## INDOOR AIR QUALITY

***Topic Snapshot:***
People spend a large portion of their time inside homes and offices. In fact, the U.S. Environmental Protection Agency estimates that most people spend 90 to 95 percent of their time indoors. This makes indoor air quality very important to health. Harmful gasses and particles can compromise indoor air quality. Ensuring that combustion sources and heating, ventilation, and air conditioning equipment are working properly is a great place to start. Ensuring that new furnishings, carpets, and cabinetry contain safe, low-emitting materials helps protect the quality of air in homes and commercial buildings. Taking a careful look at cleaning and maintenance products also helps reduce the likelihood of unintentionally compromising indoor air quality.

Improving ventilation (increasing the amount of outdoor air coming in) can significantly reduce the concentration of indoor air pollutants. Air cleaners can remove particles from air, but may not be equipped to reduce the amount of gaseous pollutants in air. Another method for improving the quality of indoor air is source control, removing individual sources of pollutants. There are a variety of means to help improve indoor air quality.

***Estimated Cost Savings & Benefits:***
Typically the most cost-effective option for improving indoor air quality is source control. Any new combustion sources, materials, furnishings, or cleaning products in the home or in a building are potential sources of indoor air pollution. Careful analysis of products prior to purchase can help. The operating myth is that improving home and/or building ventilation systems can actually increase energy costs. Proper sizing and cleaning of heating, ventilation, and air conditioning (HVAC) systems can actually save money on energy costs and improve indoor air quality. Even simple filter cleaning and/or replacement helps HVAC systems operate more efficiently and improves indoor air quality.

The benefits of protecting indoor air quality are significant. Improved indoor air quality can have positive effects on human health, productivity, and comfort. Canadian researchers have measured the relationships between employee productivity and indoor air quality and found that reduced indoor pollutant levels resulted in reductions in absenteeism.

***Issues:***
Improving indoor air quality in an apartment building can be more challenging if the building owner or manager is the only person who can address sources of indoor air pollution. The first step is to alert management, in written form, of any potential issues with indoor air quality and encourage building management to follow EPA's IAQ Building Education and Assessment Model (I-BEAM). It is sometimes possible to help building owners and their managers see the financial benefits of improving indoor air quality in the form of increased tenant retention and lease rates, reduced liabilities, and improved resale value.

As people spend a significant portion of their day in office buildings, IAQ is an issue in these environments as well. Office buildings can have significant air quality issues. If you or others in your office are experiencing problems with health and/or comfort and you suspect poor indoor air quality is the cause, EPA recommends that you talk to your supervisor, your personal physician, and/or the state or local health department.

The good news is that sometimes solving indoor air quality problems is possible and not always unreasonably expensive. With proper analysis of HVAC systems and other sources of indoor pollutants, building managers can sometimes turn "sick" buildings into relatively healthier environments.

***Regional Issues:***
In cooler climates, outdoor temperatures can make it more challenging to improve ventilation by simply opening a few windows in your home or in commercial buildings. Mechanical ventilation systems, proper cleaning, source control, and air cleaners may be good options.

In warmer, humid climates, high temperatures and humidity levels can increase the concentration of some pollutants. There are some additional climate-related challenges with respect to windows and mechanical systems.

***Installation (Getting It Done):***
A range of professionals address indoor air quality issues. Selected HVAC contractors are capable of helping homeowners and building owners make decisions that can result in improved indoor air quality. Selected interior designers are now more cognizant of the types of design decisions that contribute to indoor air pollution or to healthier homes and buildings. As with any design, construction, and/or maintenance decision, it is a good idea to get two or three bids from different contractors. Even though this may be a bit more time-consuming, the end result is usually a more cost-effective and informed decision. There are no guarantees with indoor air quality, but informed decision-making can result in substantial improvements to health and productivity.

***More Information On This Topic:***

U.S. Department of Energy's Building Technologies Program: Indoor Air Quality Research and Development
http://www.eere.energy.gov/buildings/tech/indoorairquality.html

U.S. Environmental Protection Agency: An Introduction to Indoor Air Quality
http://www.epa.gov/iaq/ia-intro.html

U.S. Environmental Protection Agency: Sources of Indoor Air Pollution - Improving Indoor Air Quality
http://www.epa.gov/iaq/is-imprv.html

U.S. Environmental Protection Agency: Indoor Air Quality in Large Buildings
http://www.epa.gov/iaq/largebldgs/index.html

U.S. Environmental Protection Agency: The Inside Story: A Guide to Indoor Air Quality
http://www.epa.gov/iaq/pubs/images/the_inside_story.pdf