



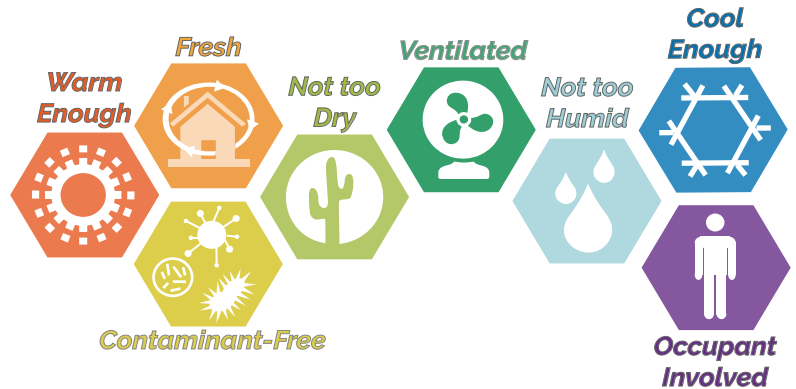
# Cold Climate Indoor Air Quality

Photo courtesy of Ned Rozell

## What constitutes healthy indoor air quality?

Healthy indoor air can best be described as air that is fresh, at a comfortable temperature and humidity, and free of chemicals, mold, and other contaminants. There are many ways a resident can improve their indoor air quality (IAQ) and doing so not only makes a living space more comfortable, but saves energy, money, and improves the health of occupants.

The first step in ensuring healthy IAQ is recognizing what can compromise it. Excess contaminants and moisture have the largest impact on IAQ, but even air that is too dry, cold, or hot can lead to discomfort and health problems.



Once air is indoors, the buildup of contaminants and moisture is the greatest threat to IAQ. Knowing which substances and activities can contaminate indoor air and avoiding them when possible is a great proactive strategy. However, contaminants come in many forms and originate from a range of sources, so it can be nearly impossible to prevent all contaminants from infiltrating your indoor air. Because of this, making sure indoor air is constantly refreshed so that moisture and harmful substances do not build up over time is the best and most reliable reactive strategy in ensuring healthy IAQ.



There are two strategies for actively creating healthy IAQ: **Proactively** preventing the introduction of contaminants, moisture, and undesirable conditioning to indoor air, and **reactively** removing contaminants if they have been introduced. Proactive approaches include filtering and heating incoming outdoor air, storing pollutants outside, and maintaining a well-sealed building envelope. Reactive approaches include flushing indoor air as well as identifying and removing contaminant sources.

In most cases, healthy IAQ begins with, and relies on, the exchange of indoor and outdoor air. Outdoor air is generally the cleanest air source, however certain conditions can worsen outdoor air quality. In those conditions, making sure poor outdoor air is warmed and filtered before it enters a home is an important proactive step in ensuring healthy IAQ.

Pollutant	Health Effects	Source
Carbon Monoxide (CO)	<ul style="list-style-type: none"><li>Fatigue and chest pain in low exposure</li><li>Flulike symptoms in higher exposure</li><li>Can be fatal</li></ul>	Combustion from indoor and outdoor sources
Radon	<ul style="list-style-type: none"><li>Upper respiratory problems and infections</li><li>Cancer</li></ul>	Naturally-occurring element in certain soils, rock types, and water sources
PM <sub>2.5</sub>	<ul style="list-style-type: none"><li>Premature death in people with heart or lung disease</li><li>Nonfatal heart attacks</li><li>Irregular heartbeat</li><li>Aggravated asthma</li><li>Decreased lung function</li></ul>	Combustion from indoor and outdoor sources: candles, wood burning, cooking, home heating, cigarettes
Mold	<ul style="list-style-type: none"><li>Upper respiratory problems and infections</li><li>Asthma</li><li>Allergies</li></ul>	Moist and damp conditions, high humidity
Acrolein	<ul style="list-style-type: none"><li>Respiratory, eye, nose, and throat irritation</li></ul>	Heated cooking oil, smoke from candles, wood stoves, cigarettes
Formaldehyde	<ul style="list-style-type: none"><li>Respiratory, eye, nose, and throat irritation</li><li>Cancer</li></ul>	Off-gassing of furniture, carpet, paint, foam, synthetic fabric, cosmetics, building materials
Toluene, Benzene	<ul style="list-style-type: none"><li>Short-term exposure can lead to central nervous system problems and irritation of skin, eyes, and nose</li><li>Prolonged exposure to benzene can lead to cancer</li></ul>	Petroleum products, paint, cigarettes



# Cold Climate Indoor Air Quality

## How can you improve your IAQ?



### *If air is too **WARM...***

During warmer seasons, air inside homes can be dramatically heated from solar exposure through windows. Closing blinds, opening windows, and keeping indoor air circulating with Heat Recovery Ventilators (HRVs) or fans can keep homes cooler. During cooler seasons, heating appliances are responsible for warming air, so lowering the setpoint on your thermostat or using your heating appliance less frequently can help manage air temperature.



### *If air is too **DRAFTY...***

Drafty indoor air is usually symptomatic of leaky walls or imbalanced airflow through HRV ducting. In homes with HRVs, consulting a ventilation technician on properly balancing the HRV can improve airflow and reduce drafts. In homes with leaky walls, determining the locations of air leaks in the building envelope and repairing them not only reduces draftiness, but can improve heat retention and lower energy bills!



### *If air is too **STALE/STUFFY...***

Stale air is air that is not being refreshed often enough, and begins to collect contaminants and moisture. Flushing out stale air and bringing in fresh air is the best solution. This can be accomplished by opening at least two windows on opposite ends of your home (to encourage cross-airflow), regularly using exhaust fans (such as range hood and bathroom exhausts) and if you have an HRV, keeping it on and well-maintained.



### *If air is too **HUMID...***

Moisture tends to be introduced to indoor air through occupant activities. Moisture-producing activities, such as cooking, bathing, washing clothes, etc., can be minimized by activating exhaust fans which vent to the outdoors, like those commonly found in kitchens and bathrooms. Dehumidifiers can also assist in removing excess moisture in local areas (single rooms).



### *If air contains **CONTAMINANTS...***

Not all contaminants are easy to detect by humans, so it is important to preemptively reduce contaminant build-up. Cleaning your home regularly, keeping your home well-ventilated, filtering incoming air when possible, using exhaust fans when cooking or showering, and avoiding products that contain known contaminants will reduce build-up. Certain plants can help filter Volatile Organic Compounds (VOCs) and contaminants too!



### *If air is too **COOL...***

In cold climates, the most common source of cold air is outdoor air itself. Warming incoming air before it is distributed to living areas helps reduce discomfort. This can be done with an HRV/ERV or a heating appliance placed near an incoming air source. In winter, keeping windows, doors, and other openings closed as much as possible and equally distributing warm air throughout the home is the best defense against cold air.



### *If air is too **DRY...***

Air that is too dry can not only be uncomfortable, but can aggravate certain health conditions like asthma. When indoor air is dry, moisture must be added using humidifiers or certain plants. However, if water is intentionally added to indoor air, humidity levels must be monitored carefully to prevent mold growth and structural damage.



### *Being **AIR-AWARE...***

Occupant awareness of IAQ and healthy habits can go a long way in ensuring healthy IAQ. Keeping the home well-ventilated and comfortably warmed, providing routine maintenance for heating/cooling/ventilation systems, installing smoke and carbon monoxide alarms, and purchasing household products that are free of known contaminants can all contribute to great IAQ.



# Cold Climate Indoor Air Quality

## *How can you improve your long-term IAQ?*

- 1 Install smoke alarms and carbon monoxide detectors, test them regularly, and change the batteries at once a year ✓
- 2 Use cigarettes/vaporizers outside of your home, or consider quitting altogether ✓
- 3 Read the instructions/homeowner manuals for your heating and ventilation appliances. Have them regularly cleaned, professionally serviced, and maintained ✓
- 4 Test your home for radon exposure and install mitigation systems as necessary ✓
- 5 Clean your home and possessions often to deter contaminant buildup ✓
- 6 Establish a habit of using the range hood when you cook and a bathroom exhaust fan when you shower ✓
- 7 Consider installing HRVs and exhaust fans for regular ventilation. If already installed, make sure the vents are properly sealed, balanced, and cleaned ✓
- 8 Check product information on materials that may contain VOCs. Consider purchasing products that are low-VOC or VOC-free ✓
- 9 When you must work with products containing VOCs (engines, paint, chemicals, etc.), consider handling them outside to avoid contaminating indoor living space ✓
- 10 Consult an energy auditor for help finding and fixing air and moisture leaks in your building envelope ✓
- 11 For wood-burning appliances, cure firewood to limit moisture and contaminants produced, and clean the chimney once per year ✓
- 12 Select combustion appliances with sealed combustion chambers and direct venting to the outdoors ✓



# Cold Climate Indoor Air Quality

*Where can I find more IAQ Information?*

## Building Information

**Alaska Housing  
Finance Corporation**  
ahfc.com  
907.338.6100

**Association of Alaska  
Housing Authorities**  
aahaak.com  
907.330.8398

**Green Seal**  
greenseal.org

**Green Guard**  
greenguard.org

**EPA Safer Choice**  
epa.gov/saferchoice

**CRI Green Label Plus**  
carpet-rug.org/green-  
-label-plus.html

**Chief Andrew Isaac  
Health Center**  
907.451.6682

**Alaska Quit Line**  
alaskaquitline.com

**American Lung  
Association**  
lung.org

**UAF Cooperative  
Extension**  
uaf.edu/ces  
907.474.5211

**Cold Climate Housing  
Research Center**  
cchrc.org  
907.457.3454

**Alaska Native Tribal  
Health Consortium**  
anthc.org  
907.729.1900

**Tanana Chiefs  
Conference**  
tananachiefs.org  
907.452.8251

**Environmental Protection Agency**  
[https://www.epa.gov/  
indoor-air-quality-iaq](https://www.epa.gov/indoor-air-quality-iaq)

**Foundation Health Patners**  
foundationhealth.org  
**Fairbanks Memorial Hospital**  
907.452.8181  
**Tanana Valley Clinic**  
907.459.3500

## IAQ Information

**Alaska Department of  
Environmental Conservation  
Division of Air Quality**  
[http://dec.alaska.gov/air/  
air-contacts.htm](http://dec.alaska.gov/air/air-contacts.htm)  
907.459.1234

**Fairbanks Northstar  
Borough  
Air Quality Division**  
[http://fnsb.us/transporta-  
tion/Pages/Air-Quality.aspx](http://fnsb.us/transportation/Pages/Air-Quality.aspx)  
907.459.1234

**AirNow**  
**Local Air Quality Conditions**  
<https://airnow.gov/>

## Health Information