold winter months of the holiday season, this percentage will increase. Complicated by tightly sealed winterized homes and energy-efficient building construction, the potential impact of indoor air quality (IAQ) on human health during the winter holiday season is significant.

## Naturally Occurring IAQ Hazards

Health risks from exposure to Radon and Carbon Monoxide (CO) is a year-round concern.



Figure 1.

However, the risk is more significant during the winter holiday season due to the reduction in ventilation caused by sealed windows and doors, energy-efficient engineered homes (Fleisher, Mogro-Campero, & Turner, 1983), and the stack effect which tends to be greater in the

winter as the warmer indoor air rises and escapes to the colder air outdoors. Indoor Radon levels are generally thought to be higher in the winter. However, studies have also shown production of Radon may be up to 10 times greater in the summer months due to dry, loosely packed soil (n.a., 1989). But, again, tightly sealed homes in the cold winter months reduce

ventilation and prevent necessary diffusion of Radon gases. Hence, indoor concentrations of this human carcinogen are greatly increased. Further, cold winter months mean greater use of fireplaces and wood stoves. Combustion of wood in these comfort amenities produces increased levels of CO. Short-term exposure at elevated levels can be lethal.

## Artificial, Synthetic, and Human-Driven IAQ Hazards

Aside from Radon and CO, which are naturally occurring IAQ risks, other activities triggered by human elements during the winter holiday season should be avoided.

**Fireplace.** Prior to the holiday season, it would be a good practice to clean your fireplace chimney and make sure the flue is operating properly. If burning the customary Yule log is traditional in your household, avoid storing logs or wood indoors as mold is certain to grow and affect your indoor environment. Never burn Christmas gift-wrapping paper in the fireplace as chemicals and materials used in manufacturing may produce irritable vapors. If you desire to burn scented incense for that perfect olfactory holiday experience, it is highly recommended that you burn it in the fireplace with an open flue.

**Storage of decorations and ornaments.** When the holiday parties are over and it's time to store decorations and ornaments, don't use corrugated boxes stacked in the garage, attic or basement because they can collect dust which can aggravate asthmatic or allergic symptoms in some people. Also, this practice promotes mold growth. Certain climatic conditions and inadequate ventilation will increase the likelihood for moisture. Combined with the excellent nutrient source of dust and cellulose,

this environment is ideal for growth of indoor mold. Decorations and ornaments should be stored in plastic bags and airtight containers. Figure 1 displays a classic wooden Nutcracker decoration contaminated with mold after a season in storage. The fungi growth damages or destroys ornaments like these, and promotes dispersal of spores into the air, affecting air quality.

**Candles.** There is nothing like flickering candle flames and the manufactured scent of pine trees to create holiday spirit. Unfortunately, the smoke and perfume scent in many candles can produce unsightly soot staining and increase airborne particulates and volatile organic compounds, which may affect sensitive individuals. The use of smokeless/flameless candles will avoid many of these issues.

**Christmas trees.** Live Christmas trees bring the feeling of outdoors and fresh pine scent into the home during the cold holiday season when outdoor activities are kept to a minimum. Unfortunately, a study presented to The American College of Allergy, Asthma & Immunology, examining the relationship between mold growth on live Christmas trees and poor indoor air quality, revealed unhealthy levels of mold spores in the air. Concentrations increased incrementally as the live tree remained indoors (Chakravarty, 1995; Gruchalla & Santilli, 2007). Proper tree care and frequent changing/cleaning of the water supply can help reduce mold and algae growth. Shaking live and artificial trees outdoors is recommended to remove dust and fungal spores before bringing the trees indoors for decorating. Keeping live trees indoors for a shorter duration will also help prevent escalating concentrations of mold. Plastic trees or live trees with spray-on snow or pine-scented coatings should be avoided because they can exacerbate asthma or allergies in some people.

**Christmas crafts.** If your home transforms into Santa's workshop during the winter holiday season, there are IAQ concerns you need to recognize and avoid. Many materials, solvents, paints, and adhesives contain irritants and sometimes toxic VOCs which may easily become aerosolized and concentrate in locations with inadequate ventilation. You can dissipate and diffuse VOCs by opening windows and using exhaust fans. Most HVAC systems have a fan/circulate mode which can also be activated while working on crafts.

### Conclusion

Asthma, along with other respiratory and sinus complaints, increases during the winter months and seem particularly evident during the holiday season. Taking the proper steps to avoid activities that contribute to poor IAQ and, including increasing ventilation to diffuse harmful VOCs whenever possible, will help make the holiday season healthy for you and your family.

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