



Outdoor Air Quality and Health

September 2015

The Air Quality and Health Team, under the guidance of Intermountain LiVe Well and the Office of the Sustainability, developed this care process model (CPM) to provide evidence-based guidelines on the health effects of air quality. It is primarily intended to help providers counsel patients about outdoor physical activity when air quality is poor. This CPM is based on guidelines from the U.S. Environmental Protection Agency, current research on air quality and health, and advice from Intermountain experts.

► Why Focus on OUTDOOR AIR QUALITY?

- **Everyone is affected.** Air quality affects the entire population we care for. All providers need to know how to counsel patients on how to respond. Because exposure to polluted air cannot be measured in the individual patient, it is usually not apparent as a contributor to acute and chronic health conditions. The World Health Organization (WHO) estimates, however, that 2 million premature deaths may be attributable to air pollution each year.^{WHO}
- **A high proportion of Utah's population is at risk.** People at increased risk for adverse health outcomes from exposure to poor air include children, the elderly, and people with existing asthma, lung disease, cardiovascular disease, and stroke. One-third of Utah's population is either 18 and under or 65 and older; about 230,000 have asthma; and nearly 500,000 have cardiovascular disease.
- **Utah's air can be especially bad.** The American Lung Association's *State of the Air 2015* report ranked the Salt Lake City-Provo-Orem area as the 7th worst in the U.S. for short-term spikes in particle pollution, a regular occurrence during wintertime temperature inversions. Logan was ranked 8th.^{ALA}
- **Clear, objective evidence** can aid healthcare providers in counseling patients. This CPM provides evidence-based recommendations, acknowledges gaps in our current understanding of the health effects of air pollution, and helps clinicians better understand susceptible groups for whom a more precautionary approach may be advised.

► WHAT'S INSIDE

POLLUTANTS	2
HEALTH EFFECTS OF POOR AIR QUALITY	3
COUNSELING PATIENTS.	4
Pregnant women	4
Very young children	4
Children with asthma	4
People exercising or working outdoors	4
Adults with asthma	5
Adults with lung disease	5
Adults with cardiovascular conditions	5
Adults with neurological conditions	5
AIR QUALITY AND LOCATION	6
THE AIR QUALITY INDEX.	7
Measurement stations in Utah	7
RESOURCES	8
Patient education resources	8
Provider resources	8
Other helpful resources	8

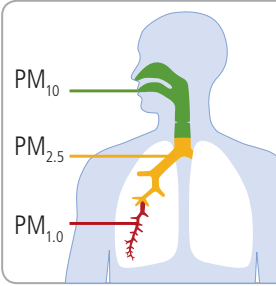
► GOALS

The goals of this CPM are to:

- Improve clinicians' knowledge of the impact of air quality on health outcomes.
- Help clinicians provide evidence-based recommendations to their patients.

► POLLUTANTS

The table below lists “criteria pollutants,” or pollutants with national air quality standards that define allowable concentrations in ambient air. Click on each pollutant name to link to more detailed information from the U.S. Environmental Protection Agency.

Pollutant	What it is	Mechanisms of harm and populations at risk
Particulate matter (PM)	<p>Particulate matter (PM) is a complex mixture of particles and liquid droplets of varied constituents, including acids, organic chemicals, metals, soil, and dust. PM is categorized by size, which in turn dictates health effects.</p> <ul style="list-style-type: none"> • PM₁₀ — coarse particles, such as those found in the dust of roadways, agriculture, or construction sites, and are between 2.5 µm (micrometers) and 10 µm in diameter. • PM_{2.5} — fine particles, such as those found in smoke and haze, are less than 2.5 µm in diameter. These are formed from gas and condensation of high temperature vapors during combustion. • PM_{1.0} — ultrafine particles, a subset of fine particles, are less than 1.0 µm in diameter. The leading source is motor vehicles, especially those powered by diesel engines. <p>Sources: Human and natural activities, including vehicle emissions, industrial processes, agricultural operations, combustion of wood and fossil fuels, construction activities, road dust, windblown dust, wind erosion, and wildfires.</p>	<p>Particle size and composition influence the toxicity of PM.</p> <p>PM₁₀ uses gravity to settle in the nasal or oral cavities, pharynx, larynx, and upper trachea and relies on mucociliary clearance for removal.</p> <p>PM_{2.5} deposits on the surface of epithelial cells in the bronchioles and alveoli, and are phagocytosed by alveolar macrophages.</p> <p>PM_{1.0} deposition depends largely on diffusion and may have unique effects because of translocation into the bloodstream, with transport to other organs, including the heart and brain.</p> <p>Both PM_{2.5} and PM_{1.0} have been implicated in inducing pulmonary and systemic inflammation and oxidative stress, and may be associated with various cardiovascular endpoints, including vascular and endothelial dysfunction, alterations in heart rate variability, coagulation, and cardiac autonomic function.</p> <p>Populations at greatest risk: people with heart or lung disease, previous stroke, older adults, and children.</p>  <p>Particle size determines level of deposition.</p>
Ground-level ozone (O₃)	<p>Ground-level ozone (O₃) is an irritant gas, and a primary component of smog. (Atmospheric ozone, by contrast, is not harmful.)</p> <p>Ground-level ozone is created by chemical reactions between nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight. It's generally worse in hot, sunny weather and later in the day. In high elevations with heavy industry (such as Cache Valley and Uintah Basin) it can also be high in winter. While ozone is worse in urban environments, it can be transported hundreds of miles by wind.</p> <p>Sources: Emissions from industrial facilities, electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents.</p>	<p>When exposed to ozone, epithelial cells lining the respiratory tract leak intracellular enzymes and initiate a series of events leading to lung inflammation and airway narrowing. Neural inhibition of inhalation effort also leads to shortness of breath.</p> <p>The degree of decreased lung function varies substantially among individuals exposed to the same level of ozone, due to variations in breathing patterns and lung anatomy.</p> <p>Populations at greatest risk: people with lung disease, children and older adults, and people who are active outdoors.</p>
Sulfur dioxide (SO₂)	<p>SO₂ reacts with other compounds to form particulate matter.</p> <p>Sources: Vehicle emissions and industrial activity.</p>	<p>Short-term exposure is linked to adverse respiratory effects including bronchoconstriction and increased asthma symptoms, especially in asthmatics while exercising or playing.</p> <p>Populations at greatest risk: children, asthmatics, the elderly, and people with heart or lung disease.</p>
Nitrogen oxides (NO₂)	<p>NO₂ contributes to the formation of ground-level ozone and PM_{2.5}</p> <p>Sources: Emissions of motor vehicles, power plants, gas appliances, and other sources that burn fossil fuels.</p>	<p>Short-term exposure to NO₂ is linked to adverse respiratory effects including airway inflammation in healthy people and increased respiratory symptoms in people with asthma.</p> <p>Populations at greatest risk: people with asthma, children, and older adults.</p>
Carbon monoxide (CO)	<p>CO is a toxic gas that is colorless, odorless, and tasteless. In addition to the conditions described at right, it can cause sudden illness or death.</p> <p>Sources: Vehicle exhaust, fuel-burning appliances (wood stoves, gas water heaters, gas stoves, improperly used generators in enclosed spaces, unvented gas or kerosene heaters), cars idling in enclosed spaces, and smoking.</p>	<p>CO exposure initiates pulmonary and systemic oxidative stress, leading to a cascade of physiological responses that can instigate cardiovascular events such as congestive heart failure, cerebrovascular disease, anemia, and COPD.⁸⁰ Large quantities of CO inhibit the ability of hemoglobin to deliver oxygen to the body.</p> <p>Populations at greatest risk: people with cardiovascular disease or lung disease, pregnant women and their fetuses, and young infants.</p>

► HEALTH EFFECTS OF POOR AIR QUALITY

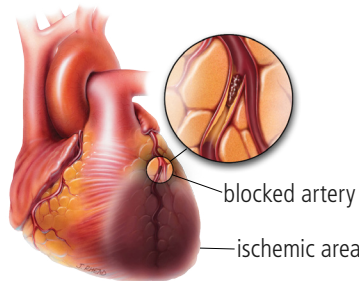
TABLE 1. Health effects of poor air

Acute effects of **short-term** exposure

Long-term effects of **repeated or chronic** exposure

Heart

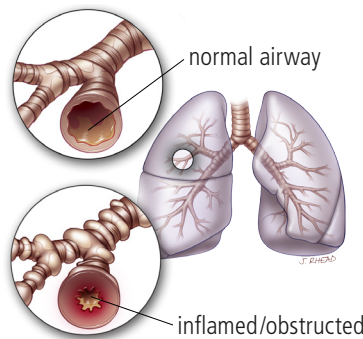
- PM is associated with changes in heart rate variability, blood pressure, vascular tone, blood coagulability, and destabilization and rupture of existing coronary artery plaque.^{ABE}
- CO reduces the oxygen-carrying capacity of the blood.



- PM exposure may accelerate the progression of atherosclerosis. Many of these effects are mediated through proinflammatory pathways and the generation of reactive oxygen species.^{ABE}

Lungs

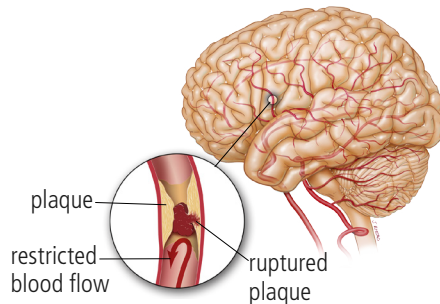
- PM is associated with significant inflammatory response even in healthy controls, and with increased asthma symptoms in those with asthma.^{SAL}
- Ozone is associated with decreased lung function and inflamed lung tissue, leading to neural shortness of breath, chest pain, cough, throat irritation, and congestion.
- NO₂ is associated with airway inflammation in people with and without asthma.



- PM exposure is associated with pulmonary inflammation, airway obstruction, and increased susceptibility to respiratory infection and sensitivity to allergens, increased childhood wheeze,^{DIC} and asthma development.^{MOR} It is also associated with increased risk of lung cancer.^{ABE}
- In children, repeated short-term ozone exposure damages developing lungs and may lead to reduced lung function in adulthood.
- In adults, ozone exposure may permanently scar lung tissue and accelerate the natural decline in lung function that occurs with age.^{EPA1}

Brain

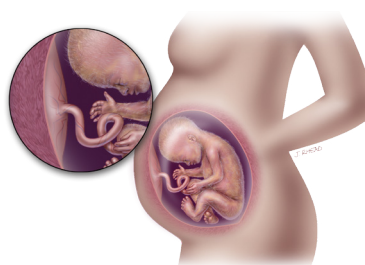
- Both PM and ozone increase the number of stroke events over several days following exposure — especially in people with prior history of stroke or greater number of cardiac risk factors.^{HEN}
- Systemic effects known to impact lung and cardiovascular disease also impinge on central nervous system health.^{BLO}



- PM and ozone exposure are associated with neuroinflammation, oxidative stress, and cerebral vascular damage.^{BLO}
- The above processes lead to increased incidence of ischemic stroke, Alzheimer's disease, and Parkinson's disease.^{BLO}
- PM has been associated with insidious effects on structural brain aging, even in dementia-free and stroke-free persons.^{WIL}

Pregnancy, infant, young child

- Researchers suspect that lung inflammation initiates a biochemical response that may cause placental insufficiency.^{EPA2}
- High levels of PM or CO during pregnancy may interfere with placental development and subsequent oxygen and nutrient delivery to the fetus.
- CO complicates the delivery of oxygen to the developing fetus.^{AAP}



- PM exposure is associated with premature delivery and low birth weight.^{EPA2}
- Maternal PM exposure during pregnancy may contribute to higher rates of infant mortality.^{EPA2}
- Children are at greatest risk from ozone exposure, as their lungs are still developing and they are more likely to be active outdoors when ozone levels are high.^{EPA2}

AVOIDING OR REDUCING EXPOSURE

The factors listed below increase health risk from poor air. Most recommended patient counselling revolves around these issues.

- **Prolonged exertion** is outdoor activity, either continued or intermittent, **over several hours** that causes a person to breathe harder than normal. Examples include working in the yard for part of the day, doing outdoor work, or prolonged exercise.
 - Counsel patients to reduce activity time or schedule activity early in the day when pollution is less.
- **Heavy exertion.** Intense outdoor activity that causes a person to breathe hard.
 - Counsel patients to exercise indoors, early in the day, or at an altitude above the inversion.
- **Increased pollution levels.** Ambient air pollution is generally worse near roads with heavy traffic and during commute hours, when more vehicles are on the road.
 - Counsel patients to avoid exposure to outdoor air near heavy road traffic whenever possible, and to schedule outdoor activities early in the day.^{ABE}
- **Individual susceptibility.** Patients should be taught to pay attention to how they feel and learn their personal sensitivity to each risk level of the Air Quality Index (see page 7).
 - Counsel patients to pay attention to places and situations that induce reactions. People who experience any unusual coughing, chest discomfort, wheezing, breathing difficulty, or unusual fatigue should reduce their activity level or move inside. Persistent symptoms should prompt medical attention.

WHAT WE DON'T KNOW

Exposure to poor quality air varies greatly among individuals. We don't know enough to be able to provide detailed advice on safe:

- Duration of exposure
- Chronicity of exposure
- Intensity of activity

► COUNSELLING PATIENTS

Poor quality air can affect all people, but certain populations are at increased risk. The guidelines outlined below are designed to help providers recommend reasonable safety precautions without causing undue alarm. The handouts pictured in each section provide guidance for patients. See page 8 for ordering instructions.

Pregnant women and developing fetuses

What we know: Prenatal exposure to high levels of polluted air can increase the risk of preterm birth, intrauterine growth retardation (IUGR), and low birth weight (LBW).^{AAP} Women exposed to high levels of ozone during the second and third trimesters are at particular risk for IUGR.^{EPA2} In utero and early life exposure to traffic-related pollution may increase the likelihood of clinically significant asthma later in life.^{DON}

What remains unclear: Existing evidence does not allow precise identification of specific pollutants and timing of exposure that can result in birth defects.^{WHO} A recent study found that higher maternal exposure to PM_{2.5} during pregnancy, in particular the third trimester, was associated with greater odds of having a child with autism spectrum disorder.^{RAZ} Further study is needed before this association can be confirmed.

What to do: Counsel patients to adjust activity or stay indoors during inversions and other periods of high AQI, and to quit smoking. Give the *patient fact sheet*.



Very young children

What we know: Young children are especially vulnerable due to ongoing lung development, incomplete metabolic systems, immature host defenses, and activity patterns that lead to higher exposure.^{WHO} Chronic exposure to air pollution may increase the risk of respiratory infections.^{WHO}

- Ambient air pollution is associated with increased upper and lower respiratory symptoms, reduced lung growth rates and lung function, aggravation of asthma, and increased cough and bronchitis.^{WHO}
- Children with underlying chronic lung diseases, particularly asthma and cystic fibrosis, are especially vulnerable later in childhood.^{WHO}

What remains unclear: Existing evidence does not show whether there is an increased risk of allergic sensitization in otherwise healthy children.

What to do: Counsel parents to keep very young children indoors during inversions and other periods of high AQI. Give the *patient fact sheet*.



Children with asthma

What we know: The effect of poor air quality on asthma is greater in children than adults due to ongoing development of lungs, brain, and immune systems.

- Short-term exposure is associated with exacerbation of existing asthma; increased severity of respiratory symptoms; increased use of outpatient care, emergency department visits, and hospitalizations.^{TO}
- Long-term exposure is associated with development of new asthma^{ABE}; possible delay of lung development^{ABE}; Repeated short-term ozone damage to may lead to reduced lung function in adulthood.^{EPA1}

What remains unclear: Existing evidence does not show which element of pollution is most responsible, or whether day-by-day prevention is possible.

What to do: Manage acute exacerbations triggered by air pollution clinically in the same manner as those triggered by other factors. Counsel patients to follow their asthma action plan, adhere to medications, and to avoid playing/exercising outdoors when AQI is high. Give the *patient fact sheet*.



People exercising or working outdoors

What we know: During exercise, elevated ventilation rate, mouth breathing, and increased airflow velocity carry pollutants deeper into the lungs and amplify the dose of pollutants. The effect may be worse in women.^{MAR}

- People exercising may be at particular risk of ozone exposure, due to heavier exertion in summer.
- The benefits of exercise outweigh the risks. Individuals should change location or timing of exercise, not quit.

What remains unclear: It is not clear how much exposure is a danger, or how long a person needs to be exposed. Further research is needed to better understand the role of PM and athlete performance on respiratory and cardiovascular disease.^{CUT}

What to do: Counsel patients to adjust activity and exercise indoors when possible. Give the *patient fact sheet*.



Adults with asthma

What we know:

- Short-term exposure is associated with exacerbation of preexisting asthma; increased susceptibility to allergens^{ABE}; reduced lung function and airway inflammation^{EPA1}; and increased use of asthma-related health services.^{TO} Patients with asthma have increased sensitivity to ozone, even at low levels of exposure.^{EPA1}
- Long-term exposure is associated with development of new asthma^{ABE}; acceleration of age-related decline in lung function.

What remains unclear: Existing evidences does not show which elements of pollution are most responsible, or whether day-by-day prevention is possible.

What to do: Manage acute exacerbations triggered by air pollution clinically in the same manner as those triggered by other factors. Counsel patients to follow their asthma action plan, adhere to medications (especially when AQI is high), adjust activity, and quit smoking. Give the [patient fact sheet](#).



Adults with lung disease (COPD, chronic bronchitis)

What we know:

- Short-term exposure is linked to exacerbation of preexisting disease; increased coughing and wheezing; increase in COPD hospitalizations and COPD-related mortality.^{FAU} Ambient air pollution, including traffic-related fine PM and wood smoke, is associated with increased risk of COPD^{FAU} and chronic bronchitis.^{SAL}
- COPD patients are especially susceptible to PM₁₀ and NO₂.^{FAU}

What remains unclear: Limited data exist in examining the relationship between air pollution exposure, physical activity, and resultant respiratory disease.

What to do: Manage acute exacerbations triggered by air pollution clinically in the same manner as those triggered by other factors. Counsel patients to adhere to medications (especially during periods of inversion), to adjust activity, and to quit smoking. Give the [patient fact sheet](#).



Adults with existing cardiovascular conditions (CAD, CHF, unstable angina)

What we know:

- Short-term exposure to poor air is linked to exacerbation of preexisting heart disease, increased hospitalization, and mortality due to cardiovascular disease, especially in persons with congestive heart failure, frequent arrhythmias, or both.^{BRO,POP1}
- Short-term elevated PM exposures and related inflammation may contribute to acute ischemic events by increasing the risk of plaque rupture and thrombosis.^{POP1} Exposure to particulate air pollution may play a role in precipitating heart failure symptoms in otherwise well-managed patients.^{POP2}
- Long-term exposure to air pollutants (especially PM_{2.5}, sulfate particles, and SO₂) has been linked to death from cardiovascular disease. There also appears to be an association between cardiopulmonary mortality and summertime ozone. Air pollution is associated with both ischemic and nonischemic cardiovascular events.^{BRO}

What remains unclear: Limited data exist in examining the relationship between air pollution exposure, physical activity, and new onset cardiovascular disease.

What to do: Manage acute exacerbations triggered by air pollution clinically in the same manner as those triggered by other factors. Counsel patients to adhere to medications (especially when AQI is high), to adjust activity, and to quit smoking. Give the [patient fact sheet](#).



Adults with existing neurological conditions (stroke, TIA)

What we know:

- Short-term exposure to elevated levels of particulate matter and ozone increases the number of ischemic cerebrovascular events on subsequent days, especially in patients with prior history of stroke^{QUD} and cardiac risk factors.^{HEN} Recent PM_{2.5} and ozone exposure has been associated with stroke/TIA risk even in a community with relatively low pollutant levels.^{MIT}
- Long-term, chronic exposure to air pollution is also associated with increased risk of stroke. The association is stronger for fatal than nonfatal stroke, and stronger for ischemic than hemorrhagic stroke.^{MIT}

What remains unclear: The pathways for such an increased susceptibility are unknown.

What to do: Manage acute exacerbations triggered by air pollution clinically in the same manner as those triggered by other factors. Counsel patients to adhere to medications (especially when AQI is high), to adjust activity, and to quit smoking. Give the [patient fact sheet](#).



KEY RECOMMENDATIONS

- Guidance related to air pollution exposure should not discourage physical activity, except for those with known cardiopulmonary disease.
- Counsel patients to adjust activity and/or exercise indoors as recommended in patient handout.
- Give patient fact sheet at visit. To pre-order color copies of fact sheets, see [instructions on page 8](#).

OLDER ADULTS ARE ALSO AT GREATER RISK

Older adults are considered to be particularly susceptible to short-term risk. This may be due to the fact that they are more likely to have undiagnosed cardiovascular or respiratory conditions.

✓ KEY MESSAGES

- Winter temperature inversions increase particulate matter pollution.
- Within-city variations in air quality vary greatly. Living near a major roadway can have a greater effect on health than city-wide background air pollution.

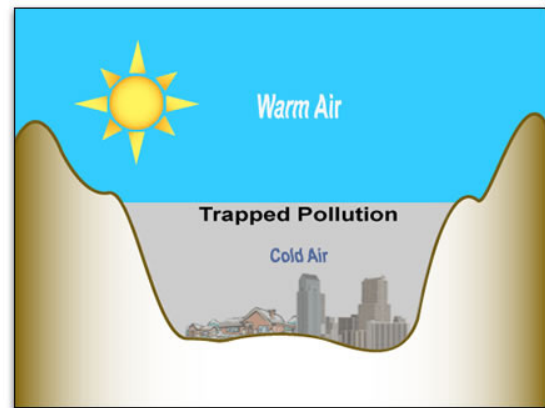
► AIR QUALITY AND LOCATION

Air quality in Utah has been consistently recognized as some of the worst in the United States. This is due in part to a confluence of topographic and meteorologic factors, and concentrated populations.

Winter temperature inversions in Utah valleys and particulate matter

Utah's topography contributes to the creation of winter temperature inversions, which in turn increase the concentration of winter air pollution. Temperature inversion is especially problematic in the basin communities of the Wasatch Front, Cache Valley, and the Uintah Basin.

- Cold air flows from mountain peaks into the valleys and pushes under the warmer air rising from the valley.
- Warm air acts as a "lid" trapping the cold air below.
- Snow-covered valley floors reflect the heat rather than absorb it, and prevent the normal vertical mixing of air.
- Pollutants build up in the trapped cold air.



Because the majority of Utah's population lives in a relatively small area along the Wasatch Front, the effects of human activity — especially vehicle exhaust — are concentrated. Encourage patients to listen to news sources for air quality updates.

Regional industrial and agricultural processes and other pollutants

Industrial and agricultural processes also contribute to Utah's poor air.

- Cache Valley experiences ozone pollution year round due to oil and gas production.
- Eastern Utah and the Uintah Basin experience increased ozone pollution year round due to oil and gas production.
- Rural communities experience increased coarse particulate matter from blowing dust and increased nitrogen dioxide from agricultural processes.

Air quality variations within a city

An individual's exposure to air pollution may vary as much within a single city as across different cities.^{BRO} Near freeways and busy highways air quality may never be acceptable and are a risk factor for mortality due to air pollution. One large study found exposure to traffic-related air pollutants was more highly related to mortality than were city-wide background levels. Patients at high risk may benefit from moving to a less-polluted area if possible.

▶ THE AIR QUALITY INDEX (AQI)

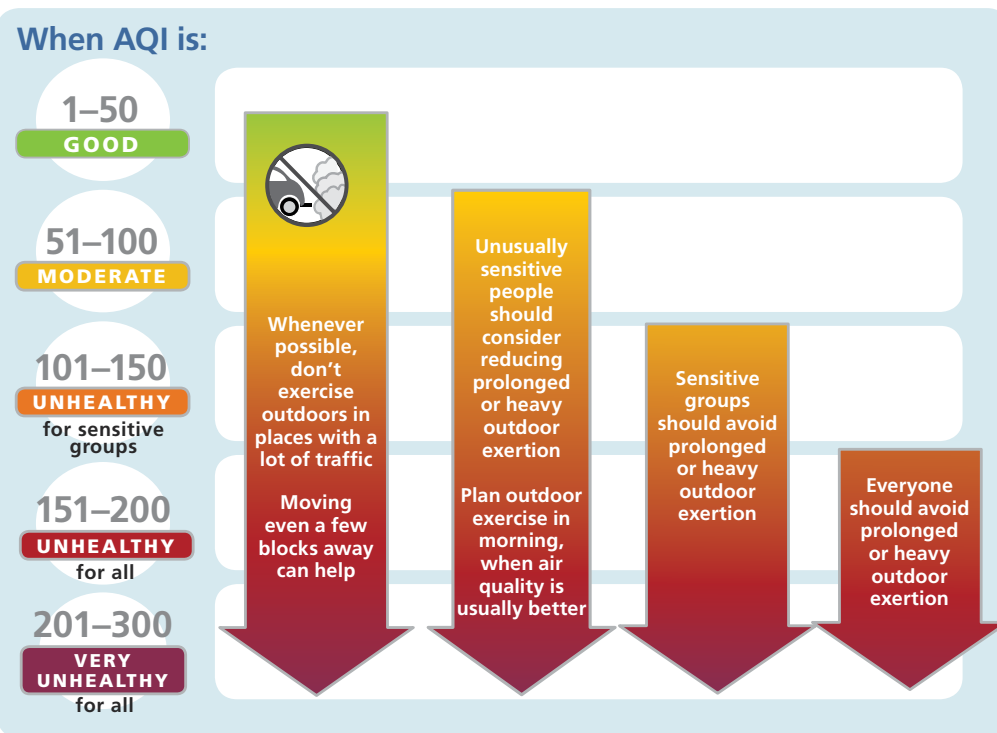
The AQI is a measurement used by the Environmental Protection Agency (EPA) and local air quality officials to let the public know when major air pollutant levels become unhealthy. Currently, the EPA measures particle pollution (PM), ground-level ozone (O₃), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), and carbon monoxide (CO). In cities with more than 350,000 inhabitants, state and local agencies are required to report the AQI to the public daily.

What does the AQI mean?

Each pollutant “safe level” (based on EPA standards for public health) is expressed as 100. If there is an unsafe level of a single pollutant, the AQI number will be over 100. If more than one pollutant is above the safe level, the AQI number used will be the highest recorded of the pollutants measured. For example, if the AQI on a given day is 130 for ozone and 101 for particulate matter, the report would announce the AQI as “130 for ozone, and particulate matter is also high.” When AQI is above 100, the report must also include which groups may be sensitive to the pollutant.

Where is the AQI reported?

1. On the web: Visit airnow.gov for daily AQI conditions and forecasts for over 300 U.S. cities as well as links to local sites.
2. In the media: Many local radio, television, and newspapers provide daily reports as part of the weather forecast.
3. On smartphone apps: Including [UtahAir](#) and [AirNow](#).
4. Via email: Sign up for free emails and advice on safety measures from the EPA at enviroflash.info.



MEASUREMENT STATIONS IN UTAH

Utah has 23 air quality measurement stations. Three measure only wind, and 20 measure a variety of pollutants, as outlined below:

- **Box Elder County**, 140 W. Fishburn Dr, Brigham City: PM_{2.5}, O₃
- **Cache County**
 - 125 W. Center St, Logan: O₃, PM₁₀, PM_{2.5}, NO₂, SO₂
 - 675 W. 220 N., Smithfield: PM₁₀, PM_{2.5}
- **Carbon County**, 351 S. 2500 E., Price: O₃, NO₂, NO_x
- **Davis County**, 171 W. 1370 N., Bountiful: NO₂, O₃, SO₂, PM_{2.5}, PM₁₀, CO
- **Duchesne County**
 - 6200 S. 45000 W., Fruitland: O₃, NO₂, NO_x
 - 290 S. 1000 W., Roosevelt: O₃, NO₂, NO_x
- **Uintah County**, 600 N. 1650 E., Vernal: O₃, PM_{2.5}, NO₂, NO_x
- **Utah County**
 - 50 N. Main St, Lindon: PM_{2.5}, PM₁₀
 - 1355 N. 200 W., Provo: CO, NO₂, O₃, PM_{2.5}, PM₁₀
 - Airport, Spanish Fork: O₃, PM_{2.5}
- **Salt Lake County**
 - 1675 S. 600 E., SLC: PM_{2.5}, PM₁₀, CO, O₃, NO₂
 - 1400 W. Goodwin Ave, SLC: PM_{2.5}
 - 8449 S. Monroe St, Midvale: O₃, NO₂
 - 14058 Mirabella Dr, Herriman: O₃, NO₂
 - 1200 S. 8560 W., Magna: SO₂, Pb, PM₁₀
- **Tooele County**: O₃, PM_{2.5}
- **Washington County**: 147 N. 870 W., Hurricane: O₃, PM_{2.5}, NO₂, NO_x
- **Weber County**
 - 425 W. 2550 N., Harrisville: O₃, PM₁₀, PM_{2.5}
 - 228 E. 32nd St, Ogden: NO₂, NO_x, PM₁₀, PM_{2.5}

RESOURCES

Patient education resources

Order preprinted Intermountain fact sheets for distribution to patients:

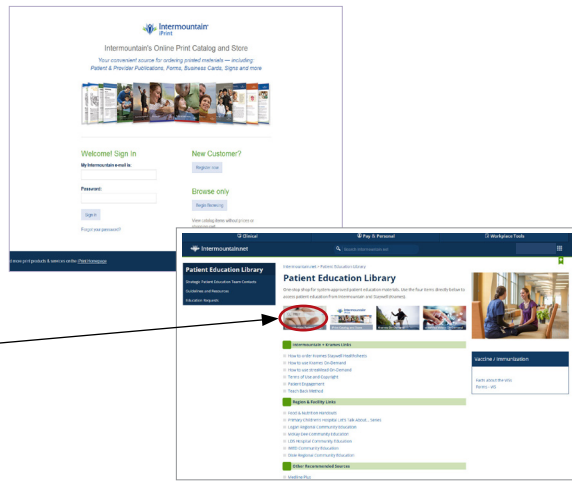
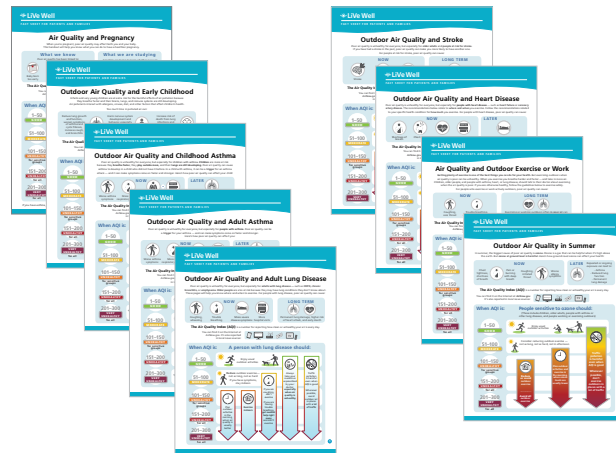
- Use iPrintStore.org, Intermountain’s online library and print center. Print from your desktop (this option *only* recommended if you can print in color; key information is lost in black and white):
- Log in to Intermountain.net **Patient Education Library** (PEL) page. Click on the Intermountain Patient Education box and search for the title or item number.
- Or, click on the links provided within this document.

These fact sheets are *not* currently available in the iCentra workflow.

Provider resources

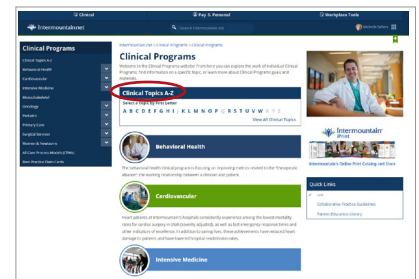
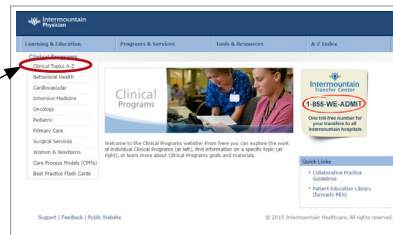
Intermountain fact sheets:

- [Air Quality and Pregnancy \(FSLW065\)](#)
- [Outdoor Air Quality and Early Childhood \(FSLW058\)](#)
- [Outdoor Air Quality and Childhood Asthma \(FSLW059\)](#)
- [Outdoor Air Quality and Adult Asthma \(FSLW060\)](#)
- [Outdoor Air Quality and Adult Lung Disease \(FSLW061\)](#)
- [Outdoor Air Quality and Stroke \(FSLW062\)](#)
- [Outdoor Air Quality and Heart Disease \(FSLW063\)](#)
- [Air Quality and Outdoor Exercise or Work \(FSLW064\)](#)
- [Outdoor Air Quality in Summer \(FSLW066\)](#)



To find this CPM and its reference list, go to either IntermountainPhysician.org/clinicalprograms or Intermountain.net/clinicalprograms and click on **Clinical Topics A–Z** to see the **Air Quality** topic page.

Printed copies can be ordered from iPrintstore.org.



Other helpful resources

- Utah Division of Air Quality, airquality.utah.gov
- Utah Clear Air, UCAIR.org
- Materials from the Environmental Protection Agency, available at epa.gov/airquality
 - [AQI: A Guide to Air Quality and Your Health](#)
 - [Air Pollution and Pregnancy](#)

