AMERICAN LUNG ASSOCIATION®

STATE OF THE AIR 2019

20th ANNIVERSARY

Acknowledgments

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The American Lung Association assumes sole responsibility for the content of the American Lung Association "State of the Air® 2019."

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The State of the Air 2019

Too many cities across the nation experienced more ozone and more particle pollution in 2015-2017. Many reached or tied their highest levels ever.

The "State of the Air" 2019 found that, in 2015-2017, more cities had high days of ozone and short-term particle pollution compared to 2014-2016 and many cities measured increased levels of year-round particle pollution.

The "State of the Air" 2019 report shows that too many cities across the nation increased the number of days when particle pollution, often called "soot," soared to often record-breaking levels. More cities suffered from higher numbers of days when ground-level ozone, also known as "smog," reached unhealthy levels. Many cities saw their year-round levels of particle pollution increase as well.

The "State of the Air" 2019 report adds to the evidence that a changing climate is making it harder to protect human health. The three years covered in this report ranked as the hottest years on record globally. High ozone days and spikes in particle pollution zoomed, putting millions more people at risk and adding challenges to the work cities are doing across the nation to clean up.

The 2019 report—the 20th annual release—uses the most recent quality-assured air pollution data, collected by the federal, state and local governments and tribes in 2015, 2016 and 2017. The "State of the Air" 2019 report looks at levels of ozone and particle pollution found in official monitoring sites across the United States in 2015, 2016 and 2017. For comparison, the "State of the Air" 2018 report covered data from 2014, 2015 and 2016.[1] The report uses the most current quality-assured nationwide data available for these analyses.

The report examines particle pollution ($PM_{2.5}$) in two separate ways: averaged year-round (annual average) and short-term levels (24-hour). For both ozone and short-term particle pollution, the analysis uses a weighted average number of days that allows recognition of places with higher levels of pollution. For the year-round particle pollution rankings, the report uses averages calculated and reported by the U.S. Environmental Protection Agency (EPA).

Overall Trends

The "State of the Air" 2019 found that ozone and short-term particle pollution worsened in many cities in 2015-2017, compared to 2014-2016. Even levels of year-round particle pollution increased in some cities.

More than four in 10 Americans, approximately 43.3 percent of the population, live in counties that have monitored unhealthy ozone and/or particle pollution. The number of people exposed to unhealthy air increased to nearly 141.1 million. That represents an increase from the past two reports: higher than the 133.9 million in the 2018 report (covering 2014-2016) and the 125 million in the 2017 report (covering 2013-2015). **Close to 20.2 million people,** or 6.2 percent, **live in 12 counties with unhealthful levels for all three measures.**

Still, progress continues, thanks to the tools in the Clean Air Act. While this is a significant spike in areas with unhealthy levels of ozone and particle pollution, it remains still far below the 166 million in the years covered in the 2016 report (2012-2014).

Los Angeles remains the city with the worst ozone pollution as it has for 19 years of the 20-year history of the report. **Fresno-Madera-Hanford, CA returned to the most-polluted slot for year-round particle pollution,** while **Bakersfield, CA, maintains its rank** as the city with the **worst short-term particle pollution.**

More must be done to address climate change and to protect communities from the growing risks to public health. This year's report covered the three warmest years in modern history and demonstrates the increased risk of harm from air pollution that comes despite other protective measures being in place. **The Clean Air Act must remain intact and enforced** to enable the nation to continue to protect all Americans from the dangers of air pollution. This law has driven improvements in air quality for nearly 50

years, improvements that the "State of the Air" 2019 continues to document. Figure 1 from EPA shows that since 1970, the air has gotten cleaner while the population, the economy, energy use and miles driven increased greatly.[2] We must ensure that the Clean Air Act's tools remain in place, funded, and followed.

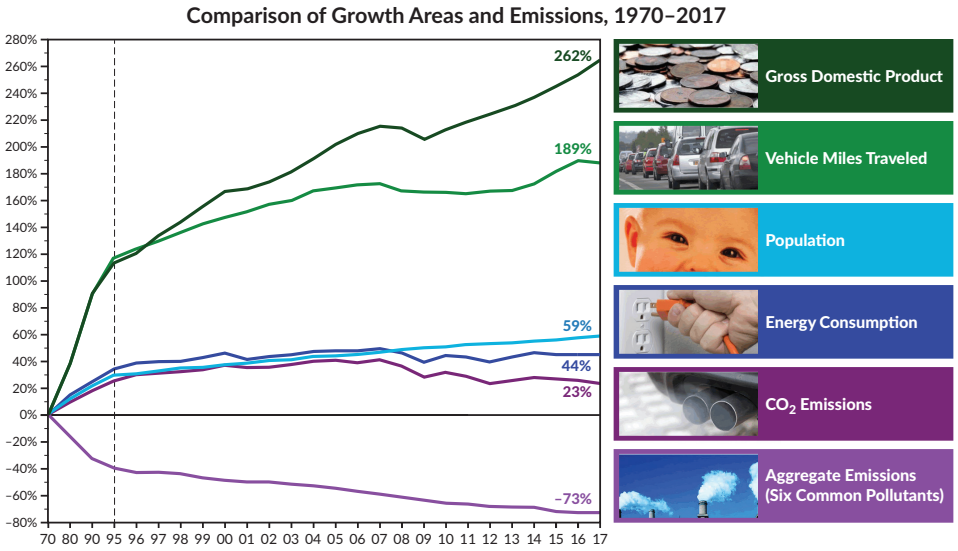

Figure 1: Air pollution emissions have dropped steadily since 1970 thanks to the Clean Air Act. Source: U.S. EPA, Air Trends: Air Quality National Summary, 2019.

As climate change continues, cleaning up these pollutants will become ever more challenging.

The "State of the Air" 2019 report shows, again, that climate change makes it harder to protect human health. This year's report shows the spike in high ozone days and in unhealthy particle pollution episodes driven by wildfires. While most of the nation has much cleaner air quality than even a decade ago, too many cities suffered increased ozone from the increased temperature and continued high particle pollution from wildfires driven by changing rain patterns.

As climate change continues, cleaning up these pollutants will become ever more challenging. Climate change poses many threats to human health, including worsened air quality and extreme weather events. The nation must work to reduce emissions that worsen climate.

The Clean Air Act must remain intact and enforced to enable the nation to continue to protect all Americans from the dangers of air pollution. At its core, the Clean Air Act protects public health and has driven improvements in air quality for nearly 50 years, as shown in Figure 1. Since 2000, the "State of the Air" reports have also documented these improvements, as shown in trend charts for counties and cities available at www.stateoftheair.org. That progress is not certain to continue, as some in Congress seek to remove or weaken that law, and as the administration seeks to repeal or reverse the safeguards in place to enforce the law.

Ozone Pollution

Ozone pollution worsened in much of the nation. Of the 25 most-ozone-polluted cities in the U.S, 17 had more high ozone days on weighted average during 2015-2017, than in the 2018 report that covered 2014-2016. Eight of the 25 cities had fewer days, three reaching their fewest days ever.

Increased heat in 2017, the third warmest year on record in the United States, likely drove this increase in ozone. All three years in this report mark the warmest years ever recorded.

Increased heat in 2017 likely drove this increase in ozone. Warmer temperatures stimulate the reactions in the atmosphere that cause ozone to form, and 2017 saw the second warmest temperatures on record in the United States. All three years covered in this report rank as the three warmest years ever recorded.[3]

Los Angeles remains at the top of this list as it has for all but one of the 20 reports. Los Angeles also recorded more unhealthy ozone days in this report, measured by weighted average.

In addition to Los Angeles, 16 others among the 25 cities with the worst ozone pollution each had a higher average of unhealthy days in 2015-2017, including some of the nation's largest metropolitan areas: New York City; Chicago; San Diego; Denver; Phoenix; Houston; Las Vegas; Philadelphia; Washington-Baltimore; and Salt Lake City. Many smaller cities on that list also suffered from more ozone: Visalia, CA; Sacramento, CA; El Centro, CA; Chico, CA; El Paso-Las Cruces, TX-NM; and Sheboygan, WI.

Eight cities had fewer unhealthy ozone days on average in 2015-2017, including three that reached their fewest unhealthy days ever: Bakersfield, CA; Dallas-Fort Worth; and San Jose-San Francisco (with additional counties in the metro area). Other cities that had fewer high-ozone days included: Fresno-Madera-Hanford, CA; Atlanta, GA; Fort Collins, CO; Redding-Red Bluff, CA; and Hartford, CT.

These rankings are all based on unhealthy air days as recorded using the Air Quality Index adopted with the 2015 ozone national air quality standard. In 2018, EPA officially designated all or parts of the 25 most polluted cities as "nonattainment" for the 2015 ozone national air quality standard. That action requires all to take steps to clean up the sources of pollution going forward.

Regional Differences. Cities in the West and the Southwest continue to dominate the most-ozone-polluted list. California retains its historic distinction with 10 of the 25 most-polluted cities in that state. The Southwest continues to fill most of the remaining slots, with eight of the 25 cities. Texas has three cities in the 25 most-polluted list: Houston, Dallas-Fort Worth and El Paso. Colorado has two: Denver and Fort Collins. Arizona, Nevada and Utah each have one.

Only seven cities are east of the Mississippi River, including the New York City metro area, where Fairfield, CT suffers from the highest levels in the metropolitan area. Others in the Northeast and Mid-Atlantic in the 25 most-polluted list are Philadelphia; Washington, DC-Baltimore, MD; and Hartford, CT. The Midwest has two: Chicago and Sheboygan, WI. Atlanta remains the only southeast city to remain on the list.

The findings show the continued impact of transported pollution that moves ozone and ozone precursors across state lines. Chicago's ozone crosses Lake Michigan to reach Sheboygan, WI. Fairfield County, CT, remains the county with the highest ozone in the eastern half of the nation because of the transported ozone from other states.

Increased heat played a major role in the higher number of unhealthy air days. This year's report covers the three warmest years on record in the U.S. According to the National Oceanic and Atmospheric Administration, 2017 was the second warmest year on record, following 2016, which was the warmest year, and just ahead of 2015, which was the third warmest. Warmer weather makes ozone more likely to form.

Those changes reflect changes seen in the past four reports, where increased oil and gas extraction in the Southwest and cleanup of power plants in the eastern U.S. have shifted the cities that experienced the greatest number of unhealthy air days.

Short-Term Particle Pollution

Bakersfield (CA) remains the city most polluted by spikes in particle pollution. Bakersfield has held this position for all but two years since the 2010 report covering data from 2006-2008. **Twenty of the 26 most polluted cities had more days on average** in the 2019 report. Many of these are due to wildfires.

Eight cities had their highest-ever weighted average number of days with spikes in particle levels: Fairbanks, AK; Missoula, MT; Yakima, WA; Spokane-Spokane Valley-Coeur d'Alene, WA-ID; Santa Maria-Santa Barbara, CA; Salinas, CA; Bend-Prineville, OR; and Bismarck, ND.

Wildfire smoke shifted Santa Maria—Santa Barbara, CA off the list of cleanest cities for short-term particle pollution for the past six years to rank as the 17th most polluted city.

Showing the impact of wildfires, prior to this year's report, Santa Maria—Santa Barbara, CA had been on the list of cleanest cities for short-term PM for the past six years.

Twelve others also suffered from more days when particle pollution spiked into unhealthy levels. San Jose-San Francisco, Los Angeles, Seattle and Pittsburgh, Logan, UT; Phoenix; Sacramento; Medford-Grants Pass, OR; Eugene, OR; Reno, NV; Portland, OR; and Pocatello, ID.

San Jose-San Francisco CSA added two counties from the former Modesto-Merced MSA, which had ranked fifth most polluted in the 2018 report. Their addition increased the weighted average, but, even without those counties, the metro area had more days.

Six of the 26 most-polluted cities improved and had fewer unhealthy air days on average than in the 2018 report. Despite being among the 10 most-polluted, Salt Lake City dropped to its fewest days ever reported on average. Five other cities had fewer unhealthy days on average: Bakersfield, CA; Fresno-Madera-Hanford, CA; Anchorage; Visalia, CA; and El Centro, CA.

In California, Washington and Oregon, extended wildfires increased the days when PM levels spiked. The Los Angeles metro area had two days when levels spiked to "hazardous," the highest "maroon" level in the Air Quality Index. Medford-Grants Pass, OR, Eugene, OR and Calaveras County, CA each had one maroon day.

Wildfires are not the only source of high particle pollution days. Other sources including wood stove use (especially in Fairbanks), older diesel vehicles and equipment, and industrial sources (as in Pittsburgh) contribute to a lot of particle pollution. Changes in weather patterns can create atmospheric inversions that trap particles in place, leading to days with spikes. Pittsburgh is the only city in the 25 most polluted that is east of the Mississippi River.

Year-Round Particle Pollution

Fresno-Madera-Hanford, CA returned to the rank of most polluted by year-round particle pollution in 2015-2017. This metro area now officially includes Kings County, the county with the highest year-round levels of particle pollution in the nation. This ties the highest year-round levels ever for Kings County, and for the metro area.

Fourteen of the 25 cities most polluted year-round by particle pollution improved over the levels in the 2018 report. Bakersfield, Visalia (CA), and El Centro (CA) continued to improve as they had in the 2018 report. Last year's most-polluted city, Fairbanks, AK, dropped back to #3. Ten reached their lowest annual level ever: Cleveland; Detroit; Birmingham; Lancaster, PA; Houston, TX, Philadelphia; Chicago; Indianapolis; Harrisburg, PA; and Knoxville, TN. This is Chicago's first year back with complete data on particle pollution in Illinois.

Fourteen of the 25 cities with the highest year-round particle levels experienced lower levels in the 2019 report.

Eleven of the 25 cities suffered worse year-round levels. Two, Fresno-Madera-Hanford, CA and Missoula, MT, tied their worst annual average levels of particle pollution. Others that had higher levels were Los Angeles; San Jose-San Francisco; Pittsburgh; Medford-Grants Pass, OR; Cincinnati; Johnstown-Somerset, PA; Atlanta; McAllen-Edinburg, TX; and Shreveport, LA.

All the cities below the seven most-polluted meet the current national air quality standards. Often annual levels vary in cities once they clean up enough to meet that standard. However, evidence shows that no threshold exists for harmful effects from particle pollution, even below the official standard.

California continues to dominate this list, with six of the 10 most-polluted, and five of the seven cities that fail to meet the annual standard. Pennsylvania has five cities on this list, although only Pittsburgh fails to meet the standard. Other areas with several cities on the list include the Midwest with five cities; Southeast with four cities; the Northwest with three cities; and Texas with two.

For San Jose-San Francisco, the higher levels came in the two counties added to the metro area by the Office of Management and Budget. Both had been part of the former Merced-Modesto, CA MSA. They were incorporated into the larger CSA because of increased integration with the larger metro area.

Cities with high power plant emissions as well as local, industrial sources continue to show up on the list. That list includes Pittsburgh; Philadelphia; Detroit; Cincinnati; Cleveland; Chicago; Birmingham; Atlanta; Indianapolis; Youngstown; and Shreveport, LA.

Fortunately, year-round particle pollution continues to decline across most of the nation, unlike the days with high ozone and high short-term particle pollutions.

Because of the high numbers and long duration, the western wildfires contributed to some of the elevated annual averages in western cities. That is especially true in Missoula, MT, Medford-Grants Pass, OR, and likely in Los Angeles as well.

Cleanest Cities

Six cities ranked on all three cleanest cities lists for ozone, year-round particle pollution and short-term particle pollution. They had zero high ozone or high particle pollution days and were among the 25 cities with the lowest year-round particle levels. Four have repeated their ranking on this list, but two join this list for the first time. Listed alphabetically below, these six cities are:

- Bangor, ME
- Burlington-South Burlington, VT
- Honolulu, HI
- Lincoln-Beatrice, NE
- Palm Bay-Melbourne-Titusville, FL
- Wilmington, NC

Eight other cities ranked among the cleanest cities for both year-round and short-term levels of particle pollution. That means they had no days in the unhealthy level for short-term particle pollution and were on the list of the cleanest cities for year-round particle pollution. They are:

- Cape Coral-Fort Myers-Naples, FL
- Elmira-Corning, NY
- Gainesville-Lake City, FL
- Grand Island, NE
- North Port-Sarasota, FL
- Pittsfield, MA
- St. George, UT
- Syracuse-Auburn, NY

Nineteen other cities ranked among the cleanest for ozone and short-term particle pollution. That means they had no days in the unhealthy level for ozone or for short-term particle pollution. They are:

- Bowling Green-Glasgow, KY
- Clarksville, TN-KY
- Eau Claire-Menomonie, WI
- Fayetteville-Sanford-Lumberton, NC
- Fayetteville-Springdale-Rogers, AR
- Florence, SC
- Fort Smith, AR-OK
- Gadsden, AL
- Greenville-Kinston-Washington, NC
- Houma-Thibodaux, LA
- Jackson-Vicksburg-Brookhaven, MS
- La Crosse-Onalaska, WI-MN
- McAllen-Edinburg, TX
- Monroe-Ruston, LA
- Roanoke, VA
- Springfield, MO
- Tallahassee, FL
- Tuscaloosa, AL
- Waterloo-Cedar Falls, IA

Four cities ranked on both lists for ozone and year-round particle pollution levels. These cities had no days in the unhealthy level for ozone pollution and were on the list of the cleanest cities for year-round particle pollution. They are:

- Anchorage, AK
- Bellingham, WA
- Casper, WY
- Salinas, CA

People at Risk

The "State of the Air" 2019 shows that too many people in the United States live where the air is unhealthy for them to breathe.

- **More than four in 10 people (43.3 percent) in the United States live in counties that have unhealthful levels of either ozone or particle pollution.** Nearly 141.1 million Americans live in 244 counties where they breathe unhealthful levels of air pollution in the form of either ozone or short-term or year-round levels of particles.
  - **The number has increased—again.** More people suffered unhealthy air in this year's report covering 2015-2017, than in the years covered by the 2018 report (2014-2016) when the total was 133.9 million and more than in the 2017 report (2013-2015), when the total was only 125 million. Fortunately, these are still far below the 166 million in the years covered in the 2016 report (2012-2014).
  - **Why? One big reason is climate change.** Warmer weather, different rain patterns create continued challenges to long-term progress in reducing harmful air pollution under the Clean Air Act.
- **More than four in 10 (41.1 percent) of the people in the United States live in areas with unhealthy levels of ozone pollution.** More than 134.0 million people live in 197 counties that earned an F for ozone in this year's report, significantly more than the approximately 128.9 million people who lived in counties earning an F in 2014-2016, the period covered in last year's report.
- **Nearly one in six people (15.2 percent) in the United States—more than 49.6 million—live in an area with too many days with unhealthful levels of particle pollution.** More people experienced those unhealthy spikes than in the last two reports. In the 2018 report, approximately 35.1 million people and in the 2017 report, approximately 43 million people experienced too many unhealthy days.
- **More than 20.5 million people (6.3 percent) suffered from unhealthy year-round levels of particle pollution in 2015-2017.** These people lived in 18 counties where the annual average concentration of particle pollution was too high. This population estimate is considerably higher than in last year's report, when the data showed only 9.8 million people who lived where the year-round levels were unhealthy. As explained last year, the lower tally of populations exposed was likely due to missing population data from two counties with incomplete data—Los Angeles County and San Bernardino County in California. Data from those counties are available again and included in this estimate, so their populations were included in the tally this year.
- **Nearly 20.2 million people (6.2 percent) live in 12 counties with unhealthful levels of all three: ozone and short-term and year-round particle pollution in 2015-2017.** The difference in this year's and the 2018 report's estimate of 7.7 million exposed to unhealthy levels for all three measures also comes largely because of the missing data from the two California counties. However, a better comparison is with the 2017 report which covered 2013-2015, when both California counties reported data. This year's report found an additional 2.1 million people lived in counties in 2015-2017 with unhealthy air for all three measures than the 18 million people reported in the 2017 report.

Many people are at greater risk because of their age or because they have asthma or other chronic lung disease, cardiovascular disease or diabetes, or because they have low socioeconomic status. With the risks from airborne pollution so great, the Lung Association seeks to inform people who may be in danger. The following list identifies the numbers of people in each at-risk group.

- **Older and Younger**—Nearly 20 million adults age 65 and over and more than 32.5 million children under 18 years old live in counties that received an F for at least one pollutant. More than 2.6 million seniors and nearly 4.9 million children live in counties failing all three tests.

- **People with Asthma**—More than 2.5 million children and more than 9.7 million adults with asthma live in counties of the United States that received an F for at least one pollutant. More than 306,000 children and more than 1.2 million adults with asthma live in counties failing all three tests.
- **Chronic Obstructive Pulmonary Disease (COPD)**—More than 6.2 million people with COPD live in counties that received an F for at least one pollutant. More than 686,000 people with COPD live in counties failing all three tests.
- **Lung Cancer**—More than 75,200 people with lung cancer live in counties that received an F for at least one pollutant. More than 8,600 people with lung cancer live in counties failing all three tests.
- **Cardiovascular Disease**—More than 8.2 million people with cardiovascular diseases live in counties that received an F for at least one pollutant; nearly 968,000 people live in counties failing all three tests.
- **Diabetes**—More than 3.7 million people with diabetes live in counties that received an F for either short-term or year-round particle pollution; more than 1.5 million live in counties failing both tests. Having diabetes increases the risk of harm from particle pollution.
- **Poverty**—More than 17.9 million people with incomes meeting the federal poverty definition live in counties that received an F for at least one pollutant. More than 3 million people in poverty live in counties failing all three tests. Evidence shows that people who have low incomes may face higher risk from air pollution.

Seven threats to the nation's air quality

The nation has made significant strides to clean up the air we breathe over the past two decades since our first "State of the Air" Report. Serious challenges remain, especially tackling the growing threats from climate change. Cleaning up air pollution requires a strong, coordinated effort on the part of our federal, state, tribal and local leaders. Stopping or retreating cannot be an option.

Unfortunately, this Administration has focused on steps to roll back or create loopholes in core healthy air protections put in place to comply with the Clean Air Act. These attacks began under the former U.S. EPA Administrator Scott Pruitt and have continued and expanded under the current Administrator, Andrew Wheeler. Not only has this Administration targeted specific Clean Air Act safeguards for rollbacks, it has also sought to weaken the scientific review and undermine the basis for current and future protections.

Below are seven key threats to the nation's progress toward cleaner, healthier air. The Lung Association strongly opposes these actions that pave the way for more pollution in the air we breathe, and we hope you will speak up for healthy air as well.

The American Lung Association opposes efforts to repeal the Clean Power Plan and will continue to push for a system-wide reduction in carbon dioxide emissions from power plants.

Threat 1: Repealing plans to reduce carbon pollution from power plants

To protect public health, the nation must act to fight climate change. This means dramatically cutting carbon pollution. Unfortunately, the current EPA has taken steps to dismantle our nation's best federal plan to limit carbon pollution from power plants, the Clean Power Plan, and has proposed a weaker approach that would increase harmful emissions.

Scientists tell us that carbon pollution contributes to a warming climate, enhancing conditions for ozone formation and making it harder to reduce this lethal pollutant. The increased ozone problems reflected in this year's report came in large part because 2015, 2016, and 2017 represent the three warmest years in global history.[4] Climate change also leads to particle pollution from worsened droughts and wildfires, leading to many of the high particle pollution days recorded in 2015-2017 and documented in this report.

Power plants comprise the largest stationary source of carbon pollution in the United States. The electric sector produced 28.4 percent of all energy-related greenhouse gas emissions in 2016, with coal-fired power plants contributing approximately 67 percent of those emissions.[5] These utilities emitted 24 percent of the total industrial carbon dioxide emissions in 2016.[6]

The current Administration has proposed to repeal the Clean Power Plan, the only nationwide plan to clean up carbon pollution from these power plants. Adopted in 2015, the Clean Power Plan delivered a flexible, practical toolkit for states to reduce carbon pollution from power plants approximately 32 percent (below 2005 levels) by 2030. States could choose a variety of ways to cut carbon pollution, including requiring cleaner fuels for existing utilities, improving energy efficiency, producing more clean energy or partnering with other states to jointly reduce carbon pollution.

Reducing carbon to tackle climate change was only one of the anticipated benefits from the Clean Power Plan. Steps to reduce carbon using the tools in the Clean Power Plan also reduce other air pollutants that themselves worsen asthma, cause cardiovascular harm and cause premature deaths. EPA's original analysis estimated that reducing these other pollutants would prevent up to 3,600 premature deaths and up to 90,000 asthma attacks in children in 2030.[7] In an updated analysis in 2017 published along with EPA's proposal to repeal the Plan, the Agency projected even greater benefits from putting the Plan in place, including preventing up to 4,500 premature deaths in 2030.[8]

Even though EPA has proposed to repeal the Clean Power Plan, the Clean Air Act still requires that the agency reduce carbon pollution, which means that EPA must clean up carbon pollution from power plants. In August 2018, EPA proposed a dangerous replacement, called the "Affordable Clean Energy (ACE)" Rule. The ACE plan only sets minimal limits on carbon emissions at power plants themselves, rejecting the approach of the Clean Power Plan that embraced a wide range of solutions to reduce carbon emissions from the entire electrical system. The ACE rule is especially dangerous because, not only would the plan have far less impact on reducing carbon pollution, independent scientists found that this type of approach could actually *increase* emissions of at least one other dangerous air pollutant, and, with that, increase the risk of premature deaths and asthma attacks.[9] In short, EPA's proposed replacement for the Clean Power Plan could be worse than doing nothing at all.

The Lung Association spoke out in opposition to the ACE proposal with our medical and health partners[10] and will continue to oppose efforts to repeal the Clean Power Plan. The nation urgently needs a system-wide reduction in carbon dioxide emissions from power plants and other sources to combat climate change.

Given the threats to public health from climate change, the Lung Association calls on members of Congress and the administration to protect public health with measures that address climate change and reduce air pollution at the same time. The American Lung Association also calls on states and local governments to develop strong plans to reduce carbon pollution from power plants and protect public health. Several states and cities have moved ahead to adopt goals to cut carbon emissions and begin this work.

Threat 2: Removing limits on methane and other emissions from oil and gas operations

Currently, EPA provides only minimal protection from emissions from the existing oil and gas infrastructure. Oil and gas production wells, processing plants, transmission pipelines and storage units have long emitted harmful gases, including methane, volatile organic compounds and other pollutants. For the last few years, "State of the Air" has reported elevated levels of unhealthy ozone in places where oil and gas production has expanded, even in largely rural counties in the West. Despite this, in 2018, EPA proposed steps to weaken or roll back health-protective standards the agency had

adopted in 2016 to reduce harmful emissions of these gases from new and modified sources within the oil and natural gas industry.[11] EPA also stated that the agency will consider weakening this rule even further with additional changes, including changes specifically weakening limits on greenhouse gas emissions.[12]

Rolling back limits on emissions from oil and gas operations means more people will be forced to breathe cancer-causing emissions and other toxic gases that also worsen ozone and climate change.

Strong standards would not only help to mitigate climate change and its associated health risks by curtailing emissions of methane, an especially potent greenhouse gas, but would also limit emissions of major precursors to ozone, as well as other toxic and carcinogenic air pollutants, benefiting public health in communities across the country.

EPA even reversed course on a 2016 effort to collect data from the oil and gas industry about the location and size of their facilities. Gathering this information is an essential step for EPA to more fully understand and eventually limit harmful emissions from these existing sources. However, after industry objected, in March 2017 EPA withdrew its request for updated information on these facilities.

EPA's efforts to roll back these protections reflect a much higher priority on eliminating so-called "burdensome regulations" on polluters than protecting the health of the American people.[13]

Threat 3: Opening doors for more polluting cars and trucks

More polluting cars. In 2018, EPA and the Department of Transportation proposed new rules to weaken limits on greenhouse gas emissions from cars, SUVs, and personal trucks. Labeling their proposal the "Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule," the agencies are seeking to roll back limits for greenhouse gas emissions and standards for fuel economy that were adopted in 2012 and are scheduled to go into place for model year 2021-2025 vehicles.

Together with rules that apply to model years 2017-2020 vehicles, these limits would cut 6 billion metric tons of greenhouse gas emissions.

The rollback also attacks states' rights to set stronger standards to protect their residents. Under the Clean Air Act, California has the right to establish its own emission standards for cars and trucks. Other states have the option of adopting California's standards, and many have done so. California's ability to set more protective emissions standards has helped drive lifesaving reductions in harmful pollution from vehicles nationwide; maintaining this authority is critical.

The Lung Association has strongly opposed these proposed rollbacks and recruited nearly 100 national, state and local health organizations to join comments to EPA in opposition.

Dirtiest diesel. Pollution from heavy-duty diesel trucks causes cancer, heart attacks, asthma attacks and premature death. Thanks to long-adopted requirements for cleaner fuels and engines, people living near heavily traveled highways and busy city streets have had to breathe less of these dangerous emissions. But now, that progress is threatened by a loophole that the current EPA has tried to open.

EPA's proposed glider loophole exempts trucks that emit up to 450 times more than other diesel trucks from having to clean up.

The loophole benefits "gliders." "Gliders" is the name used for trucks that embed an old, dirty engine in a new truck body. Originally conceived to help truck owners whose truck body had been damaged, but whose engine remained intact, the use of gliders has expanded to become a cottage industry repackaging old, polluting diesel engines in new truck bodies. One EPA study found that these engines produced emissions *up to 450 times higher* than a comparable 2014 or 2015 model year truck.[14]

In 2016, EPA put in place a new rule to require that these glider trucks meet the same limits on emissions as all new trucks, a position that the trucking industry fully supported. However, in 2017, despite broad opposition from the rest of the trucking industry and public health advocates, the new EPA administration proposed to eliminate the requirement that gliders meet current emissions limits, creating a loophole for these

dirtier trucks to keep polluting long into the future.[15] The Lung Association spoke up to oppose this proposed change at EPA's public hearing and in comments with 11 other health and medical groups.[16]

Two potential bright spots present opportunities to reduce diesel vehicle emissions. First, in November 2018, then-acting EPA Administrator Andrew Wheeler announced plans to reduce nitrogen oxide emissions from heavy-duty trucks.[17] In stark contrast to other EPA actions, the Cleaner Trucks Initiative has the potential to reduce emissions. Time will tell whether this is indeed the case: EPA has yet to make a specific proposal and the implementation would not occur until the middle of the decade.

Legal action presents a second cleanup opportunity. As the world learned from the Volkswagen diesel cheating scandal, even new diesel vehicles must be subject to strict oversight and enforcement to ensure compliance with emissions standards.[18] In January 2019, EPA and the Department of Justice announced a civil settlement to address emissions cheating from Fiat Chrysler.[19]

Threat 4: Cutting funding and expertise needed to clean up the air

The Trump Administration's proposed budget would greatly reduce the ability of EPA to protect public health.

The Clean Air Act set up smart, open processes for protecting Americans from air pollution, which have enabled the U.S. to reduce some of the most common pollutants by more than 70 percent, as shown in the earlier chart. Still, these processes only work if EPA has the funding, staffing and scientific advisors it needs to implement and enforce the law. The Trump Administration proposed a budget that would greatly reduce the ability of EPA to protect public health, including slashing overall funding for the agency and reducing grants to support the work of state and local agencies and tribes to implement the requirements of the Clean Air Act and other critical laws. The proposed budget for FY 2020 claims that a priority goal is to "improve air quality" but would cut EPA funding for that work substantially.[20]

The Lung Association calls on Congress to ensure that EPA has sufficient funding to protect public health with the full range of programs, including state, local and tribal grants. In many cases, key EPA and other public health programs need funding increases to keep pace with their role in protecting the public. Investment in clean air and public health protections is critical.

Threat 5: Stacking the deck to deny the scientific evidence

EPA has taken steps to remove independent science advisors from key advisory committees.

Scientific Reviews. A fundamental reason for the success of the Clean Air Act is the requirement that EPA base decisions and actions on up-to-date science to protect public health. This requires ensuring that independent expert scientists regularly analyze current, peer-reviewed research and then provide their conclusions and perspectives to the EPA staff scientists and the Administrator. Unfortunately, the current EPA has taken steps to remove independent science advisors from key advisory committees, including the Clean Air Scientific Advisory Committee (CASAC), and replace them with people paid by polluting industries.[21] EPA also dismissed a panel of experts that had been providing advice based on their deep understanding of the complex research on particle pollution. Many former participants and independent health and medical groups, including the Lung Association, urged EPA to reinstitute the panel.[22]

EPA is stacking the deck to deny the evidence.

Former chairs and members of CASAC have raised concerns about the lack of scientific expertise in the new members of the CASAC, as well as the dramatically reduced capacity for scientific reviews.[23]

EPA has also signaled that the agency will restrict what research it will allow its scientists to consider, essentially eliminating from consideration major scientific research that supports strong clean air safeguards.[24] Specifically, these proposals would block EPA from using studies that cannot make all the underlying data fully open for public review. Some members of Congress have proposed similar limitations. The

arguments cite a need for "transparency," but the reality is that they seek to stack the deck against stronger air pollution standards.

Many databases that scientists use today do allow unrestricted access to the information, but others do not because of the need for patient confidentiality for subjects included in the research. The studies are available and transparent, but the private health data they are based on must be protected. Blocking the use of these key studies that have been through multiple independent reviews and show widespread harm from outdoor air pollutants introduces dangerous bias that could limit the evidence, risking weaker air pollution safeguards.

The Lung Association calls on EPA to return to its historic practice of appointing qualified, independent scientists to its scientific review committees and to reject artificial and inappropriate limitations on what peer-reviewed research it accepts.

Benefits Assessment. In addition to undermining the science that shows the need for clean air protections, recent EPA actions also undermine the math—that is, the analysis that identifies and estimates the costs and benefits of these protections.

In late 2018, EPA issued a proposal that would undermine the Mercury and Air Toxics Standards (MATS), lifesaving protections that are fully implemented, widely supported, and successful in reducing a long list of dangerous emissions. In its proposal, EPA deliberately undercounted the benefits of these protections.

EPA adopted the Mercury and Air Toxics Standards in 2011 to limit emissions of mercury and other hazardous air pollutants, including carcinogens, like arsenic, acid gases and other dangerous toxins. Reducing these emissions from power plants results in the reduction of other harmful emissions at the same time. This is great news, because it means that the standards have not only slashed mercury and air toxics emissions but have also prevented thousands of premature deaths and asthma attacks every year. EPA has proposed not to count the benefits stemming from reductions of particulate matter and other pollutants not explicitly covered by the rule, which artificially tips the balance to make the rule appear less cost-effective than it is. This approach to calculating benefits, by design, obscures the enormous positive health impacts resulting from the MATS rule.

EPA relies on this same approach in its proposed ACE rule for power plants. EPA proposed a method of calculating the costs and benefits of this proposal that ignores key health impacts. The science is clear that there is no level of particulate matter that is safe to breathe. EPA specifically requested comment on whether it would be appropriate to ignore health impacts of particle pollution below a certain threshold, looking for support to once again tip the scales away from the health impacts of their proposal.

Threat 6: Weakening Clean Air Act Implementation

EPA has issued several directives to roll back or undermine steps to implement the Clean Air Act's requirements for reducing major air pollutants, weakening both current pollution cleanup and likely future air pollution standards, including for ozone and particulate matter.

EPA rejected requests by states to recognize and address ozone transported across state lines.[25] In addition, in 2018, the agency put forward a very aggressive timeline and process for completing a full review of both the ozone and particulate matter standards before the end of 2020.[26] Such a shortened review would severely limit what is supposed to be a thorough assessment of the science.

EPA also proposed weakening "New Source Review" requirements, which would allow new polluting sources to add to the burden of unhealthy air from industrial sources in communities in several ways.

- EPA proposed redefining "ambient air" to allow industries to pollute more on their own facilities. EPA seeks to reverse a decades-old policy that narrowed the area that an industry could use to limit public access to its emissions.[27]
- As part of the ACE proposal, EPA would allow emissions to be calculated at an hourly rate as opposed to an annual one. The result would be that emissions could increase dramatically, but facilities would not have to install and operate modern pollution controls as long as their hourly rate of emissions did not increase.
- Finally, EPA also announced an end to its decades-old "Once-In, Always-In" policy, allowing facilities to increase toxic air emissions.[28]

Threat 7: Weakening the Clean Air Act

Congress must make certain that the Clean Air Act remains strong, fully implemented and fully enforced.

The Clean Air Act remains a strong public health law put in place by an overwhelming bipartisan majority in Congress nearly 50 years ago. Congress wrote the Clean Air Act to set up science-based, technology-fostering steps to protect public health by reducing pollution. Under the Clean Air Act, Congress directed EPA and each state to take steps to clean up the air to protect public health. For 20 years, the "State of the Air" report has chronicled the slow but steady improvement in the nation's air quality thanks to the Clean Air Act—a trend that continues even as climate change makes pollution cleanup more difficult.

Now, that positive trend is threatened, and not just by the impacts of climate change. Unfortunately, some in Congress seek changes to the Clean Air Act that would dismantle key provisions of the law and threaten the progress made over nearly five decades.

Undermining the Act itself is one of the fundamental goals of polluters and their allies. They have repeatedly challenged Clean Air Act provisions in court, and have repeatedly lost, so now they seek to weaken the law. Recent proposed efforts include exempting certain polluting facilities from some emissions controls, delaying science-based updates to air pollution standards, and undermining public health as the core premise of the Act's key pollution limits.

To protect the lives and health of millions of Americans, the Lung Association calls on Congress to reject attempts to weaken the Clean Air Act and make certain the law remains strong, fully implemented and fully enforced.

What You Can Do

We need your help in the fight for healthy air! You can help reduce air pollution outdoors by taking a few simple steps:

Speak Up Today:

Send a message to Congress and to the White House: Protect health from climate change! This report shows that Americans are already experiencing worsened ozone and particle pollution due to warmer temperatures and increased wildfires. Join us in urging Congress and the administration to adopt science-based solutions to reduce emissions that are causing climate change, ensuring that no community near a polluting source gets left behind. All members of Congress, as well as the president, must act now to protect health from climate change.

Other Ways You Can Help:

Share your story. Do you or any member of your family have a personal reason to fight for healthier, cleaner air? Go to Lung.org/healthyair to let us know how healthy air affects you. Your story helps us remind decision makers what is at stake when it comes to clean air.

Sign up for alerts. Sign up for more information about times when your voice can be particularly helpful in the fight for healthy air at Lung.org/healthyair.

Get involved locally. Participate in state and local efforts to clean up air pollution and address climate change. To find your local air pollution control agency, go to www.4cleanair.org.

Step up to Curb Pollution in Your Community.

Drive less. Combine trips, walk, bike, carpool or vanpool, and use buses, subways or other alternatives to driving. Vehicle emissions are a major source of air pollution. Support community plans that provide ways to get around that don't require a car, such as more sidewalks, bike trails and transit systems.

Use less electricity. Turn out the lights and use energy-efficient appliances. Generating electricity is one of the biggest sources of pollution, particularly in the eastern United States.

Don't burn wood or trash. Burning firewood and trash is among the largest sources of particle pollution in many parts of the country. If you must use a fireplace or stove for heat, convert your woodstove to natural gas, which has far fewer polluting emissions. Compost and recycle as much as possible and dispose of other waste properly; don't burn it. Support efforts in your community to ban outdoor burning of construction and yard wastes. Avoid the use of outdoor hydronic heaters, also called outdoor wood boilers, which are frequently much more polluting than woodstoves.

Make sure your local school system requires cleaner school buses, which includes replacing or retrofitting old school buses with filters and other equipment to reduce emissions. Make sure your local schools don't idle their buses, a step that can immediately reduce emissions. Parents shouldn't idle in their cars outside of schools either.

Thank you for being part of the fight for healthy air.

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1. A complete discussion of the sources of data and the methodology is included in **Methodology**.
2. U.S. Environmental Protection Agency. Air Trends National Summary, 2019. Sources are: CO2 emissions estimate through 2016 (Source: 2015 US Greenhouse Gas Inventory Report); Gross Domestic Product: Bureau of Economic Analysis; Vehicle Miles Traveled: Federal Highway Administration; Population: Census Bureau, Energy Consumption: Dept. of Energy, Energy Information Administration; Aggregate Emissions: EPA's Air Pollutant Emissions Trends Data.
3. NOAA National Centers for Environmental Information, Global Climate Report--Annual 2017, published online January 2018. Accessed at https://www.ncdc.noaa.gov/sotc/global/201713.
4. National Oceanic and Atmospheric Administration. News Release: 2018 was 4th hottest year on record for the globe. February 6, 2019.
5. U.S. Environmental Protection Agency. *Inventory of Greenhouse Gas Emissions and Sinks: 1990-2016*. Washington, DC: U.S. EPA, 2017. Accessed at https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#electricity.
6. U.S. EPA *Inventory of Greenhouse Gas Emissions and Sinks: 1990-2016*.
7. U.S. EPA. Regulatory Impact Analysis for the Clean Power Plant Final Rule. August 2015. EPA-452/R-15-003.
8. U.S. EPA. Regulatory Impact Analysis for the Review of the Clean Power Plant: Proposal (RIA). October 2017. EPA-452/R-17-004.
9. Driscoll C, Buonocore J, Levy J, Lambert K, et al. 2015 US power plant carbon standards and clean air and health co-benefits. Nature Climate Change 5: 525-540. Schwartz J, Buonocore J, Levy J, Driscoll C, Fallon Lambert K, and Reid S. Health Co-Benefits of Carbon Standard for existing Power Plants: Part 2 of the Co-Benefits of Carbon Standards Study. September 30, 2014. Harvard School of Public Health, Syracuse University, Boston University. Available at Health Co-Benefits of Carbon Standards for Existing Power Plants.
10. These comments are available at http://www.lung.org/get-involved/become-an-advocate/advocacy-archive.html.
11. U.S. EPA. Proposed Improvements 2016 New Source Performance Standards, September 11, 2018.
12. U.S. EPA. Fact Sheet: EPA Proposes Amendments to the 2016 New Source Performance Standards for the Oil and Natural Gas Industry. 2018.
13. U.S. EPA. EPA Year in Review: 2017-2018. March 5, 2018.

14. U.S. EPA. 2017. Chassis Dynamometer Testing of Two Recent Model Year Heavy-Duty On-Highway Diesel Glider Vehicles. p. 3. Accessed at https://www.regulations.gov/document?D=EPA-HQ-OAR-2014-0827-2417

15. 82 Federal Register 53442.

16. These comments are available at http://www.lung.org/get-involved/become-an-advocate/advocacy-archive.html.

17. U.S. EPA. Cleaner Trucks Initiative. November 13, 2018.

18. Schwartz J and Bryan V. "VW's Dieselgate bill hits $30 bln after another charge." Reuters, September 29, 2017.

19. U.S. EPA. News Release: Fiat Chrysler Automobiles Clean Air Act Civil Settlement Information Sheet. January 10, 2019.

20. U.S. EPA. FY 2020: EPA Budget in Brief. March 2019. EPA 190-R-19-001.

21. Memo from EPA Administrator Scott Pruitt. Subject: Strengthening and Improving Membership on EPA Federal Advisory Committees. October 31, 2017.

22. The testimony took place at the December 12, 2018 meeting of the Chartered Clean Air Scientific Advisory Committee (CASAC) Public Meeting on Particulate Matter. All testimony is posted on that site.

23. Letter to Tony Cox, Chair Clean Air Scientific Advisory Committee from H. Christopher Frey, Jonathan M. Samet, et al. RE: CASAC Advice on the EPA's Integrated Review Plan for the Ozone National Ambient Air Quality Standards (External Review Draft). November 26, 2018.

24. Waldman S and Bravender R. "Pruitt is expected to restrict science. Here's what it means." E & E News. March 16, 2018.

25. U.S. EPA. "News Release: EPA Proposal Address 'Good Neighbor' Obligations for 2008 Ozone Standard." June 29, 2018; Comments from the Attorney Generals of the States of New York, Connecticut, Maryland, and New Jersey and the City of New York Corporation to U.S. EPA on the Proposed Rule "Determination Regarding Good Neighbor Obligations for the 2008 Ozone National Ambient Air Quality Standard," August 31, 2018.

26. Memo from Scott Pruitt, EPA Administrator, Re: Back-to-Basics Process for Reviewing National Ambient Air Quality Standards, May 9, 2018.

27. U.S. EPA. Draft Guidance: Revised Policy on Exclusions from "Ambient Air." November 2018.

28. U.S. EPA. News Release: Reducing Regulatory Burdens: EPA withdraws "once in always in" policy for major sources under Clean Air Act. January 25, 2018.

People at Risk from Short-Term Particle Pollution (24-Hour $PM_{2.5}$)

	Chronic Diseases							Age Groups			
In Counties where the Grades were:	Adult Asthma	Pediatric Asthma	COPD	Lung Cancer	CV Disease	Diabetes	Poverty	Under 18	65 and Over	Total Population	Number of Counties
Grade A (0.0)	6,228,833	1,715,893	4,523,623	52,198	5,760,789	7,197,301	11,508,084	19,008,951	13,458,218	86,085,108	291
Grade B (0.3-0.9)	3,625,570	954,955	2,655,737	31,068	3,359,377	4,177,403	6,808,522	11,939,728	7,569,535	52,522,037	147
Grade C (1.0-2.0)	1,682,876	430,014	1,168,029	14,351	1,500,643	1,982,899	3,433,849	5,686,208	3,448,511	24,562,119	50
Grade D (2.1-3.2)	471,481	107,366	318,738	3,724	409,143	532,013	808,037	1,412,958	979,965	6,575,557	25
Grade F (3.3+)	3,294,046	781,999	1,864,181	21,769	2,545,912	3,746,111	6,352,702	11,722,580	6,845,711	49,627,268	76
National Population in Counties with $PM_{2.5}$ Monitors	15,796,219	4,130,392	10,879,545	126,978	14,051,547	18,202,029	29,621,210	51,178,684	33,441,228	225,819,641	642

People at Risk from Year-Round Particle Pollution (Annual $PM_{2.5}$)

	Chronic Diseases							Age Groups			
In Counties where the Grades were:	Adult Asthma	Pediatric Asthma	COPD	Lung Cancer	CV Disease	Diabetes	Poverty	Under 18	65 and Over	Total Population	Number of Counties
Pass	13,418,282	3,512,903	9,374,161	109,100	12,024,392	15,358,900	24,622,490	42,804,581	28,256,251	189,965,697	519
Fail	1,257,027	313,806	700,338	8,841	988,045	1,573,141	3,123,419	4,922,189	2,714,286	20,545,762	18
National Population in Counties with $PM_{2.5}$ Monitors	15,796,219	4,130,392	10,879,545	126,978	14,051,547	18,202,029	29,621,210	51,178,684	33,441,228	225,819,641	642

People at Risk from Ozone

	Chronic Diseases					Age Groups			
In Counties where the Grades were:	Adult Asthma	Pediatric Asthma	COPD	CV Disease	Poverty	Under 18	65 and Over	Total Population	Number of Counties
Grade A (0.0)	1,550,643	405,848	1,163,336	1,518,471	3,115,108	5,076,647	3,706,956	22,722,823	189
Grade B (0.3-0.9)	2,216,025	577,540	1,753,703	2,226,065	3,719,115	6,818,126	5,245,297	31,212,793	177
Grade C (1.0-2.0)	2,348,750	619,078	1,849,706	2,280,647	4,210,356	7,243,551	5,182,789	32,820,374	138
Grade D (2.1-3.2)	1,477,709	390,422	991,835	1,283,622	2,307,415	4,343,019	3,090,489	19,523,528	65
Grade F (3.3+)	9,201,005	2,429,735	5,923,239	7,836,766	17,103,277	30,969,353	18,878,076	134,017,168	197
National Population in Counties with Ozone Monitors	16,928,849	4,453,835	11,786,243	15,280,976	30,684,779	54,831,386	36,430,210	242,075,694	802

Note: *The State of the Air 2019* covers the period 2015-2017. The Appendix provides a full discussion of the methodology.

People at Risk In 25 U.S. Cities Most Polluted by Short-Term Particle Pollution (24-hour $PM_{2.5}$)

2019 Rank[1]	Metropolitan Statistical Areas	Total Population[2]	Under 18[3]	65 and Over[3]	Pediatric Asthma[4,6]	Adult Asthma[5,6]	COPD[7]	Lung Cancer[8]	CV Disease[9]	Diabetes[10]	Poverty[11]
1	Bakersfield, CA	893,119	259,120	95,307	16,083	49,617	26,076	373	35,790	60,013	182,948
2	Fresno-Madera-Hanford, CA	1,296,246	365,661	155,133	22,695	73,023	39,469	540	54,813	90,788	261,425
3	Fairbanks, AK	99,703	23,931	9,706	1,901	6,431	4,187	55	4,477	5,207	7,051
4	San Jose-San Francisco-Oakland, CA	9,658,361	2,098,636	1,400,989	130,254	598,339	340,714	4,015	480,965	793,588	942,299
5	Missoula, MT	117,441	22,463	17,656	1,926	8,760	5,358	61	6,195	6,528	16,351
6	Yakima, WA	250,193	74,414	33,654	5,440	18,628	9,904	133	13,019	15,674	44,726
7	Los Angeles-Long Beach, CA	18,788,800	4,317,234	2,511,924	267,954	1,142,240	636,210	7,806	890,929	1,479,796	2,582,162
8	Salt Lake City-Provo-Orem, UT	2,559,350	771,143	252,835	46,981	159,617	68,111	662	102,957	121,102	224,867
9	Seattle-Tacoma, WA	4,764,736	1,024,114	674,955	74,861	397,192	210,671	2,540	273,648	333,479	438,522
10	Pittsburgh-New Castle-Weirton, PA-OH-WV	2,623,639	499,580	515,760	44,395	214,890	151,013	1,699	229,913	235,133	292,380
11	Logan, UT-ID	138,002	42,374	13,331	2,664	8,545	3,552	39	5,233	6,074	19,171
12	Visalia, CA	464,493	143,726	51,669	8,921	25,149	13,466	193	18,628	30,984	110,299
13	Phoenix-Mesa, AZ	4,790,771	1,155,134	738,748	93,121	360,835	227,133	2,243	281,706	372,324	635,629
14	El Centro, CA	182,830	52,296	23,042	3,246	10,266	5,654	76	7,909	13,022	35,830
15	Spokane-Spokane Valley-Coeur d'Alene, WA-ID	708,519	158,514	118,839	11,819	56,016	31,682	373	43,622	51,551	92,465
15	Sacramento-Roseville, CA	2,598,377	598,140	399,007	37,124	158,830	92,789	1,079	132,172	216,432	330,612
17	Medford-Grants Pass, OR	303,831	61,967	68,735	3,580	26,255	14,284	150	22,166	25,603	45,917
17	Santa Maria-Santa Barbara, CA	448,150	99,713	66,887	6,189	27,419	15,374	186	21,688	35,228	60,921
19	Eugene-Springfield, OR	374,748	70,090	70,206	4,049	33,306	16,508	185	24,127	28,664	60,773
20	Salinas, CA	437,907	114,861	57,637	7,129	25,455	14,154	183	19,847	32,724	49,860
21	Anchorage, AK	400,888	100,962	42,686	8,022	25,620	16,979	218	19,230	22,425	39,431
22	Bend-Prineville, OR	209,998	42,822	41,936	2,474	18,196	9,501	104	14,264	16,943	20,994
23	Portland-Vancouver-Salem, OR-WA	3,201,058	705,750	477,266	42,953	271,786	131,850	1,605	181,273	223,680	372,765
23	Reno-Carson City-Fernley, NV	621,769	132,305	109,892	10,264	50,864	36,065	289	44,032	53,668	65,928
25	Bismarck, ND	127,766	29,752	19,989	1,936	8,362	5,045	70	7,852	9,170	9,360
25	Pocatello, ID	92,869	25,099	13,036	1,994	6,064	3,277	47	4,825	5,600	12,945

Notes:

1. Cities are ranked using the highest weighted average for any county within that Combined Metropolitan Statistical Area or Metropolitan Statistical Area.
2. **Total Population** represents the at-risk populations for all counties within the respective Combined Metropolitan Statistical Area or Metropolitan Statistical Area.
3. Those **under 18** and **65 and over** are vulnerable to $PM_{2.5}$ and are, therefore, included. They should not be used as population denominators for disease estimates.
4. **Pediatric asthma** estimates are for those under 18 years of age and represent the **estimated** number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
5. **Adult asthma** estimates are for those 18 years and older and represent the **estimated** number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
6. Adding across rows does not produce valid estimates. Adding the disease categories (asthma, COPD, etc.) will double-count people who have been diagnosed with more than one disease.
7. **COPD** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
8. **Lung cancer** estimates are the number of new cases diagnosed in 2015.
9. **CV disease** is cardiovascular disease and estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
10. **Diabetes** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
11. **Poverty** estimates come from the U.S. Census Bureau and are for all ages.

People at Risk In 25 U.S. Cities Most Polluted by Year-Round Particle Pollution (Annual $PM_{2.5}$)

2019 Rank[1]	Metropolitan Statistical Areas	Total Population[2]	Under 18[3]	65 and Over[3]	Pediatric Asthma[4,6]	Adult Asthma[5,6]	COPD[7]	Lung Cancer[8]	CV Disease[9]	Diabetes[10]	Poverty[11]
1	Fresno-Madera-Hanford, CA	1,296,246	365,661	155,133	22,695	73,023	39,469	540	54,813	90,788	261,425
2	Bakersfield, CA	893,119	259,120	95,307	16,083	49,617	26,076	373	35,790	60,013	182,948
3	Fairbanks, AK	99,703	23,931	9,706	1,901	6,431	4,187	55	4,477	5,207	7,051
4	Visalia, CA	464,493	143,726	51,669	8,921	25,149	13,466	193	18,628	30,984	110,299
5	Los Angeles-Long Beach, CA	18,788,800	4,317,234	2,511,924	267,954	1,142,240	636,210	7,806	890,929	1,479,796	2,582,162
6	San Jose-San Francisco-Oakland, CA	9,658,361	2,098,636	1,400,989	130,254	598,339	340,714	4,015	480,965	793,588	942,299
7	Pittsburgh-New Castle-Weirton, PA-OH-WV	2,623,639	499,580	515,760	44,395	214,890	151,013	1,699	229,913	235,133	292,380
8	El Centro, CA	182,830	52,296	23,042	3,246	10,266	5,654	76	7,909	13,022	35,830
9	Cleveland-Akron-Canton, OH	3,601,729	770,358	649,514	66,584	280,646	242,995	2,464	292,281	329,890	501,805
10	Medford-Grants Pass, OR	303,831	61,967	68,735	3,580	26,255	14,284	150	22,166	25,603	45,917
11	Missoula, MT	117,441	22,463	17,656	1,926	8,760	5,358	61	6,195	6,528	16,351
12	Detroit-Warren-Ann Arbor, MI	5,336,286	1,175,204	853,415	102,969	450,730	361,918	3,372	431,324	456,731	766,549
13	Cincinnati-Wilmington-Maysville, OH-KY-IN	2,260,884	533,124	336,754	44,850	175,289	155,121	1,659	174,859	195,404	266,137
14	Birmingham-Hoover-Talladega, AL	1,312,627	300,572	210,001	39,667	110,809	109,790	856	122,776	142,980	190,057
15	Johnstown-Somerset, PA	207,555	39,085	45,583	3,472	16,688	12,118	134	19,202	19,461	27,921
15	Lancaster, PA	542,903	129,134	94,984	11,470	42,083	27,532	350	42,676	43,500	52,380
17	Houston-The Woodlands, TX	7,078,523	1,883,271	773,341	149,026	383,590	242,452	3,571	393,149	604,115	972,819
18	Philadelphia-Reading-Camden, PA-NJ-DE-MD	7,206,807	1,575,227	1,144,047	136,258	556,551	367,119	4,538	509,782	588,136	898,948
19	Atlanta-Athens-Clarke County-Sandy Springs, GA-AL	6,700,650	1,645,466	821,284	149,930	428,139	347,810	4,160	405,995	562,004	839,136
19	Chicago-Naperville, IL-IN-WI	9,901,711	2,273,535	1,414,413	132,523	640,267	514,131	6,522	577,235	827,021	1,160,829
19	Indianapolis-Carmel-Muncie, IN	2,411,086	586,531	335,722	40,314	184,112	153,166	1,779	168,860	209,343	295,169
22	McAllen-Edinburg, TX	925,115	305,550	100,660	24,179	45,214	28,176	465	46,616	70,176	271,937
22	Shreveport-Bossier City-Minden, LA	440,933	106,798	70,737	9,345	29,214	30,351	293	38,480	46,215	97,000
24	Harrisburg-York-Lebanon, PA	1,260,071	274,361	222,169	24,369	99,963	66,627	812	102,540	105,052	117,983
25	Knoxville-Morristown-Sevierville, TN	1,128,379	235,474	205,629	22,933	90,025	87,636	885	110,071	123,181	160,962

Notes:

1. Cities are ranked using the highest weighted average for any county within that Combined Metropolitan Statistical Area or Metropolitan Statistical Area.
2. **Total Population** represents the at-risk populations for all counties within the respective Combined Metropolitan Statistical Area or Metropolitan Statistical Area.
3. Those **under 18** and **65 and over** are vulnerable to $PM_{2.5}$ and are, therefore, included. They should not be used as population denominators for disease estimates.
4. **Pediatric asthma** estimates are for those under 18 years of age and represent the **estimated** number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
5. **Adult asthma** estimates are for those 18 years and older and represent the **estimated** number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
6. Adding across rows does not produce valid estimates. Adding the disease categories (asthma, COPD, etc.) will double-count people who have been diagnosed with more than one disease.
7. **COPD** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
8. **Lung cancer** estimates are the number of new cases diagnosed in 2015.
9. **CV disease** is cardiovascular disease and estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
10. **Diabetes** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
11. **Poverty** estimates come from the U.S. Census Bureau and are for all ages.

People at Risk In 25 Most Ozone-Polluted Cities

2019 Rank[1]	Metropolitan Statistical Areas	Total Population[2]	Under 18[3]	65 and Over[3]	Pediatric Asthma[4,6]	Adult Asthma[5,6]	COPD[7]	CV Disease[8]	Poverty[9]
1	Los Angeles-Long Beach, CA	18,788,800	4,317,234	2,511,924	267,954	1,142,240	636,210	7,806	1,479,796
2	Visalia, CA	464,493	143,726	51,669	8,921	25,149	13,466	193	30,984
3	Bakersfield, CA	893,119	259,120	95,307	16,083	49,617	26,076	373	60,013
4	Fresno-Madera-Hanford, CA	1,296,246	365,661	155,133	22,695	73,023	39,469	540	90,788
5	Sacramento-Roseville, CA	2,598,377	598,140	399,007	37,124	158,830	92,789	1,079	216,432
6	San Diego-Chula Vista-Carlsbad, CA	3,337,685	728,528	454,826	45,217	205,392	113,301	1,389	261,785
7	Phoenix-Mesa, AZ	4,790,771	1,155,134	738,748	93,121	360,835	227,133	2,243	372,324
8	San Jose-San Francisco-Oakland, CA	9,658,361	2,098,636	1,400,989	130,254	598,339	340,714	4,015	793,588
9	Houston-The Woodlands, TX	7,078,523	1,883,271	773,341	149,026	383,590	242,452	3,571	604,115
10	New York-Newark, NY-NJ-CT-PA	23,035,605	4,945,052	3,552,752	448,996	1,651,293	996,592	13,532	1,881,665
11	Redding-Red Bluff, CA	243,847	54,095	48,761	3,357	15,277	9,848	101	23,119
12	Denver-Aurora, CO	3,515,374	802,822	443,992	63,790	253,103	115,044	1,440	193,028
13	Las Vegas-Henderson, NV	2,248,281	521,582	330,243	40,464	180,576	118,876	1,047	175,054
14	Salt Lake City-Provo-Orem, UT	2,559,350	771,143	252,835	46,981	159,617	68,111	662	121,102
15	El Centro, CA	182,830	52,296	23,042	3,246	10,266	5,654	76	13,022
16	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA	9,763,116	2,211,348	1,334,881	202,583	709,893	466,200	5,438	765,847
17	Dallas-Fort Worth, TX-OK	7,800,952	2,033,735	894,992	161,137	428,063	276,303	3,936	685,209
18	Chicago-Naperville, IL-IN-WI	9,901,711	2,273,535	1,414,413	132,523	640,267	514,131	6,522	827,021
19	Chico, CA	229,294	45,870	41,618	2,847	14,563	8,724	95	20,120
20	Sheboygan, WI	115,344	25,882	20,148	1,915	8,546	4,646	67	8,459
21	Philadelphia-Reading-Camden, PA-NJ-DE-MD	7,206,807	1,575,227	1,144,047	136,258	556,551	367,119	4,538	588,136
22	El Paso-Las Cruces, TX-NM	1,060,397	285,683	134,286	23,353	62,184	37,728	508	87,607
23	Hartford-East Hartford, CT	1,479,292	297,120	253,171	38,314	126,918	68,132	856	115,129
24	Fort Collins, CO	343,976	68,427	51,994	5,437	25,587	11,943	141	19,935
25	Atlanta—Athens-Clarke County—Sandy Springs, GA-AL	6,700,650	1,645,466	821,284	149,930	428,139	347,810	4,160	562,004

Notes:

1. Cities are ranked using the highest weighted average for any county within that Combined Metropolitan Statistical Area or Metropolitan Statistical Area.
2. **Total Population** represents the at-risk populations for all counties within the respective Combined Metropolitan Statistical Area or Metropolitan Statistical Area.
3. Those **under 18** and **65 and over** are vulnerable to $PM_{2.5}$ and are, therefore, included. They should not be used as population denominators for disease estimates.
4. **Pediatric asthma** estimates are for those under 18 years of age and represent the **estimated** number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
5. **Adult asthma** estimates are for those 18 years and older and represent the **estimated** number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
6. Adding across rows does not produce valid estimates. Adding the disease categories (asthma, COPD, etc.) will double-count people who have been diagnosed with more than one disease.
7. **COPD** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
8. **CV disease** is cardiovascular disease and estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
9. **Poverty** estimates come from the U.S. Census Bureau and are for all ages.

People at Risk in 25 Counties Most Polluted by Short-Term Particle Pollution (24-hour $PM_{2.5}$)

2019 Rank[1]	County	ST	Total Population[2]	At-Risk Groups									High $PM_{2.5}$ Days in Unhealthy Ranges, 2015–2017	
				Under 18[3]	65 and Over[3]	Pediatric Asthma[4,6]	Adult Asthma[5,6]	COPD[7]	Lung Cancer[8]	CV Disease[9]	Diabetes[10]	Poverty[11]	Weighted Avg.[12]	Grade[13]
1	Kern	CA	893,119	259,120	95,307	16,083	49,617	26,076	373	35,790	60,013	182,948	34.8	F
2	Kings	CA	150,101	40,964	15,054	2,542	8,492	4,296	63	5,818	9,791	24,810	32.5	F
3	Ravalli	MT	42,563	8,262	10,661	708	3,063	2,458	22	3,165	3,151	5,275	29.3	F
4	Fresno	CA	989,255	281,684	118,527	17,483	55,536	30,071	411	41,788	69,186	205,046	29.0	F
5	Fairbanks North Star Borough	AK	99,703	23,931	9,706	1,901	6,431	4,187	55	4,477	5,207	7,051	26.2	F
6	Stanislaus	CA	547,899	148,525	70,316	9,218	31,501	17,541	228	24,583	40,690	75,614	21.7	F
7	Lewis and Clark	MT	67,773	14,599	12,239	1,252	4,817	3,390	35	4,106	4,266	5,474	19.2	F
8	San Joaquin	CA	745,424	203,134	92,800	12,608	42,757	23,656	310	33,057	54,941	113,375	17.0	F
9	Missoula	MT	117,441	22,463	17,656	1,926	8,760	5,358	61	6,195	6,528	16,351	16.5	F
10	Plumas	CA	18,742	3,153	5,211	196	1,279	928	8	1,409	2,197	2,640	16.3	F
11	Merced	CA	272,673	80,640	30,187	5,005	15,042	7,992	114	11,023	18,379	61,297	15.8	F
12	Shoshone	ID	12,542	2,532	2,859	201	887	583	6	920	1,047	2,143	15.3	F
13	Yakima	WA	250,193	74,414	33,654	5,440	18,628	9,904	133	13,019	15,674	44,726	14.8	F
14	Lincoln	MT	19,440	3,540	5,401	304	1,410	1,194	10	1,564	1,542	3,001	14.7	F
15	Los Angeles	CA	10,163,507	2,224,905	1,343,960	138,091	625,653	344,960	4,221	481,419	801,001	1,490,853	13.2	F
15	Madera	CA	156,890	43,013	21,552	2,670	8,995	5,103	65	7,207	11,811	31,569	13.2	F
15	Riverside	CA	2,423,266	616,211	340,498	38,246	142,917	81,395	1,008	115,017	189,009	309,235	13.2	F
18	Silver Bow	MT	34,602	7,026	6,420	602	2,506	1,736	18	2,106	2,173	5,487	13.0	F
19	Salt Lake	UT	1,135,649	312,338	120,002	19,029	73,451	31,885	294	48,668	57,300	103,384	11.7	F
20	San Bernardino	CA	2,157,404	571,669	243,122	35,481	124,484	66,466	897	91,640	153,951	339,748	11.3	F
21	Benewah	ID	9,184	2,096	2,014	167	629	415	5	653	745	1,297	10.8	F
21	Snohomish	WA	801,633	182,237	104,535	13,321	65,891	35,107	427	45,016	55,645	58,157	10.8	F
23	Flathead	MT	100,000	22,100	18,805	1,895	7,038	5,066	52	6,196	6,399	10,824	10.7	F
24	Allegheny	PA	1,223,048	230,313	225,605	20,457	101,080	65,853	786	101,908	103,941	132,929	10.5	F
25	Cache	UT	124,438	37,922	11,447	2,310	7,729	3,093	32	4,549	5,281	18,068	10.2	F

Notes:

1. Counties are ranked by weighted average. See note 12 below.
2. **Total Population** represents the at-risk populations in counties with $PM_{2.5}$ monitors.
3. Those **under 18** and **65 and over** are vulnerable to $PM_{2.5}$ and are, therefore, included. They should not be used as population denominators for disease estimates.
4. Pediatric asthma estimates are for those under 18 years of age and represent the estimated number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
5. **Adult asthma** estimates are for those 18 years and older and represent the estimated number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
6. Adding across rows does not produce valid estimates. Adding the disease categories (asthma, COPD, etc.) will double-count people who have been diagnosed with more than one disease.
7. **COPD** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
8. **Lung cancer** estimates are the number of new cases diagnosed in 2015.
9. **CV disease** is cardiovascular disease and estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
10. **Diabetes** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
11. **Poverty** estimates come from the U.S. Census Bureau and are for all ages.
12. The **Weighted Average** was derived by counting the number of days in each unhealthful range (orange, red, purple, maroon) in each year (2015-2017), multiplying the total in each range by the assigned standard weights (i.e., 1 for orange, 1.5 for red, 2.0 for purple, 2.5 for maroon), and calculating the average.
13. **Grade** is assigned by weighted average as follows: A=0.0, B=0.3-0.9, C=1.0-2.0, D=2.1-3.2, F=3.3+.

People at Risk in 25 Counties Most Polluted by Year-Round Particle Pollution (Annual $PM_{2.5}$)

2019 Rank[1]	County	ST	Total Population[2]	At-Risk Groups									$PM_{2.5}$ Annual, 2015–2017	
				Under 18[3]	65 and Over[3]	Pediatric Asthma[4,6]	Adult Asthma[5,6]	COPD[7]	Lung Cancer[8]	CV Disease[9]	Diabetes[10]	Poverty[11]	Design Value[12]	Pass/ Fail[13]
1	Kings	CA	150,101	40,964	15,054	2,542	8,492	4,296	63	5,818	9,791	24,810	22.2	Fail
2	Kern	CA	893,119	259,120	95,307	16,083	49,617	26,076	373	35,790	60,013	182,948	17.3	Fail
3	Fairbanks North Star Borough	AK	99,703	23,931	9,706	1,901	6,431	4,187	55	4,477	5,207	7,051	16.5	Fail
4	Tulare	CA	464,493	143,726	51,669	8,921	25,149	13,466	193	18,628	30,984	110,299	15.7	Fail
5	Plumas	CA	18,742	3,153	5,211	196	1,279	928	8	1,409	2,197	2,640	15.1	Fail
6	San Bernardino	CA	2,157,404	571,669	243,122	35,481	124,484	66,466	897	91,640	153,951	339,748	14.7	Fail
7	Fresno	CA	989,255	281,684	118,527	17,483	55,536	30,071	411	41,788	69,186	205,046	14.0	Fail
8	Riverside	CA	2,423,266	616,211	340,498	38,246	142,917	81,395	1,008	115,017	189,009	309,235	13.6	Fail
9	Stanislaus	CA	547,899	148,525	70,316	9,218	31,501	17,541	228	24,583	40,690	75,614	13.2	Fail
10	Lincoln	MT	19,440	3,540	5,401	304	1,410	1,194	10	1,564	1,542	3,001	13.0	Fail
10	Allegheny	PA	1,223,048	230,313	225,605	20,457	101,080	65,853	786	101,908	103,941	132,929	13.0	Fail
12	Madera	CA	156,890	43,013	21,552	2,670	8,995	5,103	65	7,207	11,811	31,569	12.8	Fail
12	Hawaii	HI	200,381	43,658	40,185	4,283	15,244	6,172	90	11,128	18,713	29,604	12.8	Fail
14	Merced	CA	272,673	80,640	30,187	5,005	15,042	7,992	114	11,023	18,379	61,297	12.7	Fail
15	Los Angeles	CA	10,163,507	2,224,905	1,343,960	138,091	625,653	344,960	4,221	481,419	801,001	1,490,853	12.6	Fail
15	Lemhi	ID	7,875	1,471	2,327	117	555	401	4	668	737	1,257	12.6	Fail
17	Shoshone	ID	12,542	2,532	2,859	201	887	583	6	920	1,047	2,143	12.4	Fail
18	San Joaquin	CA	745,424	203,134	92,800	12,608	42,757	23,656	310	33,057	54,941	113,375	12.2	Fail
19	Imperial	CA	182,830	52,296	23,042	3,246	10,266	5,654	76	7,909	13,022	35,830	12.0	Pass
20	Ravalli	MT	42,563	8,262	10,661	708	3,063	2,458	22	3,165	3,151	5,275	11.7	Pass
20	Cuyahoga	OH	1,248,514	260,986	221,994	22,558	97,925	83,455	852	100,086	113,146	221,287	11.7	Pass
22	Jackson	OR	217,479	45,040	46,790	2,602	18,748	9,994	107	15,309	17,806	30,774	11.6	Pass
23	Missoula	MT	117,441	22,463	17,656	1,926	8,760	5,358	61	6,195	6,528	16,351	11.4	Pass
24	Wayne	MI	1,753,616	416,178	265,150	36,465	145,113	114,437	1,107	135,536	143,598	392,205	11.2	Pass
25	Butler	OH	380,604	90,111	54,537	7,788	28,986	23,237	261	26,998	31,056	39,242	11.1	Pass

Notes:

1. Counties are ranked by Design Value. See note 12 below.
2. **Total Population** represents the at-risk populations in counties with $PM_{2.5}$ monitors.
3. Those **under 18** and **65 and over** are vulnerable to $PM_{2.5}$ and are, therefore, included. They should not be used as population denominators for disease estimates.
4. **Pediatric asthma** estimates are for those under 18 years of age and represent the **estimated** number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
5. **Adult asthma** estimates are for those 18 years and older and represent the **estimated** number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
6. Adding across rows does not produce valid estimates. Adding the disease categories (asthma, COPD, etc.) will double-count people who have been diagnosed with more than one disease.
7. **COPD** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
8. **Lung cancer** estimates are the number of new cases diagnosed in 2015.
9. **CV disease** is cardiovascular disease and estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
10. **Diabetes** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
11. **Poverty** estimates come from the U.S. Census Bureau and are for all ages.
12. The **Design Value** is the calculated concentration of a pollutant based on the form of the Annual $PM_{2.5}$ National Ambient Air Quality Standard, and is used by EPA to determine whether the air quality in a county meets the current (2012) standard (U.S. EPA).
13. **Grades** are based on EPA's determination of meeting or failure to meet the NAAQS for annual $PM_{2.5}$ levels during 2015-2017. Counties meeting the NAAQS received grades of Pass; counties not meeting the NAAQS received grades of Fail.

People at Risk in 25 Most Ozone-Polluted Counties

2019 Rank[1]	County	ST	Total Population[2]	At-Risk Groups							High Ozone Days in Unhealthy Ranges, 2015–2017	
				Under 18[3]	65 and Over[3]	Pediatric Asthma[4,6]	Adult Asthma[5,6]	COPD[7]	CV Disease[8]	Poverty[9]	Weighted Avg.[10]	Grade[11]
1	San Bernardino	CA	2,157,404	571,669	243,122	35,481	124,484	66,466	91,640	339,748	161.2	F
2	Riverside	CA	2,423,266	616,211	340,498	38,246	142,917	81,395	115,017	309,235	130.0	F
3	Los Angeles	CA	10,163,507	2,224,905	1,343,960	138,091	625,653	344,960	481,419	1,490,853	119.2	F
4	Tulare	CA	464,493	143,726	51,669	8,921	25,149	13,466	18,628	110,299	101.2	F
5	Kern	CA	893,119	259,120	95,307	16,083	49,617	26,076	35,790	182,948	98.8	F
6	Fresno	CA	989,255	281,684	118,527	17,483	55,536	30,071	41,788	205,046	91.0	F
7	Nevada	CA	99,814	17,304	26,471	1,074	6,748	4,800	7,252	10,889	52.2	F
8	San Diego	CA	3,337,685	728,528	454,826	45,217	205,392	113,301	158,403	385,479	45.0	F
9	Kings	CA	150,101	40,964	15,054	2,542	8,492	4,296	5,818	24,810	44.2	F
10	Madera	CA	156,890	43,013	21,552	2,670	8,995	5,103	7,207	31,569	37.7	F
11	El Dorado	CA	188,987	37,869	38,464	2,350	12,256	8,071	11,892	15,620	34.3	F
12	Maricopa	AZ	4,307,033	1,045,266	638,316	84,264	323,906	201,670	248,553	570,402	33.8	F
13	Stanislaus	CA	547,899	148,525	70,316	9,218	31,501	17,541	24,583	75,614	32.5	F
14	Placer	CA	386,166	86,233	73,776	5,352	24,132	15,381	22,510	29,873	31.0	F
15	Tuolumne	CA	54,248	9,060	13,844	562	3,674	2,542	3,817	6,205	28.2	F
16	Harris	TX	4,652,980	1,249,484	473,982	98,873	249,914	153,431	248,554	733,605	26.7	F
17	Fairfield	CT	949,921	214,902	147,210	27,712	79,093	42,045	53,941	82,428	25.8	F
18	Sacramento	CA	1,530,615	364,311	209,612	22,611	92,167	51,889	72,961	213,232	25.5	F
19	Merced	CA	272,673	80,640	30,187	5,005	15,042	7,992	11,023	61,297	25.0	F
20	Tehama	CA	63,926	15,345	12,219	952	3,908	2,502	3,670	12,718	22.8	F
21	Jefferson	CO	574,613	114,968	92,236	9,135	42,578	21,412	29,286	42,729	22.5	F
22	Clark	NV	2,204,079	514,192	317,010	39,891	176,845	115,546	139,163	305,802	22.0	F
23	Salt Lake	UT	1,135,649	312,338	120,002	19,029	73,451	31,885	48,668	103,384	21.0	F
24	Imperial	CA	182,830	52,296	23,042	3,246	10,266	5,654	7,909	35,830	19.2	F
25	Calaveras	CA	45,670	7,786	12,276	483	3,110	2,240	3,391	5,904	17.8	F
25	Orange	CA	3,190,400	705,999	456,229	43,819	197,038	112,878	159,434	362,109	17.8	F

Notes:

1. Counties are ranked by weighted average. See note 10 below.
2. **Total Population** represents the at-risk populations in counties with $PM_{2.5}$ monitors.
3. Those **under 18** and **65 and over** are vulnerable to $PM_{2.5}$ and are, therefore, included. They should not be used as population denominators for disease estimates.
4. **Pediatric asthma** estimates are for those under 18 years of age and represent the **estimated** number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
5. **Adult asthma** estimates are for those 18 years and older and represent the **estimated** number of people who had asthma in 2017 based on state rates (BRFSS) applied to population estimates (U.S. Census).
6. Adding across rows does not produce valid estimates. Adding the disease categories (asthma, COPD, etc.) will double-count people who have been diagnosed with more than one disease.
7. **COPD** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
8. **CV disease** is cardiovascular disease and estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
9. **Poverty** estimates come from the U.S. Census Bureau and are for all ages.
10. The **Weighted Average** was derived by counting the number of days in each unhealthful range (orange, red, purple) in each year (2015-2017), multiplying the total in each range by the assigned standard weights (i.e., 1 for orange, 1.5 for red, 2.0 for purple), and calculating the average.
11. **Grade** is assigned by weighted average as follows: A=0.0, B=0.3-0.9, C=1.0-2.0, D=2.1-3.2, F=3.3+.

Cleanest U.S. Cities for Short-Term Particle Pollution (24-hour $PM_{2.5}$)[1]

Metropolitan Statistical Area	Population
Albany-Schenectady, NY	1,176,079
Albuquerque-Santa Fe-Las Vegas, NM	1,149,672
Alexandria, LA	153,984
Altoona-Huntingdon, PA	168,948
Appleton-Oshkosh-Neenah, WI	406,540
Bangor, ME	151,957
Birmingham-Hoover-Talladega, AL	1,312,627
Bloomington-Bedford, IN	213,491
Bloomington-Pontiac, IL	208,808
Bowling Green-Glasgow, KY	228,743
Buffalo-Cheektowaga-Olean, NY	1,214,204
Burlington-Fort Madison-Keokuk, IA-IL-MO	105,250
Burlington-South Burlington-Barre, VT	276,685
Cape Coral-Fort Myers-Naples, FL	1,152,451
Champaign-Urbana, IL	225,844
Charlotte-Concord, NC-SC	2,709,112
Charlottesville, VA	216,728
Cincinnati-Wilmington-Maysville, OH-KY-IN	2,260,884
Clarksville, TN-KY	298,397
Corpus Christi-Kingsville-Alice, TX	537,657
Dallas-Fort Worth, TX-OK	7,800,952
Dayton-Springfield-Kettering, OH	1,077,108
Decatur, IL	105,801
Eau Claire-Menomonie, WI	212,177
Edwards-Glenwood Springs, CO	131,780
Elmira-Corning, NY	181,838
Erie-Meadville, PA	360,700
Fayetteville-Sanford-Lumberton, NC	844,809
Fayetteville-Springdale-Rogers, AR	514,635
Florence, SC	205,831
Florence-Muscle Shoals, AL	147,038
Fort Smith, AR-OK	250,245
Gadsden, AL	102,755
Gainesville-Lake City, FL	394,654
Grand Island, NE	75,838
Green Bay-Shawano, WI	365,600
Greenville-Kinston-Washington, NC	283,013
Gulfport-Biloxi, MS	412,344
Harrisonburg-Staunton, VA	256,441
Hartford-East Hartford, CT	1,479,292
Hattiesburg-Laurel, MS	252,468
Hot Springs-Malvern, AR	132,232
Houma-Thibodaux, LA	210,512
Huntsville-Decatur, AL	607,315
Jackson-Brownsville, TN	195,919
Jackson-Vicksburg-Brookhaven, MS	677,569
Johnstown-Somerset, PA	207,555
Kalamazoo-Battle Creek-Portage, MI	501,470
La Crosse-Onalaska, WI-MN	136,934
Lafayette-Opelousas-Morgan City, LA	626,028
Lafayette-West Lafayette-Frankfort, IN	259,757
Lake Charles-Jennings, LA	240,834
Lansing-East Lansing, MI	546,102
Lawton, OK	127,349
Lexington-Fayette—Richmond—Frankfort, KY	737,943
Lima-Van Wert-Celina, OH	218,066
Lincoln-Beatrice, NE	353,120
Little Rock-North Little Rock, AR	908,323
Longview, TX	284,142
Lynchburg, VA	261,254
Madison-Janesville-Beloit, WI	880,520
McAllen-Edinburg, TX	925,115
Memphis-Forrest City, TN-MS-AR	1,365,878
Mobile-Daphne-Fairhope, AL	643,114
Monroe-Ruston, LA	251,830
Montgomery-Selma-Alexander City, AL	464,553
Morgantown-Fairmont, WV	195,046
New Orleans-Metairie-Hammond, LA-MS	1,510,162
North Port-Sarasota, FL	1,023,585
Oklahoma City-Shawnee, OK	1,455,963
Orlando-Lakeland-Deltona, FL	3,998,092
Owensboro, KY	118,376
Palm Bay-Melbourne-Titusville, FL	589,162
Parkersburg-Marietta-Vienna, WV-OH	151,316
Pensacola-Ferry Pass, FL-AL	525,231
Peoria, IL	407,537
Pittsfield, MA	126,313
Portland-Lewiston-South Portland, ME	639,734
Richmond, VA	1,270,746
Roanoke, VA	314,128
Rochester-Batavia-Seneca Falls, NY	1,170,402
Rockford-Freeport-Rochelle, IL	434,408
Saginaw-Midland-Bay City, MI	379,584
Salisbury-Cambridge, MD-DE	438,015
Scranton—Wilkes-Barre, PA	555,426
Shreveport-Bossier City-Minden, LA	440,933
Sierra Vista-Douglas, AZ	124,756
Springfield, MA	702,354
Springfield, MO	462,369
Springfield-Jacksonville-Lincoln, IL	309,844
St. George, UT	165,662
State College-DuBois, PA	242,345
Syracuse-Auburn, NY	732,444
Tallahassee, FL	382,627
Tampa-St. Petersburg-Clearwater, FL	3,091,399
Texarkana, TX-AR	150,355
Topeka, KS	233,149
Tuscaloosa, AL	251,129
Urban Honolulu, HI	988,650
Virginia Beach-Norfolk, VA-NC	1,851,069
Waterloo-Cedar Falls, IA	169,892
Wheeling, WV-OH	141,254
Wichita-Winfield, KS	673,629
Wilmington, NC	288,156

Note:

1. Monitors in these cities reported no days when $PM_{2.5}$ levels reached the unhealthful range using the Air Quality Index based on the 2006 NAAQS.

Top 25 Cleanest U.S. Cities for Year-Round Particle Pollution (Annual $PM_{2.5}$)[1]

Rank[2]	Design Value[3]	Metropolitan Statistical Area	Population
1	4.2	Cheyenne, WY	98,327
1	4.2	Kahului-Wailuku-Lahaina, HI	166,260
1	4.2	Urban Honolulu, HI	988,650
4	4.9	Casper, WY	79,547
4	4.9	St. George, UT	165,662
6	5.0	Elmira-Corning, NY	181,838
7	5.2	Duluth, MN-WI	289,306
7	5.2	Pueblo-Cañon City, CO	214,034
9	5.4	Bismarck, ND	127,766
10	5.5	Bellingham, WA	221,404
10	5.5	Syracuse-Auburn, NY	732,444
12	5.6	Burlington-South Burlington-Barre, VT	276,685
13	5.7	Colorado Springs, CO	723,878
13	5.7	Palm Bay-Melbourne-Titusville, FL	589,162
13	5.7	Wilmington, NC	288,156
16	5.9	Grand Island, NE	75,838
17	6.1	Anchorage, AK	400,888
17	6.1	Cape Coral-Fort Myers-Naples, FL	1,152,451
17	6.1	Gainesville-Lake City, FL	394,654
17	6.1	Grand Junction, CO	151,616
17	6.1	Salinas, CA	437,907
22	6.3	Pittsfield, MA	126,313
23	6.4	Bangor, ME	151,957
23	6.4	Lincoln-Beatrice, NE	353,120
23	6.4	North Port-Sarasota, FL	1,023,585

Notes:

1. This list represents cities with the lowest levels of annual $PM_{2.5}$ air pollution.
2. Cities are ranked by using the highest design value for any county within that metropolitan area.
3. The **Design Value** is the calculated concentration of a pollutant based on the form of the Annual $PM_{2.5}$ National Ambient Air Quality Standard, and is used by EPA to determine whether the air quality in a county meets the current (2012) standard (U.S. EPA).

Cleanest U.S. Cities for Ozone Air Pollution[1]

Metropolitan Statistical Area	Population
Anchorage, AK	400,888
Bangor, ME	151,957
Bellingham, WA	221,404
Bowling Green-Glasgow, KY	228,743
Brownsville-Harlingen-Raymondville, TX	445,309
Brunswick, GA	118,119
Burlington-South Burlington-Barre, VT	276,685
Casper, WY	79,547
Cedar Rapids-Iowa City, IA	441,784
Clarksville, TN-KY	298,397
Cleveland-Indianola, MS	57,926
Columbia-Moberly-Mexico, MO	256,640
Crestview-Fort Walton Beach-Destin, FL	271,346
Des Moines-Ames-West Des Moines, IA	862,203
Dothan-Ozark, AL	197,140
Eau Claire-Menomonie, WI	212,177
Fairbanks, AK	99,703
Fargo-Wahpeton, ND-MN	264,031
Fayetteville-Sanford-Lumberton, NC	844,809
Fayetteville-Springdale-Rogers, AR	514,635
Florence, SC	205,831
Fort Smith, AR-OK	250,245
Gadsden, AL	102,755
Greenville-Kinston-Washington, NC	283,013
Hickory-Lenoir-Morganton, NC	366,534
Houma-Thibodaux, LA	210,512
Idaho Falls-Rexburg-Blackfoot, ID	243,805
Jackson-Vicksburg-Brookhaven, MS	677,569
Joplin-Miami, MO-OK	209,819
La Crosse-Onalaska, WI-MN	136,934
Laredo, TX	274,794
Lincoln-Beatrice, NE	353,120
McAllen-Edinburg, TX	925,115
Missoula, MT	117,441
Monroe-Ruston, LA	251,830
New Bern-Morehead City, NC	193,745
Palm Bay-Melbourne-Titusville, FL	589,162
Panama City, FL	183,563
Rapid City-Spearfish, SD	163,588
Roanoke, VA	314,128
Rochester-Austin, MN	257,846
Rocky Mount-Wilson-Roanoke Rapids, NC	299,581
Salinas, CA	437,907
Savannah-Hinesville-Statesboro, GA	573,909
Sebring-Avon Park, FL	102,883
Sioux City, IA-NE-SD	143,398
Springfield, MO	462,369
Steamboat Springs-Craig, CO	38,351
Tallahassee, FL	382,627
Tupelo-Corinth, MS	202,552
Tuscaloosa, AL	251,129
Urban Honolulu, HI	988,650
Waterloo-Cedar Falls, IA	169,892
Wausau-Stevens Point-Wisconsin Rapids, WI	307,170
Wilmington, NC	288,156

Notes:

1. This list represents cities with no monitored ozone air pollution in unhealthful ranges using the Air Quality Index based on 2015 NAAQS.

Cleanest Counties for Short-Term Particle Pollution (24-hour $PM_{2.5}$)[1]

County	State	MSAs and Respective CSA[2]
Baldwin	AL	
Clay	AL	
Colbert	AL	Florence-Muscle Shoals, AL
Etowah	AL	Gadsden, AL
Jefferson	AL	Birmingham-Hoover-Talladega, AL
Madison	AL	Huntsville-Decatur, AL
Mobile	AL	Mobile-Daphne-Fairhope, AL
Montgomery	AL	Montgomery-Selma-Alexander City, AL
Morgan	AL	Huntsville-Decatur, AL
Russell	AL	Columbus-Auburn-Opelika, GA-AL
Talladega	AL	Birmingham-Hoover-Talladega, AL
Tuscaloosa	AL	Tuscaloosa, AL
Apache	AZ	
Cochise	AZ	Sierra Vista-Douglas, AZ
La Paz	AZ	
Pima	AZ	Tucson-Nogales, AZ
Arkansas	AR	
Ashley	AR	
Crittenden	AR	Memphis-Forrest City, TN-MS-AR
Garland	AR	Hot Springs-Malvern, AR
Jackson	AR	
Polk	AR	
Pulaski	AR	Little Rock-North Little Rock, AR
Union	AR	
Washington	AR	Fayetteville-Springdale-Rogers, AR
Garfield	CO	Edwards-Glenwood Springs, CO
La Plata	CO	
Rio Blanco	CO	
Fairfield	CT	New York-Newark, NY-NJ-CT-PA
Hartford	CT	Hartford-East Hartford, CT
New Haven	CT	New York-Newark, NY-NJ-CT-PA
New London	CT	Hartford-East Hartford, CT
Kent	DE	Philadelphia-Reading-Camden, PA-NJ-DE-MD
Sussex	DE	Salisbury-Cambridge, MD-DE
Alachua	FL	Gainesville-Lake City, FL
Brevard	FL	Palm Bay-Melbourne-Titusville, FL
Broward	FL	Miami-Port St. Lucie-Fort Lauderdale, FL
Escambia	FL	Pensacola-Ferry Pass, FL-AL
Hillsborough	FL	Tampa-St. Petersburg-Clearwater, FL
Lee	FL	Cape Coral-Fort Myers-Naples, FL
Leon	FL	Tallahassee, FL
Orange	FL	Orlando-Lakeland-Deltona, FL
Palm Beach	FL	Miami-Port St. Lucie-Fort Lauderdale, FL
Pinellas	FL	Tampa-St. Petersburg-Clearwater, FL
Polk	FL	Orlando-Lakeland-Deltona, FL
Sarasota	FL	North Port-Sarasota, FL
Seminole	FL	Orlando-Lakeland-Deltona, FL
Volusia	FL	Orlando-Lakeland-Deltona, FL
Floyd	GA	Atlanta—Athens-Clarke County—Sandy Springs, GA-AL
Paulding	GA	Atlanta—Athens-Clarke County—Sandy Springs, GA-AL
Honolulu	HI	Urban Honolulu, HI
Kauai	HI	
Champaign	IL	Champaign-Urbana, IL
Jersey	IL	St. Louis-St. Charles-Farmington, MO-IL
McHenry	IL	Chicago-Naperville, IL-IN-WI
McLean	IL	Bloomington-Pontiac, IL
Macon	IL	Decatur, IL
Peoria	IL	Peoria, IL
Randolph	IL	
Rock Island	IL	Davenport-Moline, IA-IL
Sangamon	IL	Springfield-Jacksonville-Lincoln, IL
Will	IL	Chicago-Naperville, IL-IN-WI
Winnebago	IL	Rockford-Freeport-Rochelle, IL
Bartholomew	IN	Indianapolis-Carmel-Muncie, IN
Clark	IN	Louisville/Jefferson County—Elizabethtown—Bardstown, KY-IN
Dubois	IN	
Greene	IN	
Hamilton	IN	Indianapolis-Carmel-Muncie, IN
Henry	IN	Indianapolis-Carmel-Muncie, IN
LaPorte	IN	Chicago-Naperville, IL-IN-WI
Madison	IN	Indianapolis-Carmel-Muncie, IN
Monroe	IN	Bloomington-Bedford, IN
Spencer	IN	
Tippecanoe	IN	Lafayette-West Lafayette-Frankfort, IN
Vanderburgh	IN	Evansville, IN-KY
Whitley	IN	Fort Wayne-Huntington-Auburn, IN
Black Hawk	IA	Waterloo-Cedar Falls, IA
Delaware	IA	
Lee	IA	Burlington-Fort Madison-Keokuk, IA-IL-MO
Montgomery	IA	
Palo Alto	IA	
Pottawattamie	IA	Omaha-Council Bluffs-Fremont, NE-IA
Van Buren	IA	
Woodbury	IA	Sioux City, IA-NE-SD
Johnson	KS	Kansas City-Overland Park-Kansas City, MO-KS
Neosho	KS	

Notes:

1. Monitors in these counties reported no days when $PM_{2.5}$ levels reached the unhealthful range using the Air Quality Index based on the 2006 NAAQS.
2. MSA and CSA are terms used by the U.S. Office of Management and Budget for statistical purposes. MSA stands for Metropolitan Statistical Area. CSA stands for Combined Statistical Area, which may include multiples and individual counties.

Cleanest Counties for Short-Term Particle Pollution (24-hour $PM_{2.5}$)[1] (cont.)

County	State	MSAs and Respective CSA[2]
Sedgwick	KS	Wichita-Winfield, KS
Shawnee	KS	Topeka, KS
Sumner	KS	Wichita-Winfield, KS
Wyandotte	KS	Kansas City-Overland Park-Kansas City, MO-KS
Boyd	KY	Charleston-Huntington-Ashland, WV-OH-KY
Campbell	KY	Cincinnati-Wilmington-Maysville, OH-KY-IN
Christian	KY	Clarksville, TN-KY
Daviess	KY	Owensboro, KY
Fayette	KY	Lexington-Fayette—Richmond—Frankfort, KY
Hardin	KY	Louisville/Jefferson County—Elizabethtown—Bardstown, KY-IN
Madison	KY	Lexington-Fayette—Richmond—Frankfort, KY
Pulaski	KY	
Warren	KY	Bowling Green-Glasgow, KY
Caddo Parish	LA	Shreveport-Bossier City-Minden, LA
Calcasieu Parish	LA	Lake Charles-Jennings, LA
Iberville Parish	LA	Baton Rouge, LA
Jefferson Parish	LA	New Orleans-Metairie-Hammond, LA-MS
Lafayette Parish	LA	Lafayette-Opelousas-Morgan City, LA
Orleans Parish	LA	New Orleans-Metairie-Hammond, LA-MS
Ouachita Parish	LA	Monroe-Ruston, LA
Rapides Parish	LA	Alexandria, LA
St. Bernard Parish	LA	New Orleans-Metairie-Hammond, LA-MS
Tangipahoa Parish	LA	New Orleans-Metairie-Hammond, LA-MS
Terrebonne Parish	LA	Houma-Thibodaux, LA
West Baton Rouge Parish	LA	Baton Rouge, LA
Androscoggin	ME	Portland-Lewiston-South Portland, ME
Cumberland	ME	Portland-Lewiston-South Portland, ME
Hancock	ME	
Kennebec	ME	
Oxford	ME	
Penobscot	ME	Bangor, ME
Baltimore	MD	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA
Cecil	MD	Philadelphia-Reading-Camden, PA-NJ-DE-MD
Dorchester	MD	Salisbury-Cambridge, MD-DE
Garrett	MD	
Howard	MD	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA
Kent	MD	
Montgomery	MD	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA
Prince George's	MD	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA
Berkshire	MA	Pittsfield, MA
Bristol	MA	Boston-Worcester-Providence, MA-RI-NH-CT
Essex	MA	Boston-Worcester-Providence, MA-RI-NH-CT
Franklin	MA	Springfield, MA
Hampden	MA	Springfield, MA
Hampshire	MA	Springfield, MA
Plymouth	MA	Boston-Worcester-Providence, MA-RI-NH-CT
Suffolk	MA	Boston-Worcester-Providence, MA-RI-NH-CT
Worcester	MA	Boston-Worcester-Providence, MA-RI-NH-CT
Allegan	MI	Grand Rapids-Kentwood-Muskegon, MI
Bay	MI	Saginaw-Midland-Bay City, MI
Berrien	MI	South Bend-Elkhart-Mishawaka, IN-MI
Chippewa	MI	
Genesee	MI	Detroit-Warren-Ann Arbor, MI
Ingham	MI	Lansing-East Lansing, MI
Kalamazoo	MI	Kalamazoo-Battle Creek-Portage, MI
Lenawee	MI	Detroit-Warren-Ann Arbor, MI
Manistee	MI	
Missaukee	MI	
St. Clair	MI	Detroit-Warren-Ann Arbor, MI
Washtenaw	MI	Detroit-Warren-Ann Arbor, MI
Scott	MN	Minneapolis-St. Paul, MN-WI
DeSoto	MS	Memphis-Forrest City, TN-MS-AR
Forrest	MS	Hattiesburg-Laurel, MS
Grenada	MS	
Hancock	MS	Gulfport-Biloxi, MS
Harrison	MS	Gulfport-Biloxi, MS
Hinds	MS	Jackson-Vicksburg-Brookhaven, MS
Jackson	MS	Gulfport-Biloxi, MS
Cedar	MO	
Greene	MO	Springfield, MO
Hall	NE	Grand Island, NE
Lancaster	NE	Lincoln-Beatrice, NE
Washington	NE	Omaha-Council Bluffs-Fremont, NE-IA
Belknap	NH	Boston-Worcester-Providence, MA-RI-NH-CT
Grafton	NH	
Hillsborough	NH	Boston-Worcester-Providence, MA-RI-NH-CT
Rockingham	NH	Boston-Worcester-Providence, MA-RI-NH-CT
Atlantic	NJ	Philadelphia-Reading-Camden, PA-NJ-DE-MD
Essex	NJ	New York-Newark, NY-NJ-CT-PA
Gloucester	NJ	Philadelphia-Reading-Camden, PA-NJ-DE-MD
Hudson	NJ	New York-Newark, NY-NJ-CT-PA
Mercer	NJ	New York-Newark, NY-NJ-CT-PA
Middlesex	NJ	New York-Newark, NY-NJ-CT-PA
Morris	NJ	New York-Newark, NY-NJ-CT-PA

Notes:

1. Monitors in these counties reported no days when $PM_{2.5}$ levels reached the unhealthful range using the Air Quality Index based on the 2006 NAAQS.
2. MSA and CSA are terms used by the U.S. Office of Management and Budget for statistical purposes. MSA stands for Metropolitan Statistical Area. CSA stands for Combined Statistical Area, which may include multiples and individual counties.

Cleanest Counties for Short-Term Particle Pollution (24-hour $PM_{2.5}$)[1] (cont.)

County	State	MSAs and Respective CSA[2]
Passaic	NJ	New York-Newark, NY-NJ-CT-PA
Warren	NJ	Allentown-Bethlehem-Easton, PA-NJ
Bernalillo	NM	Albuquerque-Santa Fe-Las Vegas, NM
Albany	NY	Albany-Schenectady, NY
Bronx	NY	New York-Newark, NY-NJ-CT-PA
Chautauqua	NY	
Erie	NY	Buffalo-Cheektowaga-Olean, NY
Essex	NY	
Kings	NY	New York-Newark, NY-NJ-CT-PA
Monroe	NY	Rochester-Batavia-Seneca Falls, NY
New York	NY	New York-Newark, NY-NJ-CT-PA
Onondaga	NY	Syracuse-Auburn, NY
Orange	NY	New York-Newark, NY-NJ-CT-PA
Queens	NY	New York-Newark, NY-NJ-CT-PA
Richmond	NY	New York-Newark, NY-NJ-CT-PA
Steuben	NY	Elmira-Corning, NY
Suffolk	NY	New York-Newark, NY-NJ-CT-PA
Cumberland	NC	Fayetteville-Sanford-Lumberton, NC
Davidson	NC	Greensboro—Winston-Salem—High Point, NC
Forsyth	NC	Greensboro—Winston-Salem—High Point, NC
Mecklenburg	NC	Charlotte-Concord, NC-SC
Montgomery	NC	
New Hanover	NC	Wilmington, NC
Pitt	NC	Greenville-Kinston-Washington, NC
Allen	OH	Lima-Van Wert-Celina, OH
Athens	OH	
Belmont	OH	Wheeling, WV-OH
Butler	OH	Cincinnati-Wilmington-Maysville, OH-KY-IN
Clark	OH	Dayton-Springfield-Kettering, OH
Greene	OH	Dayton-Springfield-Kettering, OH
Hamilton	OH	Cincinnati-Wilmington-Maysville, OH-KY-IN
Lake	OH	Cleveland-Akron-Canton, OH
Lorain	OH	Cleveland-Akron-Canton, OH
Mahoning	OH	Youngstown-Warren, OH-PA
Montgomery	OH	Dayton-Springfield-Kettering, OH
Portage	OH	Cleveland-Akron-Canton, OH
Preble	OH	
Cleveland	OK	Oklahoma City-Shawnee, OK
Comanche	OK	Lawton, OK
Oklahoma	OK	Oklahoma City-Shawnee, OK
Pittsburg	OK	
Sequoyah	OK	Fort Smith, AR-OK
Armstrong	PA	Pittsburgh-New Castle-Weirton, PA-OH-WV
Blair	PA	Altoona-Huntingdon, PA
Cambria	PA	Johnstown-Somerset, PA
Centre	PA	State College-DuBois, PA
Chester	PA	Philadelphia-Reading-Camden, PA-NJ-DE-MD
Erie	PA	Erie-Meadville, PA
Lackawanna	PA	Scranton—Wilkes-Barre, PA
Monroe	PA	New York-Newark, NY-NJ-CT-PA
Tioga	PA	
Westmoreland	PA	Pittsburgh-New Castle-Weirton, PA-OH-WV
Kent	RI	Boston-Worcester-Providence, MA-RI-NH-CT
Washington	RI	Boston-Worcester-Providence, MA-RI-NH-CT
Chesterfield	SC	
Florence	SC	Florence, SC
Oconee	SC	Greenville-Spartanburg-Anderson, SC
Spartanburg	SC	Greenville-Spartanburg-Anderson, SC
Brown	SD	
Dyer	TN	
Lawrence	TN	Nashville-Davidson—Murfreesboro, TN
Madison	TN	Jackson-Brownsville, TN
Maury	TN	Nashville-Davidson—Murfreesboro, TN
Montgomery	TN	Clarksville, TN-KY
Putnam	TN	
Shelby	TN	Memphis-Forrest City, TN-MS-AR
Sumner	TN	Nashville-Davidson—Murfreesboro, TN
Bowie	TX	Texarkana, TX-AR
Dallas	TX	Dallas-Fort Worth, TX-OK
Ellis	TX	Dallas-Fort Worth, TX-OK
Galveston	TX	Houston-The Woodlands, TX
Harrison	TX	Longview, TX
Hidalgo	TX	McAllen-Edinburg, TX
Nueces	TX	Corpus Christi-Kingsville-Alice, TX
Tarrant	TX	Dallas-Fort Worth, TX-OK
Uintah	UT	
Washington	UT	St. George, UT
Bennington	VT	
Chittenden	VT	Burlington-South Burlington-Barre, VT
Albemarle	VA	Charlottesville, VA
Charles City	VA	Richmond, VA
Chesterfield	VA	Richmond, VA
Frederick	VA	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA
Henrico	VA	Richmond, VA
Loudoun	VA	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA
Roanoke	VA	Roanoke, VA

Notes:

1. Monitors in these counties reported no days when $PM_{2.5}$ levels reached the unhealthful range using the Air Quality Index based on the 2006 NAAQS.
2. MSA and CSA are terms used by the U.S. Office of Management and Budget for statistical purposes. MSA stands for Metropolitan Statistical Area. CSA stands for Combined Statistical Area, which may include multiples and individual counties.

Cleanest Counties for Short-Term Particle Pollution (24-hour $PM_{2.5}$)[1] (cont.)

County	State	MSAs and Respective CSA[2]
Rockingham	VA	Harrisonburg-Staunton, VA
Hampton City	VA	Virginia Beach-Norfolk, VA-NC
Lynchburg City	VA	Lynchburg, VA
Norfolk City	VA	Virginia Beach-Norfolk, VA-NC
Richmond City	VA	Richmond, VA
Salem City	VA	Roanoke, VA
Virginia Beach City	VA	Virginia Beach-Norfolk, VA-NC
Skagit	WA	Seattle-Tacoma, WA
Berkeley	WV	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA
Brooke	WV	Pittsburgh-New Castle-Weirton, PA-OH-WV
Cabell	WV	Charleston-Huntington-Ashland, WV-OH-KY
Hancock	WV	Pittsburgh-New Castle-Weirton, PA-OH-WV
Harrison	WV	
Kanawha	WV	Charleston-Huntington-Ashland, WV-OH-KY
Marion	WV	Morgantown-Fairmont, WV
Marshall	WV	Wheeling, WV-OH
Monongalia	WV	Morgantown-Fairmont, WV
Ohio	WV	Wheeling, WV-OH
Wood	WV	Parkersburg-Marietta-Vienna, WV-OH
Ashland	WI	
Brown	WI	Green Bay-Shawano, WI
Dane	WI	Madison-Janesville-Beloit, WI
Eau Claire	WI	Eau Claire-Menomonie, WI
Forest	WI	
Grant	WI	
La Crosse	WI	La Crosse-Onalaska, WI-MN
Milwaukee	WI	Milwaukee-Racine-Waukesha, WI
Outagamie	WI	Appleton-Oshkosh-Neenah, WI
Ozaukee	WI	Milwaukee-Racine-Waukesha, WI
Sauk	WI	Madison-Janesville-Beloit, WI
Taylor	WI	
Vilas	WI	
Waukesha	WI	Milwaukee-Racine-Waukesha, WI
Park	WY	
Sweetwater	WY	

Notes:

1. Monitors in these counties reported no days when $PM_{2.5}$ levels reached the unhealthful range using the Air Quality Index based on the 2006 NAAQS.
2. MSA and CSA are terms used by the U.S. Office of Management and Budget for statistical purposes. MSA stands for Metropolitan Statistical Area. CSA stands for Combined Statistical Area, which may include multiples and individual counties.

Top 25 Cleanest Counties for Year-Round Particle Pollution (Annual $PM_{2.5}$)[1]

2019 Rank[2]	County	State	Design Value[3]
1	La Paz	AZ	3.0
2	Kauai	HI	3.1
3	Jackson	SD	3.5
4	McKenzie	ND	3.7
4	Custer	SD	3.7
6	Essex	NY	3.9
7	Lake	MN	4.0
8	Hancock	ME	4.1
8	Williams	ND	4.1
8	Hughes	SD	4.1
8	Ashland	WI	4.1
12	Honolulu	HI	4.2
12	Maui	HI	4.2
12	Laramie	WY	4.2
15	Lake	CA	4.3
15	Burke	ND	4.3
15	Albany	WY	4.3
15	Park	WY	4.3
19	Vilas	WI	4.5
20	San Benito	CA	4.6
20	Litchfield	CT	4.6
20	Hillsborough	NH	4.6
20	Forest	WI	4.6
20	Teton	WY	4.6
25	Nevada	CA	4.7
25	Belknap	NH	4.7
25	Kitsap	WA	4.7

Notes:

1. This list represents counties with the lowest levels of monitored annual $PM_{2.5}$ air pollution.
2. Counties are ranked by Design Value.
3. The Design Value is the calculated concentration of a pollutant based on the form of the Annual $PM_{2.5}$ National Ambient Air Quality Standard, and is used by EPA to determine whether the air quality in a county meets the current (2012) standard (U.S. EPA).

Cleanest Counties for Ozone Air Pollution[1]

County	State	Metropolitan Statistical Area
Etowah	AL	Gadsden, AL
Houston	AL	Dothan-Ozark, AL
Morgan	AL	Huntsville-Decatur, AL
Sumter	AL	
Tuscaloosa	AL	Tuscaloosa, AL
Denali Borough	AK	
Fairbanks North Star Borough	AK	Fairbanks, AK
Matanuska-Susitna Borough	AK	Anchorage, AK
Clark	AR	
Newton	AR	
Polk	AR	
Washington	AR	Fayetteville-Springdale-Rogers, AR
Colusa	CA	
Glenn	CA	
Lake	CA	
Marin	CA	San Jose-San Francisco-Oakland, CA
Mendocino	CA	
Monterey	CA	Salinas, CA
San Francisco	CA	San Jose-San Francisco-Oakland, CA
Siskiyou	CA	
Moffat	CO	Steamboat Springs-Craig, CO
Rio Blanco	CO	
Baker	FL	Jacksonville-St. Mary's-Palatka, FL-GA
Bay	FL	Panama City, FL
Brevard	FL	Palm Bay-Melbourne-Titusville, FL
Collier	FL	Cape Coral-Fort Myers-Naples, FL
Columbia	FL	Gainesville-Lake City, FL
Flagler	FL	Orlando-Lakeland-Deltona, FL
Highlands	FL	Sebring-Avon Park, FL
Holmes	FL	
Leon	FL	Tallahassee, FL
Liberty	FL	
Okaloosa	FL	Crestview-Fort Walton Beach-Destin, FL
Santa Rosa	FL	Pensacola-Ferry Pass, FL-AL
Volusia	FL	Orlando-Lakeland-Deltona, FL
Wakulla	FL	Tallahassee, FL
Chatham	GA	Savannah-Hinesville-Statesboro, GA
Chattooga	GA	Chattanooga-Cleveland-Dalton, TN-GA
Glynn	GA	Brunswick, GA
Richmond	GA	Augusta-Richmond County, GA-SC
Honolulu	HI	Urban Honolulu, HI
Butte	ID	Idaho Falls-Rexburg-Blackfoot, ID
Hamilton	IL	
Macoupin	IL	St. Louis-St. Charles-Farmington, MO-IL
Hendricks	IN	Indianapolis-Carmel-Muncie, IN
Johnson	IN	Indianapolis-Carmel-Muncie, IN
Bremer	IA	Waterloo-Cedar Falls, IA
Linn	IA	Cedar Rapids-Iowa City, IA
Montgomery	IA	
Palo Alto	IA	
Polk	IA	Des Moines-Ames-West Des Moines, IA
Van Buren	IA	
Warren	IA	Des Moines-Ames-West Des Moines, IA
Johnson	KS	Kansas City-Overland Park-Kansas City, MO-KS
Leavenworth	KS	Kansas City-Overland Park-Kansas City, MO-KS
Sumner	KS	Wichita-Winfield, KS
Trego	KS	
Bell	KY	
Carter	KY	Charleston-Huntington-Ashland, WV-OH-KY
Christian	KY	Clarksville, TN-KY
Edmonson	KY	Bowling Green-Glasgow, KY
Greenup	KY	Charleston-Huntington-Ashland, WV-OH-KY
Perry	KY	
Pike	KY	
Pulaski	KY	
Trigg	KY	Clarksville, TN-KY
Warren	KY	Bowling Green-Glasgow, KY
Caddo Parish	LA	Shreveport-Bossier City-Minden, LA
Lafourche Parish	LA	Houma-Thibodaux, LA
Ouachita Parish	LA	Monroe-Ruston, LA
Androscoggin	ME	Portland-Lewiston-South Portland, ME
Aroostook	ME	
Kennebec	ME	
Oxford	ME	
Penobscot	ME	Bangor, ME
Garrett	MD	
Becker	MN	
Crow Wing	MN	
Goodhue	MN	Minneapolis-St. Paul, MN-WI
Hennepin	MN	Minneapolis-St. Paul, MN-WI
Lake	MN	Duluth, MN-WI
Mille Lacs	MN	Minneapolis-St. Paul, MN-WI
Olmsted	MN	Rochester-Austin, MN
St. Louis	MN	Duluth, MN-WI
Scott	MN	Minneapolis-St. Paul, MN-WI
Stearns	MN	Minneapolis-St. Paul, MN-WI
Washington	MN	Minneapolis-St. Paul, MN-WI
Bolivar	MS	Cleveland-Indianola, MS
Hancock	MS	Gulfport-Biloxi, MS
Hinds	MS	Jackson-Vicksburg-Brookhaven, MS
Lauderdale	MS	
Lee	MS	Tupelo-Corinth, MS
Yalobusha	MS	
Boone	MO	Columbia-Moberly-Mexico, MO
Cedar	MO	

Notes:

1. This list represents counties with no monitored ozone air pollution in unhealthful ranges using the Air Quality Index based on 2008 NAAQS.

Cleanest Counties for Ozone Air Pollution[1] (cont.)

County	State	Metropolitan Statistical Area
Greene	MO	Springfield, MO
Jasper	MO	Joplin-Miami, MO-OK
Monroe	MO	
Taney	MO	
Fergus	MT	
Flathead	MT	
Lewis and Clark	MT	
Missoula	MT	Missoula, MT
Phillips	MT	
Powder River	MT	
Richland	MT	
Rosebud	MT	
Lancaster	NE	Lincoln-Beatrice, NE
Belknap	NH	Boston-Worcester-Providence, MA-RI-NH-CT
Grafton	NH	
Santa Fe	NM	Albuquerque-Santa Fe-Las Vegas, NM
Alexander	NC	Hickory-Lenoir-Morganton, NC
Caldwell	NC	Hickory-Lenoir-Morganton, NC
Carteret	NC	New Bern-Morehead City, NC
Caswell	NC	
Cumberland	NC	Fayetteville-Sanford-Lumberton, NC
Durham	NC	Raleigh-Durham-Cary, NC
Edgecombe	NC	Rocky Mount-Wilson-Roanoke Rapids, NC
Granville	NC	Raleigh-Durham-Cary, NC
Johnston	NC	Raleigh-Durham-Cary, NC
Lee	NC	Fayetteville-Sanford-Lumberton, NC
Lenoir	NC	Greenville-Kinston-Washington, NC
Martin	NC	
Montgomery	NC	
New Hanover	NC	Wilmington, NC
Pitt	NC	Greenville-Kinston-Washington, NC
Swain	NC	
Billings	ND	
Burke	ND	
Burleigh	ND	Bismarck, ND
Cass	ND	Fargo-Wahpeton, ND-MN
McKenzie	ND	
Mercer	ND	
Williams	ND	
Portage	OH	Cleveland-Akron-Canton, OH
Adair	OK	
Caddo	OK	
Cherokee	OK	
Creek	OK	Tulsa-Muskogee-Bartlesville, OK
Dewey	OK	
Ottawa	OK	Joplin-Miami, MO-OK
Pittsburg	OK	
Sequoyah	OK	Fort Smith, AR-OK
Bradford	PA	
Cambria	PA	Johnstown-Somerset, PA
Franklin	PA	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA
Aiken	SC	Augusta-Richmond County, GA-SC
Anderson	SC	Greenville-Spartanburg-Anderson, SC
Berkeley	SC	Charleston-North Charleston, SC
Colleton	SC	
Darlington	SC	Florence, SC
Custer	SD	
Jackson	SD	
Meade	SD	Rapid City-Spearfish, SD
Union	SD	Sioux City, IA-NE-SD
Anderson	TN	Knoxville-Morristown-Sevierville, TN
DeKalb	TN	
Wilson	TN	Nashville-Davidson--Murfreesboro, TN
Brewster	TX	
Cameron	TX	Brownsville-Harlingen-Raymondville, TX
Harrison	TX	Longview, TX
Hidalgo	TX	McAllen-Edinburg, TX
Hunt	TX	Dallas-Fort Worth, TX-OK
Polk	TX	
Webb	TX	Laredo, TX
Chittenden	VT	Burlington-South Burlington-Barre, VT
Fauquier	VA	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA
Frederick	VA	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA
Roanoke	VA	Roanoke, VA
Rockbridge	VA	
Wythe	VA	
Clallam	WA	
Skagit	WA	Seattle-Tacoma, WA
Whatcom	WA	Bellingham, WA
Greenbrier	WV	
Ashland	WI	
Dane	WI	Madison-Janesville-Beloit, WI
Eau Claire	WI	Eau Claire-Menomonie, WI
Forest	WI	
La Crosse	WI	La Crosse-Onalaska, WI-MN
Marathon	WI	Wausau-Stevens Point-Wisconsin Rapids, WI
Taylor	WI	
Vilas	WI	
Big Horn	WY	
Converse	WY	
Fremont	WY	
Natrona	WY	Casper, WY
Teton	WY	
Weston	WY	

Notes:

1. This list represents counties with no monitored ozone air pollution in unhealthful ranges using the Air Quality Index based on 2008 NAAQS.

Health Effects of Ozone and Particle Pollution

Two types of air pollution dominate in the U.S.: ozone and particle pollution.[1] These two pollutants threaten the health and the lives of millions of Americans. Thanks to the Clean Air Act, the U.S. has far less of both pollutants now than in the past. Still, more than 141 million people live in counties where monitors show unhealthy levels of one or both—meaning the air a family breathes could shorten life, cause lung cancer or other harmful effects.

So what are ozone and particle pollution?

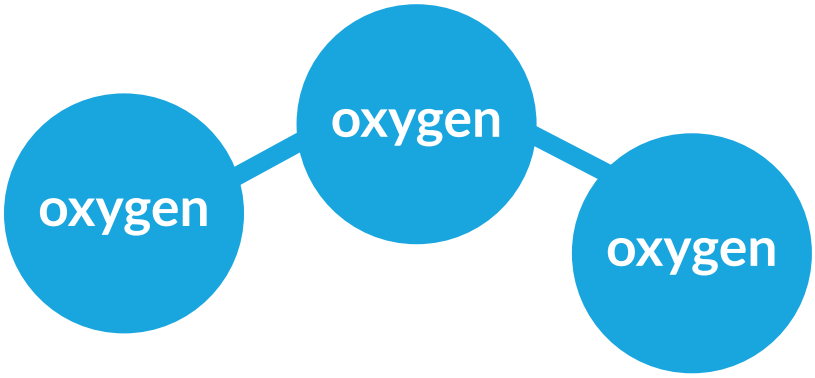
Ozone

It may be hard to imagine that pollution could be invisible, but ozone is. It is currently one of the least well controlled pollutants in the United States.[2] And it is also one of the most dangerous.

Scientists have studied the effects of ozone on health for decades. Hundreds of research studies have confirmed that ozone harms people at levels currently found in the United States. In the last few years, we've learned that it can also be deadly.

What Is Ozone?

Ozone (O_3) is a gas molecule composed of three oxygen atoms. Often called "smog," ozone is harmful to breathe. Ozone aggressively attacks lung tissue by reacting chemically with it. When ozone is present, there are other harmful pollutants created by the same processes that make ozone.



The ozone layer found high in the upper atmosphere (the stratosphere) shields us from much of the sun's ultraviolet radiation. However, ozone air pollution at ground level where we can breathe it (in the troposphere) causes serious health problems.

Where Does Ozone Come From?

Ozone develops in the atmosphere from gases that come out of tailpipes, smokestacks and many other sources. When these gases come in contact with sunlight, they react and form ozone smog.

The essential raw ingredients for ozone are nitrogen oxides (NOx) and volatile organic compounds (VOCs). They are produced primarily when fossil fuels like gasoline, oil or coal are burned or when some chemicals, like solvents, evaporate. NOx is emitted from power plants, motor vehicles and other sources of high-heat combustion. VOCs are emitted from motor vehicles, chemical plants, refineries, factories, gas stations, paint and other sources.[3]

If the ingredients are present under the right conditions, they react to form ozone. Sunlight is key. And because the reaction takes place in the atmosphere, the ozone often shows up downwind of the sources of the original gases. In addition, winds can carry ozone far from where it was formed, even internationally across borders and even across the oceans.

You may have wondered why "ozone action day" warnings are sometimes followed by recommendations to avoid activities such as mowing your lawn or driving your car. Lawn mower exhaust and gasoline vapors contain VOCs that are key to the formation of ozone in the presence of heat and sunlight.

Who Is at Risk from Breathing Ozone?

Anyone who spends time outdoors where ozone pollution levels are high may be at risk. Five groups of people are especially vulnerable to the effects of breathing ozone:

- children and teens;[4]
- anyone 65 and older;[5]
- people who work or exercise outdoors;[6]
- people with existing lung diseases, such as asthma and chronic obstructive pulmonary disease (also known as COPD, which includes emphysema and chronic bronchitis);[7] and
- people with cardiovascular disease.[8]

In addition, some evidence suggests that other groups—including women, people who suffer from obesity and people with low incomes—may also face higher risk from ozone.[9] More research is needed to confirm these findings.

The impact on your health can depend on many factors, however. For example, the risks would be greater if ozone levels are higher, if you are breathing faster because you're working outdoors or if you spend more time outdoors.

A 2008 study of lifeguards in Galveston, Texas, provided evidence of the impact of even short-term exposure to ozone on healthy, active adults. Testing the breathing capacity of these outdoor workers several times a day, researchers found that many lifeguards had greater obstruction of their airways when ozone levels were high. Because of this research, Galveston became the first city in the nation to install an air quality warning flag system on the beach.[10]

How Ozone Pollution Harms Your Health

Premature death. Breathing ozone can shorten your life. Strong evidence exists of the deadly impact of ozone from large studies conducted in cities across the U.S., in Europe and in Asia. Researchers repeatedly found that the risk of premature death increased with higher levels of ozone.[11] Newer research has confirmed that ozone increased the risk of premature death even when other pollutants also exist.[12]

Immediate breathing problems. Many areas in the United States produce enough ozone during the summer months to cause health problems that can be felt right away. Immediate problems—in addition to increased risk of premature death—include:

- shortness of breath, wheezing and coughing;
- asthma attacks;
- increased risk of respiratory infections;
- increased susceptibility to pulmonary inflammation; and
- increased need for people with lung diseases, like asthma or chronic obstructive pulmonary disease (COPD), to receive medical treatment and to go to the hospital.[13]

Cardiovascular effects. Inhaling ozone may affect the heart as well as the lungs. A 2006 study linked exposures to high ozone levels for as little as one hour to a particular type of cardiac arrhythmia that itself increases the risk of premature death and stroke.[14] A French study found that exposure to elevated ozone levels for one to two days increased the risk of heart attacks for middle-aged adults without heart disease.[15] Several studies around the world have found increased risk of hospital admissions or emergency department visits for cardiovascular disease.[16]

Long-term exposure risks. New studies warn of serious effects from breathing ozone over longer periods. With more long-term data, scientists are finding that long-term exposure—that is, for periods longer than eight hours, including days, months or years—may increase the risk of early death.

- Examining the records from a long-term national database, researchers found a higher risk of death from respiratory diseases associated with increases in ozone.[17]
- New York researchers looking at hospital records for children's asthma found that the risk of admission to hospitals for asthma increased with chronic exposure to ozone. Younger children and children from low-income families were more likely than other children to need hospital admissions even during the same time periods.[18]
- California researchers analyzing data from their long-term Southern California Children's Health Study found that some children with certain genes were more likely to develop asthma as adolescents in response to the variations in ozone levels in their communities.[19]
- Studies link lower birth weight and decreased lung function in newborns to ozone levels in their community.[20] This research provides increasing evidence that ozone may harm newborns.

Breathing other pollutants in the air may make your lungs more responsive to ozone—and breathing ozone may increase your body's response to other pollutants. For example, research warns that breathing sulfur dioxide and nitrogen oxide—two pollutants common in the eastern U.S.—can make the lungs react more strongly than to just breathing ozone alone. Breathing ozone may also increase the response to allergens in people with allergies. A large study published in 2009 found that children were more likely to suffer from hay fever and respiratory allergies when ozone and $PM_{2.5}$ levels were high.[21]

Research shows lower level of ozone causes harm. The EPA released their latest complete review of the current research on ozone pollution in February 2013.[22] The EPA had engaged a panel of expert scientists, the Clean Air Scientific Advisory Committee, to help them assess the evidence that was brought together by the EPA; in particular, they examined research published between 2006 and 2012. The experts on the committee and EPA concluded that ozone pollution posed multiple, serious threats to health. Their findings are highlighted in the box below. Based on that review, EPA strengthened the official limit on ozone, called the National Ambient Air Quality Standard, in 2015.

However, new research provides evidence that ozone can cause serious harm even at much lower levels. In a 2017 scientific paper, researchers further evidence in a nationwide study that older adults faced a higher risk of premature death even when levels of ozone pollution remained well below the current national standard.[23]

EPA Concludes Ozone Pollution Poses Serious Health Threats (2013)

- Causes respiratory harm (e.g., worsened asthma, worsened COPD, inflammation)
- Likely to cause early death (both short-term and long-term exposure)
- Likely to cause cardiovascular harm (e.g., heart attacks, strokes, heart disease, congestive heart failure)
- May cause harm to the central nervous system
- May cause reproductive and developmental harm

—U.S. Environmental Protection Agency, *Integrated Science Assessment for Ozone and Related Photochemical Oxidants*, 2013. EPA/600/R-10/076F.

Particle Pollution

Ever look at dirty truck exhaust?

The dirty, smoky part of that stream of exhaust is made of particle pollution. Overwhelming evidence shows that particle pollution—like that coming from that exhaust smoke—can kill. Particle pollution can increase the risk of heart disease, lung cancer and asthma attacks and can interfere with the growth and work of the lungs.

What Is Particle Pollution?

Particle pollution refers to a mix of tiny solid and liquid particles that are in the air we breathe. Many of the particles are so small as to be invisible, but when levels are high, the air becomes opaque. But nothing about particle pollution is simple. And it is so dangerous that it can shorten your life.

Size matters. Particles themselves are different sizes. Some are one-tenth the diameter of a strand of hair. Many are even tinier; some are so small they can only be seen with an electron microscope. Because of their size, you can't see the individual particles. You can only see the haze that forms when millions of particles blur the spread of sunlight.

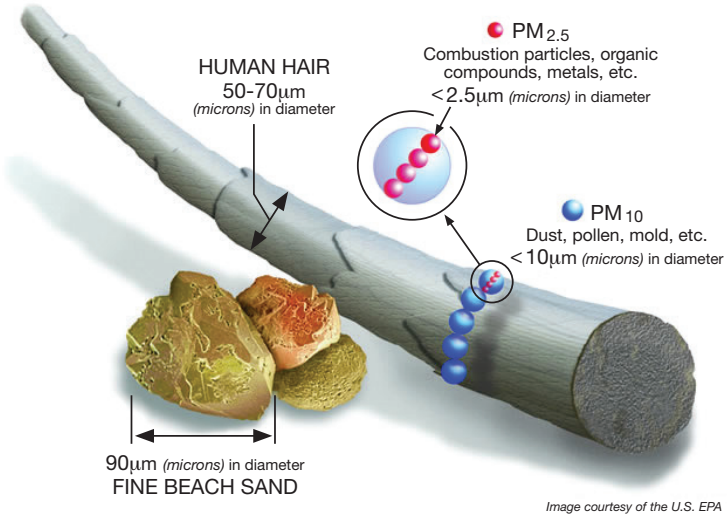


Image courtesy of the U.S. EPA

The differences in size make a big difference in how they affect us. Our natural defenses help us to cough or sneeze larger particles out of our bodies. But those defenses don't keep out smaller particles, those that are smaller than 10 microns (or micrometers) in diameter, or about one-seventh the diameter of a single human hair. These particles get trapped in the lungs, while the smallest are so minute that they can pass through the lungs into the bloodstream, just like the essential oxygen molecules we need to survive.

Researchers categorize particles according to size, grouping them as coarse, fine and ultrafine. Coarse particles (shown as blue dots in the illustration) fall between 2.5 microns and 10 microns in diameter and are called $PM_{10-2.5}$. Fine particles (shown as pink dots in the illustration) are 2.5 microns in diameter or smaller and are called $PM_{2.5}$. Ultrafine particles (not shown) are smaller than 0.1 micron in diameter[24] and are small enough to pass through the lung tissue into the blood stream, circulating like the oxygen molecules themselves. No matter what the size, particles can harm your health.

"A mixture of mixtures." Because particles form in so many ways, they can be composed of many different compounds. Although we often think of particles as solids, not all are. Some are completely liquid; others are solids suspended in liquids. As EPA put it, particles are really "a mixture of mixtures."[25]

The mixtures differ between the eastern and western United States and in different times of the year. For example, the Midwest, Southeast and Northeast states have more sulfate particles than the West on average, largely due to the high levels of sulfur dioxide emitted by large, coal-fired power plants. By contrast, nitrate particles from motor vehicle exhaust form a larger proportion of the unhealthful mix in the winter in the Northeast, Southern California, the Northwest, and North Central U.S.[26]

Who Is at Risk?

Anyone who lives where particle pollution levels are high is at risk. Some people face higher risk, however. People at the greatest risk from particle pollution exposure include:

- Infants, children and teens;[27]
- People over 65 years of age;[28]
- People with lung disease such as asthma and chronic obstructive pulmonary disease (COPD), which includes chronic bronchitis and emphysema;
- People with heart disease[29] or diabetes;[30]
- People with low incomes;[31] and
- People who work or are active outdoors.[32]

Diabetics face increased risk at least in part because of their higher risk for cardiovascular disease.[33]

People with lung cancer also appear to be at higher risk from particle pollution, according to a 2016 study of more than 350,000 patients in California. Researchers looked at the exposure they experienced between 1988 and 2011 and found that where higher concentrations of particle pollution existed, people with lung cancer had poorer survival.[34]

What Can Particles Do to Your Health?

Particle pollution can be very dangerous to breathe depending on the level. Breathing particle pollution may trigger illness, hospitalization and premature death, risks that are showing up in new studies that validate earlier research.

Thanks to steps taken to reduce particle pollution, good news is growing from researchers who study the drop in year-round levels of particle pollution.

- Looking at air quality in 545 counties in the U.S. between 2000 and 2007, researchers found that people had approximately four months added to their life expectancy on average due to cleaner air. Women and people who lived in urban and densely populated counties benefited the most.[35]
- Another long-term study of people in six U.S. cities tracked from 1974 to 2009 added more evidence of the benefits. The findings suggest that cleaning up particle pollution had almost immediate health benefits. The researchers estimated that the

U.S. could prevent approximately 34,000 premature deaths a year if the nation could lower annual levels of particle pollution by 1 µg/m^3.[36]

- Other researchers estimated that reductions in air pollution can be expected to produce rapid improvements in public health, with fewer deaths occurring within the first two years after reductions.[37]

These studies add to the growing research that cleaning up air pollution improves life and health.

Short-Term Exposure Can Be Deadly

First and foremost, short-term exposure to particle pollution can kill. Peaks or spikes in particle pollution can last from hours to days. Premature deaths from breathing these particles can occur on the very day that particle levels are high, or within one to two months afterward. Particle pollution does not just make people die a few days earlier than they might otherwise—these are deaths that would not have occurred so early if the air were cleaner.[38]

Even low levels of particles can be deadly. A 2016 study found that people aged 65 and older in New England faced a higher risk of premature death from particle pollution, even in places that met current standards for short-term particle pollution.[39] Another study in 2017 looked more closely at Boston and found a similar higher risk of premature death from particle pollution in a city that meets current limits on short-term particle pollution.[40] Looking nationwide in a 2017 study, researchers found more evidence that older adults faced a higher risk of premature death even when levels of short-term particle pollution remained well below the current national standards. This was consistent whether the older adults lived in cities, suburbs or rural areas.[41]

Particle pollution also diminishes lung function, causes greater use of asthma medications and increased rates of school absenteeism, emergency room visits and hospital admissions. Other adverse effects include coughing, wheezing, cardiac arrhythmias and heart attacks. According to extensive research, short-term increases in particle pollution have been linked to:

- death from respiratory and cardiovascular causes, including strokes;[42,43,44,45]
- increased mortality in infants and young children;[46]
- increased numbers of heart attacks, especially among the elderly and in people with heart conditions;[47]
- inflammation of lung tissue in young, healthy adults;[48]
- increased hospitalization for cardiovascular disease, including strokes and congestive heart failure;[49,50,51]
- increased emergency room visits for patients suffering from acute respiratory ailments;[52]
- increased hospitalization for asthma among children;[53,54,55] and
- increased severity of asthma attacks in children.[56]

Again, the impact of even short-term exposure to particle pollution on healthy adults was demonstrated in the Galveston lifeguard study. In addition to the harmful effects of ozone pollution, lifeguards had reduced lung volume at the end of the day when fine particle levels were high.[57]

Year-Round Exposure

Breathing high levels of particle pollution day in and day out can also be deadly, as landmark studies in the 1990s conclusively showed[58] and as later studies confirmed.[59] Chronic exposure to particle pollution can shorten life by one to three years.[60] Recent research has confirmed that long-term exposure to particle pollution still kills, even with the declining levels in the U.S. since 2000[61] and even in areas, such as New England,

that currently meet the official limit, or standard, for year-round particle pollution.[62]

In 2013, the International Agency for Research on Cancer (known as IARC), part of the World Health Organization, concluded that particle pollution causes lung cancer. The IARC based its decision on the review of multiple studies from the U.S., Europe, and Asia and the presence of carcinogens on the particles.[63]

Year-round exposure to particle pollution has also been linked to:

- increased hospitalization for asthma attacks for children living near roads with heavy truck or trailer traffic;[64,65]
- slowed lung function growth in children and teenagers;[66,67]
- development of asthma in children up to age 14;[68]
- significant damage to the small airways of the lungs;[69]
- increased risk of death from cardiovascular disease;[70] and
- increased risk of lower birth weight and infant mortality.[71]

Research has found evidence that long-term exposure to particle pollution may increase the risk of developing diabetes. Two independent reviews of published research found that particle pollution may increase the risk of developing type 2 diabetes mellitus.

Studies examining the impact on the nervous system of long-term exposure to particle pollution have found links to cognitive affects in adults including dementia and Alzheimer's Disease.[73] Scientists have found links between particle pollution and other mental health concerns.[74,75]

The EPA is conducting their new review of the current research on particle pollution. Their findings from the last review, completed in December 2009,[76] are highlighted in the box below.

EPA Concludes Fine Particle Pollution Poses Serious Health Threats (2009)

- Causes early death (both short-term and long-term exposure)
- Causes cardiovascular harm (e.g., heart attacks, strokes, heart disease, congestive heart failure)
- Likely to cause respiratory harm (e.g., worsened asthma, worsened COPD, inflammation)
- May cause cancer
- May cause reproductive and developmental harm

—U.S. Environmental Protection Agency, *Integrated Science Assessment for Particulate Matter,* December 2009. EPA 600/R-08/139F

Where Does Particle Pollution Come From?

Particle pollution is produced through two separate processes—mechanical and chemical.

Mechanical processes break down bigger bits into smaller bits with the material remaining essentially the same, only becoming smaller. Mechanical processes primarily create coarse particles.[77] Dust storms, construction and demolition, mining operations, and agriculture are among the activities that produce coarse particles. Tire, brake pad and road wear can also create coarse particles. Bacteria, pollen, mold, and plant and animal debris are also included as coarse particles.[78]

By contrast, chemical processes in the atmosphere create most of the tiniest fine and ultrafine particles in the air. Burning fuels or other human activity or by natural sources emit gases that form particles in the air. These gases can oxidize and then condense to become a particle of a simple chemical compound. Or they can react with other gases or particles in the atmosphere to form a particle of a different or of multiple chemical compounds. Particles formed by this latter process come from the reaction of elemental

carbon (soot), heavy metals, sulfur dioxide (SO_2), nitrogen oxides (NO_x) and volatile organic compounds with water and other compounds in the atmosphere.[79] Burning fossil fuels in factories, power plants, diesel- and gasoline-powered motor vehicles (cars and trucks) and equipment generate a large part of the raw materials for fine particles. Other sources include burning wood in residential fireplaces and wood stoves or wildfires.

Are Some Particles More Dangerous Than Others?

With so many sources of particles, researchers want to know if some particles pose greater risk than others. Researchers are exploring possible differences in health effects of the sizes of particles and particles from different sources, such as diesel particles from trucks and buses or sulfates from coal-fired power plants. Recent studies have tried to answer this question. So far, the answers are complicated.

Each particle may have many different components. The building blocks of each can include several biological and chemical components. Bacteria, pollen and other biological ingredients can combine in the particle with chemical agents, such as heavy metals, elemental carbon, dust and secondary species like sulfates and nitrates. These combinations mean that particles can have complex effects on the body.[80]

Some studies have found different kinds of particles may have greater risk for different health outcomes.[81,82,83]

Other studies have identified the challenges of exploring all the kinds of particles and their health effects with the limited monitoring across the nation.[84] Some particles serve as carriers for other chemicals that are also toxic, and the combination may worsen the impact.[85,86]

The best evidence shows that having less of all types of particles in the air leads to better health and longer lives.

Focusing on Children's Health

Children face special risks from air pollution because their lungs are growing and because they are so active and breathe in a great deal of air.

Just like the arms and legs, the largest portion of a child's lungs will grow long after he or she is born. Eighty percent of their tiny air sacs develop after birth. Those sacs, called the alveoli, are where the life-sustaining transfer of oxygen to the blood takes place. The lungs and their alveoli aren't fully grown until children become adults.[87] In addition, the body's defenses that help adults fight off infections are still developing in young bodies.[88] Children have more respiratory infections than adults, which also seems to increase their susceptibility to air pollution.[89]

Furthermore, children don't behave like adults, and their behavior also affects their vulnerability. They are outside for longer periods and are usually more active when outdoors. Consequently, they inhale more polluted outdoor air than adults typically do.[90]

Air Pollution Affects Children Before They Are Born

Several studies have found air pollution linked to harm to children while they are still in the womb. A large study in California found that higher particle pollution levels increased the risk of preterm birth.[91] Pregnant women exposed to even low levels of particle pollution had higher risk for preterm birth in a Boston study.[92] Preterm births occurred more frequently when particle pollution spiked, as an Australian study found, even when they controlled for other risk factors.[93]

Air Pollution Limits Lung Growth in Children

The Southern California Children's Health study looked at the long-term effects of air pollution on children and teenagers. Tracking 1,759 children who were between ages 10

and 18 from 1993 to 2001, researchers found that those who grew up in more polluted areas face the increased risk of having reduced lung growth, which may never recover to their full capacity. The average drop in lung function was similar to the impact of growing up in a home with parents who smoked.[94]

Community health studies are pointing to less obvious, but serious effects from year-round exposure to ozone, especially for children. Scientists followed 500 Yale University students and determined that living just four years in a region with high levels of ozone and related co-pollutants was associated with diminished lung function and frequent reports of respiratory symptoms.[95] Another earlier report from the Children's Health study of 3,300 schoolchildren in Southern California found reduced lung function in girls with asthma and boys who spent more time outdoors in areas with high levels of ozone.[96]

Cleaning Up Pollution Can Reduce Risk to Children

There is also real-world evidence that reducing air pollution can help protect children.

A 2015 follow-up to the Southern California Children's Health study showed that reducing pollution could improve children's health. They compared the children who had been part of their earlier studies to a new group of 863 children living in the same area, but growing up between 2007 and 2011, when the air in Southern California was much cleaner. Children growing up in the cleaner air had much greater lung function, a benefit that may help them throughout their lives. As the researchers noted, their study suggested that "all children have the potential to benefit from improvements in air quality."[97]

Further evidence that cleaner air provides real benefits to children's health came in a 2016 report from the same study exploring changes to 4,602 children's respiratory symptoms such as coughing, congestion and phlegm. The study looked at the changes in these symptoms in three groups of children living in Southern California over different periods of time when air quality also differed (1993-2001, 1996-2004, and 2003-2012). As air quality improved, the children in the study suffered fewer bronchial symptoms whether they had asthma or not. In communities where the air quality improved the most, the children experienced even fewer symptoms.[98]

So, does cleaning up the air really improve children's health? In 2017, the researchers reviewed these long-term studies of children in Southern California and the impact of improvements in air quality on their health. They concluded that the 20 years of collected data provided strong evidence of the potential to improve children's health by reducing some of the most common outdoor air pollutants.[99]

The U.S. is not alone in this finding. In Switzerland, particle pollution dropped during a period in the 1990s. Researchers there tracked 9,000 children over a nine-year period, following their respiratory symptoms. After taking other factors such as family characteristics and indoor air pollution into account, the researchers noted that during the years with less pollution, the children had fewer episodes of chronic cough, bronchitis, common cold and conjunctivitis symptoms.[100]

Disparities in the Impact of Air Pollution

The burden of air pollution is not evenly shared. Poorer people and some racial and ethnic groups are among those who often face higher exposure to pollutants and who may experience greater responses to such pollution. Many studies have explored the differences in harm from air pollution to racial or ethnic groups and people who are in a low socioeconomic position, have less education, or live nearer to major sources,[101] including a workshop the American Lung Association held in 2001 that focused on urban air pollution and health inequities.[102]

Many studies have looked at differences in the impact of air pollution on premature death. Results have varied widely, particularly for effects between racial groups. Some studies have found no differences among races,[103] while others found greater responsiveness for whites and Hispanics, but not African Americans,[104] or for African Americans but not other races or ethnic groups.[105] Other researchers have found greater risk for African Americans from hazardous air pollutants, including those pollutants that also come from traffic sources.[106]

Socioeconomic position has been more consistently associated with greater harm from air pollution. Multiple large studies show evidence of that link. Low socioeconomic status consistently increased the risk of premature death from fine particle pollution among 13.2 million Medicare recipients studied in the largest examination of particle pollution-related mortality nationwide.[107] In the 2008 study that found greater risk for premature death for communities with higher African American populations, researchers also found greater risk for people living in areas with higher unemployment or higher use of public transportation.[108] A 2008 study of Washington, DC, found that while poor air quality and worsened asthma went hand in hand in areas where Medicaid enrollment was high, the areas with the highest Medicaid enrollment did not always have the strongest association of high air pollution and asthma attacks.[109] A 2016 study of New Jersey residents found that the risk of dying early from long-term exposure to particle pollution was higher in communities with larger African-American populations, lower home values and lower median income.[110] However, two other studies in France have found no association with lower income and asthma attacks.[111]

Scientists have speculated that there are three broad reasons why disparities may exist. First, groups may face greater exposure to pollution because of factors ranging from racism to class bias to housing market dynamics and land costs. For example, pollution sources may be located near disadvantaged communities, increasing exposure to harmful pollutants. Second, low social position may make some groups more susceptible to health threats because of factors related to their disadvantage. Lack of access to health care, grocery stores and good jobs; poorer job opportunities; dirtier workplaces or higher traffic exposure are among the factors that could handicap groups and increase the risk of harm. Finally, existing health conditions, behaviors or traits may predispose some groups to greater risk. For example, diabetics are among the groups most at risk from air pollutants, and the elderly, African Americans, Mexican Americans and people living near a central city have higher incidence of diabetes.[112]

People of color also may be more likely to live in counties with higher levels of pollution. Non-Hispanic blacks and Hispanics were more likely to live in counties that had worse problems with particle pollution, researchers found in a 2011 analysis. Non-Hispanic blacks were also more likely to live in counties with worse ozone pollution. Income groups, by contrast, differed little in these exposures. However, since few rural counties have monitors, the primarily older, non-Hispanic white residents of those counties lack information about the air quality in their communities.[113]

Unemployed people, those with low income or low education and non-Hispanic blacks were found to be more likely to live in areas with higher exposures to particle pollution in a 2012 study. However, the different racial/ethnic and income groups were often breathing very different kinds of particles; the different composition and structure of these particles may have different health impacts.[114]

Highways May Be Especially Dangerous for Breathing

Being in heavy traffic or living near a road may be risky compared with being in other places in a community. Growing evidence shows that pollution levels along busy highways may be higher than in the community as a whole, increasing the risk of harm to people who live or work near busy roads.

The number of people living "next to a busy road" may include 30 to 45 percent of the urban population in North America, according to the most recent review of the evidence. In January 2010, the Health Effects Institute published a major review of the evidence put together by a panel of expert scientists. The panel looked at over 700 studies from around the world, examining the health effects of traffic pollution. They concluded that traffic pollution causes asthma attacks in children, and may cause a wide range of other effects including the onset of childhood asthma, impaired lung function, premature death and death from cardiovascular diseases, and cardiovascular morbidity. The area most affected, they concluded, was roughly the band within 0.2 to 0.3 miles (300 to 500 meters) of the highway.[115]

Children and teenagers are among the most vulnerable—though not the only ones at risk. A Danish study found that long-term exposure to traffic air pollution may increase the risk of developing chronic obstructive pulmonary disease (COPD). They found that those most at risk were people who already had asthma or diabetes.[116] Studies have found increased risk of premature death from living near a major highway or an urban road.[117] Another study found an increase in risk of heart attacks from being in traffic, whether driving or taking public transportation.[118] Urban women in a Boston study experienced decreased lung function associated with traffic-related pollution.[119]

Adults living closer to the road—within 300 meters—may risk dementia. In 2017, a study of residents of Ontario, Canada, found that those who lived close to heavy traffic had a higher risk of dementia, although not for Parkinson's disease or multiple sclerosis. Researchers found the strongest association among those who lived closest to the roads (less than 50 meters), who had never moved and who lived in major cities.[120] A study of older men in 2011 also found that long-term exposure to traffic pollution increased their risk of having poor cognition.[121]

How to Protect Yourself from Ozone and Particle Pollution

To minimize your exposure to ozone and particle pollution:

- Pay attention to forecasts for high air pollution days to know when to take precautions;
- Avoid exercising near high-traffic areas;
- Avoid exercising outdoors when pollution levels are high, or substitute an activity that requires less exertion;
- Do not let anyone smoke indoors and support measures to make all places smokefree; and
- Reduce the use of fireplaces and wood-burning stoves.

Bottom line: Help yourself and everyone else breathe easier. Support national, state and local efforts to clean up sources of pollution. Your life and the life of someone you love may depend on it.

1. Ozone and particle pollution are the most widespread, but they aren't the only serious air pollutants. Others include carbon monoxide, lead, nitrogen dioxide and sulfur dioxide, as well as scores of toxins such as mercury, arsenic, benzene, formaldehyde and acid gases. However, the monitoring networks are not as widespread nationwide for these other pollutants.
2. U.S. EPA. 2017. Nonattainment Areas for Criteria Pollutants (Green Book). Accessed at https://www.epa.gov/green-book. Data updated as of January 31, 2018.
3. U.S. Environmental Protection Agency. *Integrated Science Assessment of Ozone and Related Photochemical Oxidants (Final Report).* U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-10/076F, 2013.
4. Mar TF, Koenig JQ. Relationship between visits to emergency departments for asthma and ozone exposure in greater Seattle, Washington. *Ann Allergy Asthma Immunol.* 2009; 103: 474-479. Villeneuve PJ, Chen L, Rowe BH, Coates F. Outdoor air pollution and emergency department visits for asthma among children and adults: A case-crossover study in northern Alberta, Canada. *Environ Health Global Access Sci Source.* 2007; 6: 40.
5. Medina-Ramón M, Schwartz J. Who is more vulnerable to die from ozone air pollution? *Epidemiology.* 2008; 19: 672-679.
6. Thaller EI, Petronell SA, Hochman D, Howard S, Chhikara RS, Brooks EG. Moderate increases in ambient $PM_{2.5}$ and ozone are associated with lung function decreases in beach lifeguards. *J Occp Environ Med.* 2008; 50: 202-211; Sawyer K, Brown J, Hazucha M, Bennett WD. The effect of exercise on nasal uptake of ozone in healthy human adults. *J Appl Physiol.* 2007;102: 1380-1386; Hu SC, Ben-Jebria A, Ultman JS. Longitudinal distribution of ozone absorption in the lung: Effects of respiratory flow. *J Appl Physiol.* 1994; 77: 574-583.

7. Horstman DH, Ball BA, Brown J, Gerrity T, Folinsbee LJ. Comparison of pulmonary responses of asthmatic and nonasthmatic subjects performing light exercise while exposed to a low level of ozone. *Toxicol Ind Health.* 1995; 11: 369-385; Kreit JW, Gross KB, Moore TB, Lorenzen TJ, D'Arcy J, Eschenbacher WL. Ozone-induced changes in pulmonary function and bronchial responsiveness in asthmatics. *J Appl Physiol.* 1989; 66: 217-222; Medina-Ramón M, Zanobetti A, Schwartz J. The effect of ozone and PM10 on hospital admissions for pneumonia and chronic obstructive pulmonary disease: A national multicity study. *Am J Epidemiol.* 2006; 163(6):579-588.
8. Peel JL, Metzger KB, Klein M, Flanders WD, Mulholland JA, Tolbert PE. Ambient air pollution and cardiovascular emergency department visits in potentially sensitive groups. *Am J Epidemiol.* 2007; 165: 625-633; Medina-Ramón and Schwartz, 2008; Medina-Ramón M, Zanobetti A, Schwartz J, 2006.
9. Medina-Ramón and Schwartz, 2008; Stafoggia M, Forastiere F, Faustini A, Biggeri A, Bisanti L, et al. Susceptibility factors to ozone-related mortality: A population-based case-crossover analysis. *Am J Respir Crit Care Med.* 2010; 182: 376-384; Jerrett M, Burnett RT, Pope CA III, Ito K, Thurston G, Krewski D, Shi Y, Calle E, Thun M. Long-term ozone exposure and mortality. *N Engl J Med.* 2009;360: 1085-1095; Alexeeff SE, Litonjua AA, Suh H, Sparrow D, Vokonas PS, Schwartz J. Ozone exposure and lung function: Effect modified by obesity and airways hyperresponsiveness in the VA Normative Aging Study. *Chest.* 2007; 132: 1890-1897; McDonnell WF, Stewart PW, Smith MV. Prediction of ozone-induced lung function responses in humans. *Inhal Toxicol.* 2010; 22: 160-168. Lin S, Liu X, Le LH, Hwang SA. Chronic exposure to ambient ozone and asthma hospital admissions among children. *Environ Health Perspect.* 2008; 116: 1725-1730; Burra TA, Moineddin R, Agha MM, Glazier RH. Social disadvantage, air pollution, and asthma physician visits in Toronto, Canada. *Environ Res.* 2009; 109: 567-574.
10. Thaller, et al., 2008.
11. *Bell ML, McDermott A, Zeger SL, Samet JM, Dominici F. Ozone and short-term mortality in 95 US urban communities, 1987-2000. JAMA.* 2004; 292:2372-2378. Gryparis A, Forsberg B, Katsouyanni K, et al. Acute Effects of Ozone on Mortality from the "Air Pollution and Health: a European approach" project. *Am J Respir Crit Care Med.* 2004; 170: 1080-1087. Bell ML, Dominici F, and Samet JM. A meta-analysis of time-series studies of ozone and mortality with comparison to the national morbidity, mortality, and air pollution study. *Epidemiology.* 2005; 16:436-445. Levy JI, Chermerynski SM, Sarnat JA. Ozone exposure and mortality: An empiric Bayes metaregression analysis. *Epidemiology.* 2005; 16:458-468. Ito K, De Leon SF, Lippmann M. Associations between ozone and daily mortality: Analysis and meta-analysis. *Epidemiology.* 2005; 16:446-429.
12. Di Q, Wang Y, Zanobetti A, et al. Air Pollution and Mortality in the Medicare Population. *N Engl J Med.* 2017; 376:2513-2522; Zanobetti A, Schwartz J. Mortality displacement in the association of ozone with mortality: An analysis of 48 cities in the United States. *Am J Respir Crit Care Med.* 2008; 177:184-189; Katsouyanni K, Samet JM, Anderson HR, Atkinson R, Le Tertre A, et al. *Air pollution and health: A European and North American approach (APHENA).* Boston, MA: Health Effects Institute, 2009; Samoli E, Zanobetti A, Schwartz J, Atkinson R, Le Tertre A, et al. The temporal pattern of mortality responses to ambient ozone in the APHEA project. *J Epidemiol Community Health.* 2009; 63: 960-966; Stafoggia M, et al, 2010.
13. Gent JF, Triche EW, Holford TR, Belanger K, Bracken MB, Beckett WS, Leaderer BP. Association of Low-Level Ozone and Fine Particles with Respiratory Symptoms in Children with Asthma. *JAMA.* 2003; 290:1859-1867; Desqueyroux H, Pujet JC, Prosper M, Squinazi F, Momas I. Short-Term Effects of Low-Level Air Pollution on Respiratory Health of Adults Suffering from Moderate to Severe Asthma. Environ Res. 2002; 89:29-37; Burnett RT, Brook JR, Yung WT, Dales RE, Krewski D. Association between Ozone and Hospitalization for Respiratory Diseases in 16 Canadian Cities. *Environ Res.* 1997; 72:24-31; Medina-Ramón, et al., 2006.
14. Rich DQ, Mittleman MA, Link MS, Schwartz J, Luttmann-Gibson H, Catalano PJ, Speizer FE, Gold DR, Dockery DW. Increased Risk of Paroxysmal Atrial Fibrillation Episodes Associated with Acute Increases in Ambient Air Pollution. *Environ Health Perspect.* 2006; 114:120-123.
15. Ruidavets J-B, Cournot M, Cassadou S, Giroux M, Meybeck M, Ferrières J. Ozone Air Pollution is Associated with Acute Myocardial Infarction. *Circulation.* 2005; 111:563-569.
16. Azevedo JM, Gonçalves FL, de Fátima Andrade M. Long-range ozone transport and its impact on respiratory and cardiovascular health in the north of Portugal. *Int J Biometeorol.* 2011; 55: 187-202; Linares C, Diaz J. Short-term effect of concentrations of fine particulate matter on hospital admissions due to cardiovascular and respiratory causes among the over-75 age group in Madrid, Spain. *Public Health.* 2010; 124: 28-36; Middleton N, Yiallouros P, Kleanthous S, Kolokotroni O, Schwartz J, et al. A 10-year time-series analysis of respiratory and cardiovascular morbidity in Nicosia, Cyprus: The effect of short-term changes in air pollution and dust storms. *Environ Health.* 2008; 7: 39; Lee JT, Kim H, Cho YS, Hong YC, Ha EH, Park H. Air pollution and hospital admissions for ischemic heart diseases among individuals 64+ years of age residing in Seoul, Korea. *Arch Environ Health.* 2003; 58: 617-623; Wong TW, Lau TS, Yu TS, Neller A, Wong SL, Tam W, Pang SW. Air pollution and hospital admissions for respiratory and cardiovascular diseases in Hong Kong. *Occup Environ Med.* 1999; 56: 679-683.
17. Jerrett, et al., 2009.
18. Lin S, Liu X, Le LH, and Hwang S-A. Chronic exposure to ambient ozone and asthma hospital admissions among children. *Environ Health Perspect.* 2008; 116:1725-1730.
19. Islam T, McConnell R, Gauderman WJ, Avol E, Peters JM, and Gilliland F. Ozone, oxidant defense genes, and risk of asthma during adolescence. *Am J Respir Crit Care Med.* 2009; 177(4):388-395.
20. Salam MT, Millstein J, Li YF, Lurmann FW, Margolis HG, Gilliland FD. Birth outcomes and prenatal exposure to ozone, carbon monoxide, and particulate matter: Results from the Children's Health Study. *Environ Health Perspect.* 2005; 113: 1638-1644; Morello-Frosch R, Jesdale BM, Sadd JL, Pastor M. Ambient air pollution exposure and full-term birth weight in California. *Environ Health.* 2010; 9: 44; Hansen CA, Barnett AG, Pritchard G. The effect of ambient air pollution during early pregnancy on fetal ultrasonic measurements during mid-pregnancy. *Environ Health Perspect.* 2008; 116: 362-369; Mannes T, Jalaludin B, Morgan G, Lincoln D, Sheppeard V, Corbett S. Impact of ambient air pollution on birth weight in Sydney, Australia. *Occup Environ Med.* 2005; 62: 524-530.
21. Parker JD, Akinbami LJ, Woodruff TJ. Air Pollution and Childhood Respiratory Allergies in the United States. *Environ Health Perspect.* 2009; 117:140-147.
22. U.S. EPA, 2013.
23. Di Q, Dai L, Wang Y, Zanobetti A, Choirat C, Schwartz JD, Dominici F. Association of Short-Term Exposure to Air Pollution with Mortality in Older Adults. *JAMA.* 2017; 318: 2446-2456.
24. U.S. EPA. Integrated Science Assessment for Particulate Matter (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F, 2009. Available at http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546.
25. U.S. EPA. Air Quality Criteria for Particulate Matter, October 2004.
26. U.S. EPA, 2009.

27. Mar TF, Larson TV, Stier RA, Claiborn C, Koenig JQ. An analysis of the association between respiratory symptoms in subjects with asthma and daily air pollution in Spokane, Washington. *Inhal Toxicol.* 2004; 16: 809-815; Peel JL, Tolbert PE, Klein M, Metzger KB, Flanders WD, Knox T, Mulholland JA, Ryan PB, Frumkin H. Ambient air pollution and respiratory emergency department visits. *Epidemiology*. 2005; 16: 164-174.
28. Barnett AG, Williams GM, Schwartz J, Best TL, Neller AH, Petroeschevsky AL, Simpson RW. The effects of air pollution on hospitalizations for cardiovascular disease in elderly people in Australian and New Zealand cities. *Environ Health Perspect*. 2006; 114: 1018-1023.
29. Peel JL, Metzger KB, Klein M, Flanders WD, Mulholland JA, Tolbert PE. Ambient air pollution and cardiovascular emergency department visits in potentially sensitive groups. *Am J Epidemiol.* 2007; 165: 625-633. Pope CA III, Dockery DW. Health effects of fine particulate air pollution: Lines that connect. *J Air Waste Mange Assoc.* 2006; 56: 709-742.
30. Zanobetti A, Schwartz J. Are diabetics more susceptible to the health effects of airborne particles? *Am J Respir Crit Care Med.* 2001; 164: 831-833. National Research Council. *Research Priorities for Airborne Particulate Matter: IV. Continuing Research Progress.* Washington, DC: The National Academies Press, 2004.
31. Ostro B, Broadwin R, Green S, Feng WY, Lipsett M. Fine particulate air pollution and mortality in nine California counties: results from CALFINE. *Environ Health Perspect.* 2006: 114: 29-33; Ostro B, Feng WY, Broadwin R, Malig B, Green S, Lipsett M. The Impact of Components of Fine Particulate Matter on Cardiovascular Mortality in Susceptible Subpopulations. *Occup Environ Med.* 2008; 65(11): 750-6.
32. U.S. EPA, 2009.
33. Miller, 2007; O'Neill MS, Veves A, Zanobetti A, Sarnat JA, Gold DR, Economides PA, Horton ES, Schwartz J. Diabetes enhances vulnerability to particulate air pollution-associated impairment in vascular reactivity and endothelial function. *Circulation.* 2005; 111: 2913-2920.
34. Eckel SP, et al. 2016.
35. Correia AW, Pope CA III, Dockery DW, Wang Y, Ezzati M, Domenici F. Effect of air pollution control on life expectancy in the United States: An analysis of 545 U.S. Counties for the period from 2000 to 2007. *Epidemiology.* 2013; 24(1): 23-31.
36. Lepeule J, Laden F, Dockery D, Schwartz J. Chronic exposure to fine particles and mortality: An extended follow-up of the Harvard Six Cities Study from 1974 to 2009. *Environ Health Perspect.* 2012; 120: 965-970.
37. Schwartz J, Coull B, Laden F, Ryan L. The effect of dose and timing of dose on the association between airborne particles and survival. *Environ Health Perspect*. 2008; 116: 64-69.
38. Zanobetti A, Schwartz J, Samoli E, Gryparis A, Tuoloumi G, Peacock J, Anderson RH, Le Tertre A, Bobros J, Celko M, Goren A, Forsberg B, Michelozzi P, Rabczenko D, Perez Hoyos S, Wichmann HE, Katsouyanni K. The temporal pattern of respiratory and heart disease mortality in response to air pollution. *Environ Health Perspect.* 2003; 111:1188-1193; Dominici F, McDermott A, Zeger SL, Samet JM. Airborne particulate matter and mortality: Timescale effects in four US cities. *Am J Epidemiol.* 2003; 157: 1055-1065.
39. Shi L, Zanobetti A, Kloog I, Coull BA, Koutrakis P, Melly SJ, Schwartz JD. Low-concentration $PM_{2.5}$ and mortality: estimating acute and chronic effects in a population-based study. *Environ Health Perspect.* 2016; 124:46-52. http://dx.doi.org/10.1289/ehp.1409111.
40. Schwartz J, Bind MA, Koutrakis P. Estimating causal effects of local air pollution on daily deaths: Effect of low levels. *Environ Health Perspect*. 2017; 125:23-29. http://dx.doi.org/10.1289/EHP232.
41. Di Q, Dai L, Wang Y, Zanobetti A, Choirat C, Schwartz JD, Dominici F. Association of Short-Term Exposure to Air Pollution with Mortality in Older Adults. *JAMA.* 2017; 318: 2446-2456.
42. Dominici F, McDermott A, Zeger SL, Samet JM. On the use of generalized additive models in time-series studies of air pollution and health. *Am J Epidemiol.* 2002; 156: 193-203.
43. Hong Y-C, Lee J-T, Kim H, Ha E-H, Schwartz J, Christiani DC. Effects of air pollutants on acute stroke mortality. *Environ Health Perspect.* 2002; 110: 187-191.
44. Tsai SS, Goggins WB, Chiu HF, Yang CY. Evidence for an association between air pollution and daily stroke admissions in Kaohsiung, Taiwan. *Stroke.* 2003; 34: 2612-6.
45. Wellenius GA, Schwartz J, Mittleman MA. Air Pollution and Hospital admissions for ischemic and hemorrhagic stroke among Medicare beneficiaries. *Stroke.* 2005; 36: 2549-2553.
46. Pope and Dockery, 2006.
47. D'Ippoliti D, Forastiere F, Ancona C, Agabity N, Fusco D, Michelozzi P, Perucci CA. Air pollution and myocardial infarction in Rome: A case-crossover analysis. *Epidemiology.* 2003; 14: 528-535. Zanobetti A, Schwartz J. The effect of particulate air pollution on emergency admissions for myocardial infarction: A multicity case-crossover analysis. *Environ Health Perspect.* 2005; 113: 978-982.
48. Ghio AJ, Kim C, Devlin RB. Concentrated ambient air particles induce mild pulmonary inflammation in healthy human volunteers. *Am J Respir Crit Care Med.* 2000; 162(3 Pt 1): 981-988.
49. Metzger KB, Tolbert PE, Klein M, Peel JL, Flanders WD, Todd K, Mulholland JA, Ryan PB, Frumkin H. Ambient air pollution and cardiovascular emergency department visits in Atlanta, Georgia, 1993-2000. *Epidemiology.* 2004; 15: 46-56.
50. Tsai, et al., 2003.
51. Wellenius GA, Schwartz J, Mittleman MA. Particulate air pollution and hospital admissions for congestive heart failure in seven United States cities. *Am J Cardiol.* 2006; 97 (3): 404-408; Wellenius GA, Bateson TF, Mittleman MA, Schwartz J. Particulate air pollution and the rate of hospitalization for congestive heart failure among Medicare beneficiaries in Pittsburgh, Pennsylvania. *Am J Epidem.* 2005; 161: 1030-1036.
52. Van Den Eeden SK, Quesenberry CP Jr, Shan J, Lurmann F. *Particulate Air Pollution and Morbidity in the California Central Valley: A High Particulate Pollution Region.* Final Report to the California Air Resources Board, 2002.
53. Lin M, Chen Y, Burnett RT, Villeneuve PJ, Kerwski D. The influence of ambient coarse particulate matter on asthma hospitalization in children: Case-crossover and time-series analyses. *Environ Health Perspect.* 2002; 110: 575-581.
54. Norris G, YoungPong SN, Koenig JQ, Larson TV, Sheppard L, Stout JW. An association between fine particles and asthma emergency department visits for children in Seattle. *Environ Health Perspect.* 1999; 107: 489-493.
55. Tolbert PE, Mulholland JA, MacIntosh DD, Xu F, Daniels D, Devine OJ, Carlin BP, Klein M, Dorley J, Butler AJ, Nordenberg DF, Frumkin H, Ryan PB, White MC. Air quality and pediatric emergency room visits for asthma in Atlanta, Georgia. *Am J Epidemiol.* 2000; 151: 798-810.

56. Slaughter JC, Lumley T, Sheppard L, Koenig JQ, Shapiro, GG. Effects of ambient air pollution on symptom severity and medication use in children with asthma. *Ann Allergy Asthma Immunol.* 2003; 91: 346-353.

57. Thaller, et al., 2008.

58. Dockery DW, Pope CA III, Xu X, Spengler JD, Ware JH, Fay ME, Ferris BG, Speizer FE. An association between air pollution and mortality in six U.S. cities. *N Engl J Med*. 1993; 329: 1753-1759. Pope CA, Thun MJ, Namboodiri MM, Dockery DW, Evans JS, Speizer FE, Heath CW. Particulate air pollution as a predictor of mortality in a prospective study of U.S. adults. *Am J Respir Crit Care Med.* 1995; 151: *669-674.*

59. Zanobetti A, Schwartz J. The effect of fine and coarse particulate air pollution on mortality: A national analysis. *Environ Health Perspect*. 2009; 117: 1-40 2009; Krewski D; Jerrett M; Burnett RT; Ma R; Hughes E; Shi Y; Turner MC; Pope AC III; Thurston G; Calle EE; Thun MJ. *Extended follow-up and spatial analysis of the American Cancer Society study linking particulate air pollution and mortality.* Report No. 140 (Cambridge, MA: Health Effects Institute, 2009); Franklin M, Zeka A, Schwartz J. Association between $PM_{2.5}$ and all-cause and specific cause mortality in 27 U.S. communities. *J Expo Sci Environ Epidemiol*. 2007; 18: 1005-1011; Lepeule et al, 2012; Pope CA III, Burnett RT, Thun MJ, Calle EE, Krewski D, Ito K, Thurston GD. Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution. *JAMA*. 2002; 287(9): 1132-1141.

60. Pope CA III. Epidemiology of fine particulate air pollution and human health: Biological mechanisms and who's at risk? *Environ Health Perspect*. 2000; 108: 713-723.

61. Thurston GD, Ahn J, Cromar KR, Shao Y, Reynolds H, et al. Ambient particulate matter air pollution exposure and mortality in the NIH-AARP Diet and Health Cohort. *Environ Health Perspect*. 2015. 124: 484–490; Lepeule J, Laden F, Douglas Dockery D, and Schwartz J. Chronic exposure to fine particles and mortality: An extended follow-up of the Harvard Six Cities Study from 1974 to 2009. *Environ Health Perspect*. 2012; 120: 965–970.

62. Shi, et al., 2016.

63. Hamra GB, Guha N, Cohen A, Laden F, Raaschou-Nielsen O, Samet JM, Vineis P, Forastiere F, Saldiva P, Yorifuji T, and Loomis D. Outdoor particulate matter exposure and lung cancer: A systematic review and meta-analysis. *Environ Health Perspect*. 2014: 122: 906-911.

64. Lin S, Munsie JP, Hwang SA, Fitzgerald E, Cayo MR. Childhood asthma hospitalization and residential exposure to state route traffic. *Environ Res*. 2002; 88: 73-81.

65. Gauderman WJ, Vora H, McConnell R, Berhane K, Gilliland GF, Thomas D, Lurmann F, Avol E, Küenzli N, Jarrett M, Peters J. Effect of exposure to traffic on lung development from 10 to 18 years of age: A cohort study. *Lancet*. 2007; 369: 571-577.

66. Gauderman WJ, Gilliland GF, Vora H, Avol E, Stram D, McConnell R, Thomas D, Lurmann F, Margolis HG, Rappaport EB, Berhane K, Peters JM. Association between air pollution and lung function growth in southern California children: Results from a second cohort. *Am J Respir Crit Care Med.* 2002; 166: 76-84.

67. Gauderman WJ, Avol E, Gilliland F, Vora H, Thomas D, Berhane K, McConnell R, Küenzli N, Lurmann F, Rappaport E, Margolis H, Bates D, Peters J. The effect of air pollution on lung development from 10 to 18 years of age. *N Engl J Med.* 2004; 351: 1057-1067.

68. Gehring U, Wijga AH, Hoek G, Bellander T, et al. Exposure to air pollution and development of asthma and rhinoconjunctivitis throughout childhood and adolescence: a population-based birth cohort study. *Lancet Respiratory Medicine.* 2015; 3 (12): 933-942.

69. Churg, A Brauer, M, Avila-Casado, MdC, Fortoul TI, Wright JL. Chronic exposure to high levels of particulate air pollution and small airway remodeling. *Environ Health Perspect.* 2003; 111: 714-718.

70. Pope CA III, Burnett RT, Thurston GD, Thun MJ, Calle EE, Krewski D, Godleski JJ. Cardiovascular mortality and year-round exposure to particulate air pollution: Epidemiological evidence of general pathophysiological pathways of disease. *Circulation.* 2004; 109: 71-77.

71. Bell ML, Ebisu K, Belanger K. Ambient air pollution and low birth weight in Connecticut and Massachusetts. *Environ Health Perspect.* 2007; 115: 118-24; Ritz B, Wilhelm M, Zhao Y. Air pollution and infant death in southern California, 1989-2000. *Pediatrics*. 2006; 118: 493-502; Woodruff TJ, Parker JD, Schoendorf KC. Fine particulate matter ($PM_{2.5}$) air pollution and selected causes of postneonatal infant mortality in California. *Environ Health Perspect*. 2006; 114: 785-790.

72. Rao X, Patel P, Puett R and Rajogpalan S. Air pollution as a risk factor for type 2 diabetes. *Toxicological Sciences*. 2015; 143 (2): 231-241; Eze IC, Hemkens LG, Bucher HC, Hoffman B, et al. Association between ambient air pollution and diabetes mellitus in Europe and North America: Systematic review and meta-analysis. *Environ Health Perspect.* 2015; 123 (5): 381-389.

73. Cacciottolo M, Wang X, Driscoll I, Woodward N et al. Particulate air pollutants, APOE alleles and their contributions to cognitive impairment in older women and to amyloidogenesis in experimental models, *Translational Psychiatry.* 2017; 7, e1022; doi:10.1038/tp.2016.280; Kioumourtzoglou MA, Schwartz JD, Weisskopf MG, Melly SJ, Wang Y, Dominici F, Zanobetti A. 2016. Long-term $PM_{2.5}$ exposure and neurological hospital admissions in the northeastern United States. *Environ Health Perspect* 124:23–29; http://dx.doi.org/10.1289/ehp.1408973; Kirrane EF, Bowman C, Davis JA, Hoppin JA, Blair A, et al. Associations of ozone and $PM_{2.5}$ concentrations with Parkinson's disease among participants in the agricultural health study. *J Occup Environ Med* 2015; 57: 509-517. http://dx.doi.org/10.1097/JOM.0000000000000451.

74. Kim KY, Lim YH, Bea HJ, Kim M, Jung K, Hong YC. Long-term fine particulate matter exposure and major depressive disorder in a community-based urban cohort. *Environ Health Perspect*. 2016; 124:1547-1553.

75. Pun VC, Manjourides J, Suh H. Association of ambient air pollution with depressive and anxiety symptoms in older adults: results from the NSHAP study. *Environ Health Perspect.* 2017; 125: 342-348.

76. U.S. EPA, 2009.

77. U.S. EPA, 2009.

78. U.S. EPA, 2009.

79. U.S. EPA, 2009.

80. Morakinyo OM, Mokgobu MI, Mukhola MS, Hunter RP. Review: Health outcomes of exposure to biological and chemical components of inhalable and respirable particulate matter. *Int. J. Environ. Res. Public Health.* 2016: 592.

81. Thurston GD, Burnett RT, Turner MC, Shi Y, Krewski D, Lall R, Ito K, Jerrett M, Gapstur SM, Diver WR, Pope CA III. Ischemic heart disease mortality and long-term exposure to source-related components of U.S. fine particle air pollution. *Environ Health Perspect*; 2016; 124:785–794. http://dx.doi.org/10.1289/ehp.1509777.

82. Bell ML, Ebisu K, Leaderer BP, Gent JF, Lee HJ, Koutrakis P, Wang Y, Dominici F, Peng RD. Associations of $PM_{2.5}$ constituents and sources with hospital admissions: analysis of four counties in Connecticut and Massachusetts (USA) for persons ≥ 65 years of age. *Environ Health Perspect.* 2014: 122: 138–144; http://dx.doi.org/10.1289/ehp.1306656.

83. Ebisu K, Bell ML. Airborne $PM_{2.5}$ chemical components and low birth weight in the Northeastern and Mid-Atlantic regions of the United States. *Environ Health Perspect.* 2012; 120: 1746–1752; http://dx.doi.org/10.1289/ehp.1104763.
84. Levy JI, Diez D, Dou Y, Barr CD, Dominici F. A meta-analysis and multisite time-series analysis of the differential toxicity of major fine particulate matter constituents. *Am J Epidemiology.* 2012; 175(11): 1091-1099. doi:10.1093/aje/kwr457; Dai L, Zanobetti A, Koutrakis P, Schwartz JD. Associations of fine particulate matter species with mortality in the United States: A multicity time-series analysis. *Environ Health Perspect*. 2014; 122(8): 837-842. doi:10.1289/ehp.1307568.
85. Morakinyo et al., 2016.
86. Cassee FR, Héroux M-E, Gerlofs-Nijland ME, Kelly FJ. Particulate matter beyond mass: recent health evidence on the role of fractions, chemical constituents and sources of emission. *Inhalation Toxicology.* 2013; 25(14): 802-812. doi:10.3109/08958378.2013.850127.
87. American Academy of Pediatrics Committee on Environmental Health, Ambient Air Pollution: Health hazards to children. *Pediatrics*. 2004; 114: 1699-1707. Statement was reaffirmed in 2010. Dietert RR, Etzel RA, Chen D, et al. Workshop to identify critical windows of exposure for children's health: Immune and respiratory systems workgroup summary. *Environ Health Perspect*. 2000; 108 (supp 3): 483-490.
88. World Health Organization: The effects of air pollution on children's health and development: A review of the evidence E86575. 2005. Available at http://www.euro.who.int/document/E86575.pdf.
89. WHO, 2005.
90. American Academy of Pediatrics, 2004.
91. Laurent O, Hu J, LI L, et al. A statewide nested case-control study of preterm birth and air pollution by source and composition: California, 2001-2008. *Environ Health Perspect*. 2016. 124:1479-1486. Doi: 10.1289/ehp.1510133.
92. Nach RM, Mao G, Zhang X, et al. Intrauterine inflammation and maternal exposure to ambient $PM_{2.5}$ during preconception and specific periods of pregnancy: the Boston Birth Cohort. *Environ Health Perspect*. 2016. 124:1608–1615; http://dx.doi.org/10.1289/EHP243.
93. Li S, Guo Y, Williams G. Acute impact of hourly ambient air pollution on preterm birth. *Environ Health Perspect*. 2016. 124:1623–1629; http://dx.doi.org/10.1289/EHP200.
94. Gauderman et al., 2004.
95. Galizia A, Kinney PL. Year-round residence in areas of high ozone: Association with respiratory health in a nationwide sample of nonsmoking young adults. *Environ Health Perspect*. 1999; 107: 675-679.
96. Peters JM, Avol E, Gauderman WJ, Linn WS, Navidi W, London SJ, Margolis H, Rappaport E, Vora H, Gong H, Thomas DC. A study of twelve southern California communities with differing levels and types of air pollution. II: Effects on pulmonary function. *Am J Respir Crit Care Med.* 1999; 159: 768-775.
97. Gauderman WJ, Urman R, Avol E, Berhane K, McConnell R, Rapport E, Chang R, Lurmann F, Gilliland F. Association of improved air quality with lung development in children. *N Eng J Med.* 2015; 372: 905-913.
98. Berhane K, Chang C-C, McConnell R, Gauderman JW, et al. Association of Changes in Air Quality with Bronchiatic Symptoms in Children in California, 1993-2012. *JAMA.* 2016; 315: 1491-1501.
99. Gilliland F, Avol E, McConnell R, Berhane K, Gauderman WJ, Lurmann FW, et al. 2017. The Effects of Policy-Driven Air Quality Improvements on Children's Respiratory Health. Research Report 190. Boston, MA:Health Effects Institute.
100. Bayer-Oglesby L, Grize L, Gassner M, Takken-Sahli K, Sennhauser FH, Neu U, Schindler C, Braun-Fahrländer C. Decline of ambient air pollution levels and improved respiratory health in Swiss children. *Environ Health Perspect.* 2005; 113: 1632-1637.
101. Institute of Medicine. *Toward Environmental Justice: Research, Education, and Health Policy Needs*. Washington, DC: National Academy Press, 1999; O'Neill MS, Jerrett M, Kawachi I, Levy JI, Cohen AJ, Gouveia N, Wilkinson P, Fletcher T, Cifuentes L, Schwartz J, et al. Health, wealth, and air pollution: Advancing theory and methods. *Environ Health Perspect.* 2003; 111: 1861-1870; Finkelstein MM, Jerrett M, DeLuca P, Finkelstein N, Verma DK, Chapman K, Sears MR. Relation between income, air pollution and mortality: A cohort study. *CMAJ.* 2003; 169: 397-402; Ostro B, Broadwin R, Green S, Feng W, Lipsett M. Fine particulate air pollution and mortality in nine California counties: Results from CALFINE. *Environ Health Perspect.* 2005; 114: 29-33; Zeka A, Zanobetti A, Schwartz J. Short term effects of particulate matter on cause specific mortality: effects of lags and modification by city characteristics. *Occup Environ Med.* 2006; 62: 718-725.
102. American Lung Association. Urban air pollution and health inequities: A workshop report. *Environ Health Perspect.* 2001; 109 (suppl 3): 357-374.
103. Zeka A, Zanobetti A, Schwartz J. Individual-level modifiers of the effects of particulate matter on daily mortality. *Am J Epidemiol.* 2006; 163: 849-859.
104. Ostro, et al., 2006; Ostro, et al., 2008.
105. Bell ML, Dominici F. Effect modification by community characteristics on the short-term effects of ozone exposure and mortality in 98 US communities. *Am J Epidemiol.* 2008; 167: 986-997.
106. Apelberg BJ, Buckley TJ, White RH. Socioeconomic and racial disparities in cancer risk from air toxics in Maryland. *Environ Health Perspect.* 2005: 113: 693-699.
107. Zeger SL, Dominici F, McDermott A, Samet J. Mortality in the Medicare population and chronic exposure to fine particulate air pollution in urban centers (2000-2005). *Environ Health Perspect.* 2008: 116: 1614-1619.
108. Bell and Dominici, 2008.
109. Babin S, Burkom H, Holtry R, Tabernero N, Davies-Cole J, Stokes L, Dehaan K, Lee D. Medicaid patient asthma-related acute care visits and their associations with ozone and particulates in Washington, DC, from 1994-2005. *Int J Environ Health Res.* 2008; 18 (3): 209-221.
110. Wang Y, Kloog I, Coul BA, Kosheleva A, Zanobetti A, Schwartz JD. Estimating causal effects of long-term $PM_{2.5}$ exposure on mortality in New Jersey. *Environ Health Perspect*. 2016; 124: 1182-1188.
111. Laurent O, Pedrono G, Segala C, Filleul L, Havard S, Deguen S, Schillinger C, Rivière E, Bard D. Air pollution, asthma attacks, and socioeconomic deprivation: a small-area case-crossover study. *Am J Epidemiol.* 2008; 168: 58-65; Laurent O, Pedrono G, Filleul L, Segala C, Lefranc A, Schillinger C, Riviere E, Bard D. Influence of socioeconomic deprivation on the relation between air pollution and beta-agonist sales for asthma. *Chest.* 2009; 135 (3): 717-716.
112. O'Neill et al., 2003.

113. Miranda ML, Edwards SE, Keating MH, Paul CJ. Making the environmental justice grade: The relative burden of air pollution exposure in the United States. *Int J Environ Res Public Health.* 2011; 8: 1755-1771.

114. Bell ML, Ebisu K. Environmental inequality in exposures to airborne particulate matter component in the United States. *Environ Health Perspect.* 2012; 120: 1699–1704.

115. Health Effects Institute Panel on the Health Effects of Traffic-Related Air Pollution, *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects.* Health Effects Institute: Boston, 2010. Available at www.healtheffects.org.

116. Andersen ZJ, Hvidberg M, Jensen SS, Ketzel M, Loft S, Sørensen M, Tjønneland A, Overvad K, Raaschou-Nielsen O. Chronic obstructive pulmonary disease and long-term exposure to traffic-related air pollution: A cohort study. *Am J Respir Crit Care Med.* 2011; 183: 455-461.

117. Finklestein MM, Jerrett M, Sears MR. Traffic air pollution and mortality rate advancement periods. Am J Epidemiol. 2004; 160: 173-177; Hoek G, Brunkreef B, Goldbohn S, Fischer P, van den Brandt. Associations between mortality and indicators of traffic-related air pollution in the Netherlands: a cohort study. *Lancet.* 2002; 360: 1203-1209.

118. Peters A, von Klot S, Heier M, Trentinaglia I, Cyrys J, Hormann A, Hauptmann M, Wichmann HE, Lowel H. Exposure to traffic and the onset of myocardial infarction. *N Engl J Med.* 2004; 351: 1721-1730.

119. Suglia SF, Gryparis A, Schwartz J, Wright RJ. Association between traffic-related black carbon exposure and lung function among urban women. *Environ Health Perspect.* 2008; 116 (10): 1333-1337.

120. Chen H, Kwong JC, Copes R, et al. Living near major roads and the incidence of dementia, Parkinson's disease and multiple sclerosis: a population-based cohort study. *Lancet.* 2017. Published online https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)32399-6.

121. Power MC, Weisskopf MG, Alexeeff SE, et al. Traffic-related air pollution and cognitive function in a cohort of older men. *Environ Health Perspect* 2011; 119:682–687. doi:10.1289/ehp.1002767.

Statistical Methodology: The Air Quality Data

Data Sources

Ozone and short-term particle pollution. The data on air quality throughout the United States were obtained from the U.S. Environmental Protection Agency's Air Quality System (AQS), formerly called Aerometric Information Retrieval System (AIRS) database. The American Lung Association contracted with Dr. Allen S. Lefohn, A.S.L. & Associates, Helena, Montana, to characterize the hourly averaged ozone concentration information and the 24-hour averaged $PM_{2.5}$ concentration information for the three-year period for 2015-2017 for each monitoring site.

Year-round particle pollution. Design values for the annual $PM_{2.5}$ concentrations by county for the period 2015-2017 were retrieved from data posted on July 23, 2018, at the U.S. Environmental Protection Agency's website at https://www.epa.gov/sites/production/files/2018-07/pm10_designvalues_20152017_final_07_24_18.xlsx.

Ozone Data Analysis

The 2015, 2016, and 2017 AQS hourly ozone data were used to calculate the daily 8-hour maximum concentration for each ozone-monitoring site. The hourly averaged ozone data were downloaded on June 30, 2018, following the close of the authorized period for quality review and assurance certification of data. Only the hourly average ozone concentrations derived from FRM and FEM monitors were used in the analysis. The data were considered for a three-year period for the same reason that the EPA uses three years of data to determine compliance with the ozone standard: to prevent a situation in any single year, where anomalies of weather or other factors create air pollution levels, which inaccurately reflect the normal conditions. The highest 8-hour daily maximum concentration in each county for 2015, 2016, and 2017, based on the EPA-defined ozone season, was identified.

The current national ambient air quality standard for ozone is 70 parts per billion (ppb) measured over eight hours. The EPA's Air Quality Index reflects the 70 ppb standard. A.S.L. & Associates prepared a table by county that summarized, for each of the three years, the number of days the ozone level was within the ranges identified by the EPA based on the EPA Air Quality Index:

8-hour Ozone Concentration	Air Quality Index Levels
0 – 54 ppb	Good (Green)
55 – 70 ppb	Moderate (Yellow)
71 – 85 ppb	Unhealthy for Sensitive Groups (Orange)
86 – 105 ppb	Unhealthy (Red)
106 – 200 ppb	Very Unhealthy (Purple)
>200 ppb	Hazardous (Maroon)

The goal of this report was to identify the number of days that 8-hour daily maximum concentrations in each county occurred within the defined ranges. This approach provided an indication of the level of pollution for all monitored days, not just those days that fell under the requirements for attaining the national ambient air quality standards. Therefore, no data capture criteria were applied to eliminate monitoring sites or to require a number of valid days for the ozone season.

The daily maximum 8-hour average concentration for a given day is derived from the highest of the 17 consecutive 8-hour averages beginning with the 8-hour period from 7:00 a.m. to 3:00 p.m. and ending with the 8-hour period from 11:00 p.m. to 7:00 a.m. the following day. This follows the process EPA uses for the current ozone standard adopted in 2015, but differs from the form used under the previous 0.075 ppm 8-hour

average ozone standard that was established in 2008. All valid days of data within the ozone season were used in the analysis. However, for computing an 8-hour average, at least 75 percent of the hourly concentrations (i.e., 6-8 hours) had to be available for the 8-hour period. In addition, an 8-hour daily maximum average was identified if valid 8-hour averages were available for at least 75 percent of possible hours in the day (i.e., at least 13 of the possible 17 8-hour averages). Because the EPA includes days with inadequate data (i.e., not 75 percent complete) if the standard value is exceeded, our data capture methodology also included the site's 8-hour value if at least one valid 8-hour period were available and it was 71 ppb or higher.

As instructed by the Lung Association, A.S.L. & Associates included the exceptional and natural events that were identified in the database and identified for the Lung Association the dates and monitoring sites that experienced such events. Some data have been flagged by the state or local air pollution control agency to indicate that they had raised issues with EPA about those data. For each day across all sites within a specific county, the highest daily maximum 8-hour average ozone concentration was recorded and then the results were summarized by county for the number of days the ozone levels were within the ranges identified above.

Following receipt of the above information, the American Lung Association identified the number of days each county, with at least one ozone monitor, experienced air quality designated as orange (Unhealthy for Sensitive Groups), red (Unhealthy), or purple (Very Unhealthy).

Short-Term Particle Pollution Data Analysis

A.S.L. & Associates identified the maximum daily 24-hour AQS $PM_{2.5}$ concentration for each county in 2015, 2016, and 2017 with monitoring information. The 24-hour $PM_{2.5}$ data were downloaded on August 13, 2018, following the close of the authorized period for quality review and assurance certification of data. In addition, on August 9, 2018, hourly averaged $PM_{2.5}$ concentration data were characterized into 24-hour average $PM_{2.5}$ values by the EPA and provided to A.S.L. & Associates. Using these results, A.S.L. & Associates prepared a table by county that summarized, for each of the three years, the number of days the maximum of the daily $PM_{2.5}$ concentration was within the ranges identified by the EPA based on the EPA Air Quality Index, as adopted by the EPA on December 14, 2012:

24-hour $PM_{2.5}$ Concentration	Air Quality Index Levels
0.0 µg/m³ to 12.0 µg/m³	Good (Green)
12.1 µg/m³ to 35.4 µg/m³	Moderate (Yellow)
35.5 µg/m³ to 55.4 µg/m³	Unhealthy for Sensitive Groups (Orange)
55.5 µg/m³ to 150.4 µg/m³	Unhealthy (Red)
150.5 µg/m³ to 250.4 µg/m³	Very Unhealthy (Purple)
equal to or greater than 250.5 µg/m³	Hazardous (Maroon)

All previous data collected for 24-hour average $PM_{2.5}$ were characterized using the AQI thresholds listed above.

The goal of this report was to identify the number of days that the maximum in each county of the *daily* $PM_{2.5}$ concentration occurred within the defined ranges. This approach provided an indication of the level of pollution for all monitored days, not just those days that fell under the requirements for attaining the national ambient air quality standards. Therefore, no data capture criteria were used to eliminate monitoring sites. Both 24-hour averaged PM data, as well as hourly averaged PM data averaged over 24 hours were used. Included in the analysis are data collected using only FRM and FEM methods,

which reported hourly and 24-hour averaged data. As instructed by the Lung Association, A.S.L. & Associates included the exceptional and natural events that were identified in the database and identified for the Lung Association the dates and monitoring sites that experienced such events. Some data have been flagged by the state or local air pollution control agency to indicate that they had raised issues with EPA about those data. For each day across all sites within a specific county, the highest daily maximum 24-h $PM_{2.5}$ concentration was recorded and then the results were summarized by county for the number of days the concentration levels were within the ranges identified above.

Following receipt of the above information, the American Lung Association identified the number of days each county, with at least one $PM_{2.5}$ monitor, experienced air quality designated as orange (Unhealthy for Sensitive Groups), red (Unhealthy), purple (Very Unhealthy) or maroon (Hazardous).

Description of County Grading System

Ozone and Short-Term Particle Pollution (24-hour $PM_{2.5}$)

The grades for ozone and short-term particle pollution (24-hour $PM_{2.5}$) were based on a weighted average for each county. To determine the weighted average, the Lung Association followed these steps:

1. First, assigned weighting factors to each category of the Air Quality Index. The number of orange days experienced by each county received a factor of 1; red days, a factor of 1.5; purple days, a factor of 2; and maroon days, a factor of 2.5. This allowed days where the air pollution levels were higher to receive greater weight.
2. Next, multiplied the total number of days within each category by their assigned factor, and then summed all the categories to calculate a total.
3. Finally, divided the total by three to determine the weighted average, since the monitoring data were collected over a three-year period.

The weighted average determined each county's grades for ozone and 24-hour $PM_{2.5}$.

- All counties with a weighted average of zero (corresponding to no exceedances of the standard over the three-year period) were given a grade of "A."
- For ozone, an "F" grade was set to generally correlate with the number of unhealthy air days that would place a county in nonattainment for the ozone standard.
- For short-term particle pollution, fewer unhealthy air days are required for an F than for nonattainment under the $PM_{2.5}$ standard. The national air quality standard is set to allow two percent of the days during the three years to exceed 35 $\mu g/m^3$ (called a "98th percentile" form) before violating the standard. That would be roughly 21 unhealthy days in three years. The grading used in this report would allow only about one percent of the days to be over 35 $\mu g/m^3$ (called a "99^{th} percentile" form) of the $PM_{2.5}$. The American Lung Association supports using the tighter limits in a 99^{th} percentile form as a more appropriate standard that is intended to protect the public from short-term episodes or spikes in pollution.

Grading System

Grade	Weighted Average	Approximate Number of Allowable Orange/Red/Purple/Maroon days
A	0.0	None
B	0.3 to 0.9	1 to 2 orange days with no red
C	1.0 to 2.0	3 to 6 days over the standard: 3 to 5 orange with no more than 1 red OR 6 orange with no red
D	2.1 to 3.2	7 to 9 days over the standard: 7 total (including up to 2 red) to 9 orange with no red
F	3.3 or higher	9 days or more over the standard: 10 orange days or 9 total including at least 1 or more red, purple or maroon

Weighted averages allow comparisons to be drawn based on severity of air pollution. For example, if one county had nine orange days and no red days, it would earn a weighted average of 3.0 and a D grade. However, another county that had only eight orange days but also two red days, which signify days with more serious air pollution, would receive an F. That second county would have a weighted average of 3.7.

Note that this system differs significantly from the methodology the EPA uses to determine violations of both the ozone and the 24-hour $PM_{2.5}$ standards. The EPA determines whether a county violates the standard based on the fourth maximum daily 8-hour ozone reading each year averaged over three years. Multiple days of unhealthy air beyond the highest four in each year are not considered. By contrast, the system used in this report recognizes when a community's air quality repeatedly results in unhealthy air throughout the three years. Consequently, some counties will receive grades of "F" in this report, showing repeated instances of unhealthy air, while still meeting the EPA's 2015 ozone standard. The American Lung Association's position is that the evidence shows that the 2015 ozone standard, although stronger than the 2008 standard, still fails to adequately protect public health.

The Lung Association calculates the county population at risk from these pollutants based on the population from the entire county where the monitor is located. The Lung Association then calculates the metropolitan population at risk based upon the largest metropolitan area that contains that county. Not only do people from that county or metropolitan area circulate within the county and the metropolitan area, the air pollution circulates to that monitor through the county and metropolitan area.

Counties were ranked by weighted average. Metropolitan areas were ranked by the highest weighted average among the counties within a given Metropolitan Statistical Area as of 2018 as defined by the White House Office of Management and Budget (OMB).

Year-Round Particle Pollution (Annual $PM_{2.5}$)

Since no comparable Air Quality Index exists for year-round particle pollution (annual $PM_{2.5}$), the grading was based on the 2012 National Ambient Air Quality Standard for annual $PM_{2.5}$ of 12 $\mu g/m^3$. Counties that EPA listed as being at or below 12 $\mu g/m^3$ were given grades of "Pass." Counties EPA listed as being at or above 12.1 $\mu g/m^3$ were given grades of "Fail." Where insufficient data existed for EPA to determine a design value, those counties received a grade of "Incomplete."

Design value is the calculated concentration of a pollutant based on the form of the national ambient air quality standard and is used by EPA to determine whether the air quality in a county meets the standard. Counties were ranked by design value. Metropolitan areas were ranked by the highest design value among the counties within a given Metropolitan Statistical Area as of 2018 as defined by the OMB.

The Lung Association received critical assistance from members of the National Association of Clean Air Agencies and the Association of Air Pollution Control Agencies. With their assistance, all state and local agencies were provided the opportunity to review and comment on the data in draft tabular form. The Lung Association reviewed all discrepancies with the agencies and, if needed, with Dr. Lefohn at A.S.L. & Associates. The American Lung Association wishes to express its continued appreciation to the state and local air directors for their willingness to assist in ensuring that the characterized data used in this report are correct.

Calculations of Populations at Risk

Presently county-specific measurements of the number of persons with chronic conditions are not generally available. To assess the magnitude of chronic conditions at the state and county levels, we have employed a synthetic estimation technique originally developed by the U.S. Census Bureau. This method uses age-specific national and state estimates of self-reported conditions to project disease prevalence to the county level. The exception to this is poverty, for which estimates are available at the county level.

Population Estimates

The Lung Association includes the total county population in discussions of populations at risk from exposure to pollution in each county. The Lung Association uses that conservative count based on several factors: the recognized limited number and locations of monitors in most counties and metropolitan areas; the movement of the population both in daily activities, including outdoor activities, such as exercise or work; and the transport of emission from sources into and across the county to reach the monitor.

Not only do people from that county or metropolitan area circulate within the county and the metropolitan area, the air pollution circulates to that monitor through the county and metropolitan area. For that reason, the Lung Association calculates the county population at risk from these pollutants based on the population from the entire county where the monitor is located. The Lung Association then calculates the metropolitan population at risk based upon the largest metropolitan area that contains that county.

The counties assigned to a metropolitan area follow the groupings determined by the White House Office of Management and Budget (OMB) and used by the U.S. Census Bureau. The Lung Association uses the largest definition of a metropolitan area for these groupings where at least one urban core of 50,000 people or more is present. The Metropolitan Statistical Areas and Combined Statistical Areas are used as the basis for considering populations at risk in these urban areas because they reflect the "high degree of social and economic interaction as measured by commuting ties," as OMB describes them.[1] The definitions of these areas reflect review and analysis of such patterns by these agencies.

The U.S. Census Bureau estimated data on the total population of each county in the United States for 2017. The Census Bureau also estimated the age-specific breakdown of the population and the number of individuals living in poverty by county. These estimates are the best information on population demographics available between decennial censuses.

Poverty estimates came from the Census Bureau's Small Area Income and Poverty Estimates (SAIPE) program. The program does not use direct counts or estimates from sample surveys, as these methods would not provide sufficient data for all counties. Instead, a model based on estimates of income or poverty from the Annual Social and Economic Supplement (ASEC) to the Current Population Survey (CPS) is used to develop estimates for all states and counties.

Prevalence Estimates

Chronic Obstructive Pulmonary Disease, Cardiovascular Disease, Asthma and Diabetes. In 2017, the Behavioral Risk Factor Surveillance System (BRFSS) survey found that approximately 22.5 million (9.2 percent) of adults residing in the United States and 7.9 percent of children from 27 states and Washington D.C. reported currently having asthma. Among adults in the United States in 2017, 16.3 million (6.6 percent) had ever

1 Executive Office of the President, Office of Management and Budget Bulletin No. 18-04. September 14, 2018.

been diagnosed with chronic obstructive pulmonary disease (COPD), 21.1 million (8.3 percent) had ever been diagnosed with cardiovascular disease, and 27.0 million (9.0 percent) had ever been diagnosed with diabetes.

The prevalence estimate for pediatric asthma is calculated for those younger than 18 years. Local area prevalence of pediatric asthma is estimated by applying 2017 state prevalence rates, or, if not available, the national rate from the BRFSS to pediatric county-level resident populations obtained from the U.S. Census Bureau website. Pediatric asthma data from the 2017 BRFSS were available for 27 states and Washington D.C., from the 2016 BRFSS for four states, from the 2015 BRFSS for three states, from the 2014 BRFSS for five states, from the 2012 BRFSS for two states, from the 2011 BRFSS for one state, and national data were used for the eight states[2] that had no data available. Data from earlier years were not used due to changes in the 2011 survey methodology.

The prevalence estimate for COPD, cardiovascular disease, adult asthma and diabetes is calculated for those aged 18-44 years, 45-64 years and 65 years and older. Local area prevalence for these diseases is estimated by applying age-specific state prevalence rates from the 2017 BRFSS to age-specific county-level resident populations obtained from the U.S. Census Bureau website. Cardiovascular disease included ever having been diagnosed with a heart attack, angina or coronary heart disease, or stroke.

Incidence Estimates

Lung Cancer. State- and gender-specific lung cancer incidence rates for 2015 were obtained from StateCancerProfiles.gov, a system that provides access to statistics from both the NCI's Surveillance, Epidemiology and End Results (SEER) program and the CDC's National Program of Cancer Registries.

Local area incidence of lung cancer is estimated by applying 2015 age-adjusted and sex-specific incidence rates to 2017 county populations obtained from the U.S. Census Bureau. Thereafter, the incidence estimates for each county within a state are summed to determine overall incidence.

Limitations of Estimates. Since the statistics presented by the BRFSS and SAIPE are based on a sample, they will differ (due to random sampling variability) from figures that would be derived from a complete census or case registry of people in the U.S. with these diseases. The results are also subject to reporting, non-response and processing errors. These types of errors are kept to a minimum by methods built into the survey.

Additionally, a major limitation of the BRFSS is that the information collected represents self-reports of medically diagnosed conditions, which may underestimate disease prevalence since not all individuals with these conditions have been properly diagnosed. However, the BRFSS is the best available source for information on the magnitude of chronic disease at the state level. The conditions covered in the survey may vary considerably in the accuracy and completeness with which they are reported.

Local estimates of chronic diseases are scaled in direct proportion to the base population of the county and its age distribution. No adjustments are made for other factors that may affect local prevalence (e.g., local prevalence of cigarette smokers or occupational exposures) since the health surveys that obtain such data are rarely conducted on the county level. Because the estimates do not account for geographic differences in the prevalence of chronic and acute diseases, the sum of the estimates for each of the counties in the United States may not exactly reflect the national or state estimates derived from the BRFSS.

2 *2016:* Arizona, Kentucky, Oklahoma, Washington. *2015:* Louisiana, New Hampshire, Texas. *2014:* Alabama, Maryland, North Carolina, Tennessee, West Virginia. *2012:* North Dakota and Wyoming. *2011:* Iowa. *National:* Alaska, Arkansas, Colorado, Delaware, Idaho, South Carolina, South Dakota, and Virginia.

References

1. Irwin, R. Guide to Local Area Populations. U.S. Bureau of the Census, Technical Paper Number 39 (1972).
2. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System, 2017.
3. StateCancerProfile.gov, 2018. Cancer Incidence by State and Gender, 2015.
4. Population Estimates Branch, U.S. Census Bureau. Annual Estimates of the Resident Population by Selected Age Groups and Sex for Counties: April 1, 2010 to July 1, 2017.
5. Office of Management and Budget. Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas, and Combined Statistical Areas, and Guidance on Uses of the Delineations of These Areas. OMB Bulletin 18-04 September 14, 2018.
6. U.S. Census Bureau. Small Area Income and Poverty Estimates. State and County Data, 2017.

State Table Notes

A full explanation of the sources of data and methodology is in **Methodology**.

Notes for all state data tables

1. **Total Population** is based on 2017 U.S. Census and represents the at-risk populations in counties with ozone or $PM_{2.5}$ pollution monitors; it does not represent the entire state's sensitive populations.
2. **Those 18 & under** and **65 & over** are vulnerable to ozone and PM2.5. Do not use them as population denominators for disease estimates—that will lead to incorrect estimates.
3. **Pediatric asthma** estimates are for those under 18 years of age and represent the estimated number of people who had asthma in 2017 based on the state rates when available or national rates when not (Behavioral Risk Factor Surveillance System, or BRFSS), applied to county population estimates (U.S. Census).
4. **Adult asthma** estimates are for those 18 years and older and represent the estimated number of people who had asthma during 2017 based on state rates (BRFSS) applied to county population estimates (U.S. Census).
5. **COPD** estimates are for adults 18 and over who had ever been diagnosed with chronic obstructive pulmonary disease, which includes chronic bronchitis and emphysema, based on state rates (BRFSS) applied to county population estimates (U.S. Census).
6. **Lung cancer** estimates are for all ages and represent the estimated number of people diagnosed with lung cancer in 2015 based on state rates (StateCancerProfiles.gov) applied to county population estimates (U.S. Census).
7. **Cardiovascular disease** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to county population estimates (U.S. Census). CV disease includes coronary heart disease, stroke and heart attack.
8. **Diabetes** estimates are for adults 18 and over who have been diagnosed within their lifetime based on state rates (BRFSS) applied to county population estimates (U.S. Census).
9. **Poverty** estimates include all ages and come from the U.S. Census Bureau's Small Area Income and Poverty Estimates program. The estimates are derived from a model using estimates of income or poverty from the Annual Social and Economic Supplement and the Current Population Survey, 2017.
10. Adding across rows does not produce valid estimates. Adding the at-risk categories (asthma, COPD, poverty, etc.) will double-count people who fall into more than one category.

Notes for all state grades tables.

1. Not all counties have monitors for either ozone or particle pollution. If a county does not have a monitor, that county's name is not on the list in these tables. The decision about monitors in the county is made by the state and the U.S. Environmental Protection Agency, not by the American Lung Association.
2. **INC** (Incomplete) indicates that monitoring is underway for that pollutant in that county, but that the data are incomplete for all three years. For particle pollution, some states collected data, but experienced laboratory quality issues that meant the data could not be used for assessing pollution levels.
3. **DNC** (Data Not Collected) indicates that data on that particular pollutant is not collected in that county.
4. The **Weighted Average (Wgt. Avg)** was derived by adding the three years of individual level data (2015-2017), multiplying the sums of each level by the assigned standard weights (i.e. 1=orange, 1.5=red, 2.0=purple and 2.5=maroon) and calculating the average. Grades are assigned based on the weighted averages as follows: A=0.0, B=0.3-0.9, C=1.0-2.0, D=2.1-3.2, F=3.3+.
5. The **Design Value** is the calculated concentration of a pollutant based on the form of the National Ambient Air Quality Standard, and is used by EPA to determine whether the air quality in a county meets the standard. The numbers refer to micrograms per cubic meter, or µg/m3. Design values for the annual $PM_{2.5}$ concentrations by county for the period 2015-2017 are as posted on July 24, 2018 at EPA's website at https://www.epa.gov/sites/production/files/2018-07/pm25_designvalues_20152017_final_07_24_18.xlsx. Many design values are missing because state data did not meet EPA quality requirements according to EPA's review.
6. The annual average National Ambient Air Quality Standard for $PM_{2.5}$ is 12 µg/m3 as of December 14, 2012. Counties with design values of 12 or lower received a grade of "Pass." Counties with design values of 12.1 or higher received a grade of "Fail."

ALABAMA

American Lung Association in Alabama

www.lung.org/alabama

				AT-RISK GROUPS						
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Baldwin	212,628	46,456	42,413	6,131	18,223	19,201	139	22,331	25,520	21,199
Clay	13,367	2,750	2,706	363	1,165	1,233	9	1,435	1,642	2,363
Colbert	54,500	11,451	10,682	1,511	4,718	4,916	36	5,684	6,510	8,324
DeKalb	71,617	17,544	12,051	2,315	5,924	5,993	47	6,792	7,860	13,785
Elmore	81,677	18,232	12,026	2,406	6,947	6,754	53	7,440	8,743	9,151
Etowah	102,755	22,220	19,092	2,932	8,826	9,084	67	10,415	11,982	18,257
Houston	104,346	24,187	18,143	3,192	8,778	8,884	68	10,090	11,650	17,095
Jefferson	659,197	150,913	101,476	19,916	55,591	54,186	428	60,077	70,124	107,752
Madison	361,046	79,506	52,852	10,493	30,858	30,136	236	33,199	39,099	44,979
Mobile	413,955	97,621	65,209	12,883	34,611	34,075	269	38,016	44,258	80,116
Montgomery	226,646	53,448	33,102	7,054	18,924	18,144	147	19,929	23,330	46,315
Morgan	118,818	27,083	20,325	3,574	10,060	10,229	78	11,600	13,450	17,301
Russell	57,045	13,989	7,992	1,846	4,712	4,539	37	4,976	5,855	13,078
Shelby	213,605	50,772	31,636	6,700	17,848	17,563	140	19,460	22,844	15,585
Sumter	12,687	2,468	2,213	326	1,116	1,093	8	1,226	1,415	4,238
Talladega	80,065	17,156	14,032	2,264	6,898	7,023	52	7,972	9,236	14,062
Tuscaloosa	207,811	43,888	26,661	5,792	17,838	16,039	136	16,983	20,077	31,238
Totals	**2,991,765**	**679,684**	**472,611**	**89,699**	**253,037**	**249,093**	**1,951**	**277,624**	**323,594**	**464,838**

ALABAMA

American Lung Association in Alabama

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HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Baldwin	2	0	0	0.7	B
Clay	DNC	DNC	DNC	DNC	DNC
Colbert	1	0	0	0.3	B
DeKalb	1	0	0	0.3	B
Elmore	1	0	0	0.3	B
Etowah	0	0	0	0.0	A
Houston	0	0	0	0.0	A
Jefferson	13	1	0	4.8	F
Madison	1	0	0	0.3	B
Mobile	5	0	0	1.7	C
Montgomery	2	0	0	0.7	B
Morgan	0	0	0	0.0	A
Russell	1	0	0	0.3	B
Shelby	6	0	0	2.0	C
Sumter	0	0	0	0.0	A
Talladega	DNC	DNC	DNC	DNC	DNC
Tuscaloosa	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Baldwin	0	0	0	0	0.0	A	7.7	PASS
Clay	0	0	0	0	0.0	A	7.8	PASS
Colbert	0	0	0	0	0.0	A	7.9	PASS
DeKalb	1	0	0	0	0.3	B	8.3	PASS
Elmore	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Etowah	0	0	0	0	0.0	A	8.7	PASS
Houston	1	0	0	0	0.3	B	7.7	PASS
Jefferson	0	0	0	0	0.0	A	11.0	PASS
Madison	0	0	0	0	0.0	A	7.7	PASS
Mobile	0	0	0	0	0.0	A	8.1	PASS
Montgomery	0	0	0	0	0.0	A	8.8	PASS
Morgan	0	0	0	0	0.0	A	7.9	PASS
Russell	0	0	0	0	0.0	A	INC	INC
Shelby	INC	INC	INC	INC	INC	INC	INC	INC
Sumter	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Talladega	0	0	0	0	0.0	A	9.1	PASS
Tuscaloosa	0	0	0	0	0.0	A	8.1	PASS

ALASKA

American Lung Association in Alaska

www.lung.org/alaska

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Anchorage Municipality	294,356	72,040	30,841	5,724	18,970	12,519	160	14,027	16,356	27,663
Denali Borough	2,074	392	208	31	145	95	1	111	132	158
Fairbanks North Star Borough	99,703	23,931	9,706	1,901	6,431	4,187	55	4,477	5,207	7,051
Juneau City and Borough	32,094	6,932	4,040	551	2,158	1,460	17	1,728	2,013	2,596
Matanuska-Susitna Borough	106,532	28,922	11,845	2,298	6,650	4,460	58	5,203	6,068	11,768
Totals	**534,759**	**132,217**	**56,640**	**10,506**	**34,355**	**22,721**	**291**	**25,547**	**29,776**	**49,236**

ALASKA

American Lung Association in Alaska

www.lung.org/alaska

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Anchorage Municipality	DNC	DNC	DNC	DNC	DNC
Denali Borough	0	0	0	0.0	A
Fairbanks North Star Borough	0	0	0	0.0	A
Juneau City and Borough	DNC	DNC	DNC	DNC	DNC
Matanuska-Susitna Borough	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Anchorage Municipality	1	0	0	0	0.3	B	6.1	PASS
Denali Borough	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Fairbanks North Star Borough	35	29	0	0	26.2	F	16.5	FAIL
Juneau City and Borough	1	0	0	0	0.3	B	6.1	PASS
Matanuska-Susitna Borough	13	2	0	0	5.3	F	6.1	PASS

ARIZONA

American Lung Association in Arizona

www.lung.org/arizona

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Apache	71,606	19,778	10,647	1,594	5,153	3,304	34	4,106	5,445	23,426
Cochise	124,756	27,294	27,394	2,200	9,631	6,813	59	8,939	11,224	19,219
Coconino	140,776	29,439	17,001	2,373	11,033	6,154	66	7,265	9,912	23,946
Gila	53,501	10,864	15,070	876	4,207	3,338	25	4,554	5,551	12,661
La Paz	20,601	3,488	8,103	281	1,665	1,466	10	2,116	2,416	4,263
Maricopa	4,307,033	1,045,266	638,316	84,264	323,906	201,670	2,016	248,553	330,517	570,402
Mohave	207,200	36,215	61,447	2,919	16,865	13,471	97	18,433	22,404	34,891
Navajo	108,956	29,397	19,185	2,370	7,894	5,339	51	6,818	8,816	28,216
Pima	1,022,769	216,857	196,634	17,482	79,691	52,865	479	67,673	86,591	165,811
Pinal	430,237	99,004	85,362	7,981	32,721	22,125	202	28,599	36,256	52,566
Santa Cruz	46,212	12,604	8,027	1,016	3,335	2,246	22	2,864	3,708	10,858
Yavapai	228,168	37,774	70,166	3,045	18,782	15,236	107	20,932	25,382	31,166
Yuma	207,534	52,667	38,002	4,246	15,263	9,908	97	12,702	16,092	37,751
Totals	**6,969,349**	**1,620,647**	**1,195,354**	**130,649**	**530,147**	**343,936**	**3,264**	**433,554**	**564,313**	**1,015,176**

ARIZONA

American Lung Association in Arizona

www.lung.org/arizona

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Apache	DNC	DNC	DNC	DNC	DNC
Cochise	2	0	0	0.7	B
Coconino	4	0	0	1.3	C
Gila	15	1	0	5.5	F
La Paz	6	0	0	2.0	C
Maricopa	97	3	0	33.8	F
Mohave	DNC	DNC	DNC	DNC	DNC
Navajo	1	0	0	0.3	B
Pima	8	0	0	2.7	D
Pinal	37	1	0	12.8	F
Santa Cruz	DNC	DNC	DNC	DNC	DNC
Yavapai	5	0	0	1.7	C
Yuma	21	0	0	7.0	F

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Apache	0	0	0	0	0.0	A	INC	INC
Cochise	0	0	0	0	0.0	A	INC	INC
Coconino	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Gila	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
La Paz	0	0	0	0	0.0	A	3.0	PASS
Maricopa	9	2	1	0	4.7	F	9.6	PASS
Mohave	INC	INC	INC	INC	INC	INC	INC	INC
Navajo	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Pima	0	0	0	0	0.0	A	6.1	PASS
Pinal	18	2	0	0	7.0	F	8.6	PASS
Santa Cruz	5	3	0	0	3.2	D	9.2	PASS
Yavapai	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Yuma	5	0	0	0	1.7	C	7.5	PASS

ARKANSAS

American Lung Association in Arkansas

www.lung.org/arkansas

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Arkansas	17,967	4,091	3,421	325	1,343	1,445	14	1,923	1,831	3,515
Ashley	20,283	4,647	4,021	369	1,512	1,644	16	2,204	2,091	3,980
Clark	22,293	4,226	3,585	336	1,731	1,670	17	2,111	2,030	4,142
Crittenden	48,750	13,380	6,628	1,063	3,432	3,421	38	4,345	4,212	10,070
Garland	98,658	19,945	23,375	1,585	7,572	8,520	78	11,695	10,971	15,384
Jackson	17,135	3,470	3,023	276	1,321	1,365	14	1,778	1,704	3,292
Newton	7,828	1,536	2,021	122	606	708	6	988	923	1,534
Polk	20,118	4,627	4,520	368	1,494	1,684	16	2,307	2,169	4,645
Pulaski	393,956	92,013	58,908	7,311	29,206	29,099	309	37,085	35,826	57,780
Union	39,449	9,572	6,858	761	2,896	3,058	31	4,023	3,849	6,801
Washington	231,996	56,975	26,650	4,527	16,832	15,316	184	18,535	18,157	30,938
Totals	**918,433**	**214,482**	**143,010**	**17,042**	**67,946**	**67,930**	**723**	**86,993**	**83,763**	**142,081**

ARKANSAS

American Lung Association in Arkansas

www.lung.org/arkansas

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Arkansas	DNC	DNC	DNC	DNC	DNC
Ashley	DNC	DNC	DNC	DNC	DNC
Clark	0	0	0	0.0	A
Crittenden	4	1	0	1.8	C
Garland	DNC	DNC	DNC	DNC	DNC
Jackson	DNC	DNC	DNC	DNC	DNC
Newton	0	0	0	0.0	A
Polk	0	0	0	0.0	A
Pulaski	1	0	0	0.3	B
Union	DNC	DNC	DNC	DNC	DNC
Washington	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Arkansas	0	0	0	0	0.0	A	8.3	PASS
Ashley	0	0	0	0	0.0	A	8.2	PASS
Clark	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Crittenden	0	0	0	0	0.0	A	8.3	PASS
Garland	0	0	0	0	0.0	A	8.5	PASS
Jackson	0	0	0	0	0.0	A	8.2	PASS
Newton	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Polk	0	0	0	0	0.0	A	8.2	PASS
Pulaski	0	0	0	0	0.0	A	9.8	PASS
Union	0	0	0	0	0.0	A	8.9	PASS
Washington	0	0	0	0	0.0	A	7.9	PASS

CALIFORNIA

American Lung Association in California

www.lung.org/california

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Alameda	1,663,190	344,663	224,171	21,392	103,924	57,361	691	80,089	133,180	152,087
Amador	38,626	5,870	10,283	364	2,675	1,886	16	2,842	4,457	3,762
Butte	229,294	45,870	41,618	2,847	14,563	8,724	95	12,582	20,120	40,728
Calaveras	45,670	7,786	12,276	483	3,110	2,240	19	3,391	5,321	5,904
Colusa	21,805	5,995	3,118	372	1,254	728	9	1,035	1,696	2,633
Contra Costa	1,147,439	262,016	175,456	16,262	70,570	41,734	476	59,548	98,185	103,883
Del Norte	27,470	5,912	4,863	367	1,723	1,056	12	1,528	2,474	6,113
El Dorado	188,987	37,869	38,464	2,350	12,256	8,071	79	11,892	19,233	15,620
Fresno	989,255	281,684	118,527	17,483	55,536	30,071	411	41,788	69,186	205,046
Glenn	28,094	7,423	4,389	461	1,646	983	12	1,410	2,293	4,111
Humboldt	136,754	26,310	23,544	1,633	8,752	5,141	57	7,361	11,870	26,262
Imperial	182,830	52,296	23,042	3,246	10,266	5,654	76	7,909	13,022	35,830
Inyo	18,026	3,691	4,108	229	1,164	789	8	1,176	1,862	2,087
Kern	893,119	259,120	95,307	16,083	49,617	26,076	373	35,790	60,013	182,948
Kings	150,101	40,964	15,054	2,542	8,492	4,296	63	5,818	9,791	24,810
Lake	64,246	13,326	14,363	827	4,134	2,793	27	4,158	6,603	12,817
Los Angeles	10,163,507	2,224,905	1,343,960	138,091	625,653	344,960	4,221	481,419	801,001	1,490,853
Madera	156,890	43,013	21,552	2,670	8,995	5,103	65	7,207	11,811	31,569
Marin	260,955	52,487	56,424	3,258	16,965	11,437	108	16,971	27,262	20,222
Mariposa	17,569	2,877	4,743	179	1,203	861	7	1,302	2,038	2,641
Mendocino	88,018	19,048	18,671	1,182	5,565	3,655	37	5,407	8,576	14,156
Merced	272,673	80,640	30,187	5,005	15,042	7,992	114	11,023	18,379	61,297
Monterey	437,907	114,861	57,637	7,129	25,455	14,154	183	19,847	32,724	49,860
Napa	140,973	29,647	25,920	1,840	8,917	5,536	59	8,042	12,980	9,301
Nevada	99,814	17,304	26,471	1,074	6,748	4,800	41	7,252	11,345	10,889
Orange	3,190,400	705,999	456,229	43,819	197,038	112,878	1,325	159,434	264,313	362,109
Placer	386,166	86,233	73,776	5,352	24,132	15,381	160	22,510	36,210	29,873
Plumas	18,742	3,153	5,211	196	1,279	928	8	1,409	2,197	2,640
Riverside	2,423,266	616,211	340,498	38,246	142,917	81,395	1,008	115,017	189,009	309,235
Sacramento	1,530,615	364,311	209,612	22,611	92,167	51,889	635	72,961	120,713	213,232
San Benito	60,310	15,508	7,598	963	3,543	1,980	25	2,770	4,632	5,029
San Bernardino	2,157,404	571,669	243,122	35,481	124,484	66,466	897	91,640	153,951	339,748
San Diego	3,337,685	728,528	454,826	45,217	205,392	113,301	1,389	158,403	261,785	385,479
San Francisco	884,363	118,837	135,945	7,376	60,044	32,761	369	45,754	74,919	87,314
San Joaquin	745,424	203,134	92,800	12,608	42,757	23,656	310	33,057	54,941	113,375
San Luis Obispo	283,405	50,492	54,893	3,134	18,559	11,347	118	16,460	26,288	31,826
San Mateo	771,410	160,264	121,720	9,947	48,603	28,543	320	40,691	66,809	48,795
Santa Barbara	448,150	99,713	66,887	6,189	27,419	15,374	186	21,688	35,228	60,921

CALIFORNIA (cont.)

American Lung Association in California

www.lung.org/california

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Santa Clara	1,938,153	430,081	254,723	26,693	118,941	65,745	807	91,786	152,953	142,603
Santa Cruz	275,897	53,710	43,108	3,334	17,599	10,134	115	14,374	23,558	33,262
Shasta	179,921	38,750	36,542	2,405	11,368	7,346	75	10,808	17,241	30,155
Siskiyou	43,853	8,843	10,831	549	2,853	1,991	18	2,995	4,695	7,679
Solano	445,458	99,216	67,597	6,158	27,515	16,055	185	22,834	37,576	43,352
Sonoma	504,217	99,908	95,024	6,201	32,419	20,240	209	29,444	47,523	46,165
Stanislaus	547,899	148,525	70,316	9,218	31,501	17,541	228	24,583	40,690	75,614
Sutter	96,648	25,087	14,599	1,557	5,682	3,333	40	4,758	7,761	12,628
Tehama	63,926	15,345	12,219	952	3,908	2,502	27	3,670	5,878	12,718
Tulare	464,493	143,726	51,669	8,921	25,149	13,466	193	18,628	30,984	110,299
Tuolumne	54,248	9,060	13,844	562	3,674	2,542	23	3,817	5,975	6,205
Ventura	854,223	198,450	128,115	12,317	52,149	30,512	355	43,418	71,521	80,217
Yolo	219,116	46,251	26,495	2,871	13,446	6,907	91	9,442	15,617	36,761
Totals	**39,388,604**	**9,026,581**	**5,482,347**	**560,244**	**2,398,766**	**1,350,312**	**16,374**	**1,899,137**	**3,138,392**	**5,142,663**

CALIFORNIA

American Lung Association in California

www.lung.org/california

	HIGH OZONE DAYS 2015–2017					HIGH PARTICLE POLLUTION DAYS 2015–2017							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Alameda	26	3	1	10.8	F	12	3	0	0	5.5	F	10.6	PASS
Amador	17	0	0	5.7	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Butte	39	0	0	13.0	F	5	0	0	0	1.7	C	8.6	PASS
Calaveras	49	3	0	17.8	F	5	1	1	1	3.7	F	INC	INC
Colusa	0	0	0	0.0	A	5	2	0	0	2.7	D	7.6	PASS
Contra Costa	14	0	0	4.7	F	6	4	0	0	4.0	F	9.3	PASS
Del Norte	DNC	DNC	DNC	DNC	DNC	INC	INC	INC	INC	INC	INC	INC	INC
El Dorado	82	14	0	34.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Fresno	194	50	2	91.0	F	54	22	0	0	29.0	F	14.0	FAIL
Glenn	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Humboldt	1	0	0	0.3	B	4	4	1	0	4.0	F	6.8	PASS
Imperial	56	1	0	19.2	F	16	3	0	0	6.8	F	12.0	PASS
Inyo	11	0	0	3.7	F	9	8	1	0	7.7	F	7.2	PASS
Kern	236	39	1	98.8	F	67	25	0	0	34.8	F	17.3	FAIL
Kings	122	7	0	44.2	F	60	25	0	0	32.5	F	22.2	FAIL
Lake	0	0	0	0.0	A	2	1	0	0	1.2	C	4.3	PASS
Los Angeles	209	83	12	119.2	F	29	7	0	0	13.2	F	12.6	FAIL
Madera	101	8	0	37.7	F	32	5	0	0	13.2	F	12.8	FAIL
Marin	0	0	0	0.0	A	7	3	0	0	3.8	F	8.2	PASS
Mariposa	39	2	0	14.0	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Mendocino	0	0	0	0.0	A	9	3	0	0	4.5	F	8.1	PASS
Merced	69	4	0	25.0	F	40	5	0	0	15.8	F	12.7	FAIL
Monterey	0	0	0	0.0	A	5	8	0	0	5.7	F	6.1	PASS
Napa	2	0	0	0.7	B	7	5	2	0	6.2	F	10.9	PASS
Nevada	119	25	0	52.2	F	0	1	0	0	0.5	B	4.7	PASS
Orange	46	5	0	17.8	F	11	0	0	0	3.7	F	7.5	PASS
Placer	78	10	0	31.0	F	0	1	0	0	0.5	B	7.4	PASS
Plumas	DNC	DNC	DNC	DNC	DNC	34	10	0	0	16.3	F	15.1	FAIL
Riverside	219	102	9	130.0	F	35	3	0	0	13.2	F	13.6	FAIL
Sacramento	60	11	0	25.5	F	20	0	0	0	6.7	F	9.6	PASS
San Benito	6	0	0	2.0	C	1	0	0	0	0.3	B	4.6	PASS
San Bernardino	204	133	40	161.2	F	31	2	0	0	11.3	F	14.7	FAIL
San Diego	123	8	0	45.0	F	2	0	0	0	0.7	B	8.9	PASS
San Francisco	0	0	0	0.0	A	7	0	0	0	2.3	D	8.3	PASS
San Joaquin	41	3	0	15.2	F	48	2	0	0	17.0	F	12.2	FAIL
San Luis Obispo	17	1	0	6.2	F	1	0	0	0	0.3	B	9.6	PASS
San Mateo	2	1	0	1.2	C	4	2	0	0	2.3	D	7.7	PASS
Santa Barbara	7	0	0	2.3	D	3	9	1	0	6.2	F	8.2	PASS

CALIFORNIA (cont.)

American Lung Association in California

www.lung.org/california

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Santa Clara	9	3	0	4.5	F
Santa Cruz	1	0	0	0.3	B
Shasta	39	1	0	13.5	F
Siskiyou	0	0	0	0.0	A
Solano	5	1	0	2.2	D
Sonoma	1	0	0	0.3	B
Stanislaus	84	9	0	32.5	F
Sutter	39	0	0	13.0	F
Tehama	61	5	0	22.8	F
Tulare	230	49	0	101.2	F
Tuolumne	74	7	0	28.2	F
Ventura	39	2	0	14.0	F
Yolo	9	0	0	3.0	D

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Santa Clara	12	0	0	0	4.0	F	9.4	PASS
Santa Cruz	3	0	0	0	1.0	C	5.7	PASS
Shasta	0	2	0	0	1.0	C	6.8	PASS
Siskiyou	5	1	0	0	2.2	D	7.8	PASS
Solano	8	4	0	0	4.7	F	9.5	PASS
Sonoma	1	3	0	0	1.8	C	6.5	PASS
Stanislaus	56	6	0	0	21.7	F	13.2	FAIL
Sutter	4	0	0	0	1.3	C	9.0	PASS
Tehama	INC	INC	INC	INC	INC	INC	INC	INC
Tulare	13	8	0	0	8.3	F	15.7	FAIL
Tuolumne	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Ventura	2	5	3	2	6.8	F	9.7	PASS
Yolo	1	1	0	0	0.8	B	7.5	PASS

COLORADO

American Lung Association in Colorado

www.lung.org/colorado

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Adams	503,167	135,396	50,831	10,758	34,486	14,696	206	19,485	24,597	52,536
Arapahoe	643,052	153,189	81,353	12,172	45,686	21,028	263	28,305	35,340	49,795
Archuleta	13,315	2,446	3,354	194	986	615	5	878	1,043	1,549
Boulder	322,514	62,618	44,222	4,975	24,220	11,072	132	14,999	18,547	39,084
Chaffee	19,638	2,951	4,832	234	1,519	898	8	1,281	1,516	2,073
Clear Creek	9,574	1,501	1,852	119	744	417	4	571	712	735
Denver	704,621	140,016	81,648	11,125	52,882	21,727	289	29,294	35,956	86,353
Douglas	335,299	89,210	38,180	7,088	22,998	10,900	137	14,391	18,517	10,574
El Paso	699,232	170,198	86,788	13,523	49,360	22,205	287	29,986	37,167	73,008
Garfield	59,118	14,997	7,347	1,192	4,114	1,931	24	2,588	3,258	4,429
Grand	15,321	2,625	2,587	209	1,175	616	6	837	1,048	1,332
Gunnison	16,939	2,891	2,144	230	1,314	564	7	760	939	2,349
Jackson	1,385	235	306	19	105	61	1	86	104	189
Jefferson	574,613	114,968	92,236	9,135	42,578	21,412	235	29,286	36,137	42,729
La Plata	55,589	10,629	9,157	845	4,162	2,092	23	2,871	3,526	4,961
Larimer	343,976	68,427	51,994	5,437	25,587	11,943	141	16,436	19,935	36,954
Mesa	151,616	33,042	27,932	2,625	10,909	5,729	62	8,028	9,623	21,957
Moffat	13,131	3,389	1,948	269	903	457	5	623	772	1,428
Montezuma	26,140	5,856	5,574	465	1,852	1,076	11	1,522	1,819	3,944
Montrose	41,784	9,189	9,450	730	2,967	1,757	17	2,505	2,965	5,312
Park	17,905	2,781	3,474	221	1,393	811	7	1,101	1,395	1,526
Pueblo	166,475	37,831	30,040	3,006	11,840	6,238	68	8,716	10,494	29,408
Rio Blanco	6,420	1,539	968	122	452	225	3	308	380	579
San Miguel	7,967	1,401	1,082	111	612	297	3	394	504	614
Weld	304,633	80,558	36,146	6,401	20,918	9,431	125	12,688	15,813	28,171
Totals	**5,053,424**	**1,147,883**	**675,445**	**91,207**	**363,763**	**168,199**	**2,070**	**227,939**	**282,109**	**501,589**

COLORADO

American Lung Association in Colorado

www.lung.org/colorado

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Adams	5	0	0	1.7	C
Arapahoe	15	0	0	5.0	F
Archuleta	INC	INC	INC	INC	INC
Boulder	17	0	0	5.7	F
Chaffee	INC	INC	INC	INC	INC
Clear Creek	13	1	0	4.8	F
Denver	7	0	0	2.3	D
Douglas	41	3	0	15.2	F
El Paso	5	0	0	1.7	C
Garfield	8	0	0	2.7	D
Grand	INC	INC	INC	INC	INC
Gunnison	4	0	0	1.3	C
Jackson	INC	INC	INC	INC	INC
Jefferson	60	5	0	22.5	F
La Plata	13	0	0	4.3	F
Larimer	31	1	0	10.8	F
Mesa	3	0	0	1.0	C
Moffat	0	0	0	0.0	A
Montezuma	1	0	0	0.3	B
Montrose	INC	INC	INC	INC	INC
Park	7	0	0	2.3	D
Pueblo	DNC	DNC	DNC	DNC	DNC
Rio Blanco	0	0	0	0.0	A
San Miguel	INC	INC	INC	INC	INC
Weld	16	0	0	5.3	F

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Adams	1	0	0	0	0.3	B	INC	INC
Arapahoe	1	0	0	0	0.3	B	5.9	PASS
Archuleta	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Boulder	1	0	0	0	0.3	B	6.7	PASS
Chaffee	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clear Creek	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Denver	8	0	0	0	2.7	D	8.5	PASS
Douglas	0	1	0	0	0.5	B	5.4	PASS
El Paso	1	0	0	0	0.3	B	5.7	PASS
Garfield	0	0	0	0	0.0	A	INC	INC
Grand	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Gunnison	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jackson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jefferson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
La Plata	0	0	0	0	0.0	A	4.9	PASS
Larimer	1	2	0	0	1.3	C	7.1	PASS
Mesa	1	0	0	0	0.3	B	6.1	PASS
Moffat	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Montezuma	INC	INC	INC	INC	INC	INC	INC	INC
Montrose	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Park	2	0	0	0	0.7	B	INC	INC
Pueblo	1	0	0	0	0.3	B	5.2	PASS
Rio Blanco	0	0	0	0	0.0	A	7.8	PASS
San Miguel	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Weld	3	1	0	0	1.5	C	8.3	PASS

CONNECTICUT

American Lung Association in Connecticut

www.lung.org/connecticut

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Fairfield	949,921	214,902	147,210	27,712	79,093	42,045	549	53,941	71,130	82,428
Hartford	895,388	188,505	150,427	24,308	75,963	40,598	518	52,641	68,508	96,200
Litchfield	182,177	33,691	37,489	4,345	15,567	9,296	105	12,573	16,176	12,481
Middlesex	163,410	29,541	32,135	3,809	14,153	8,147	95	10,881	14,035	10,796
New Haven	860,435	175,065	145,632	22,575	73,698	39,267	497	50,880	66,182	91,639
New London	269,033	52,658	47,336	6,790	23,179	12,571	156	16,408	21,298	22,246
Tolland	151,461	26,416	23,273	3,406	13,624	6,816	88	8,559	11,288	10,043
Windham	116,359	23,048	18,908	2,972	10,038	5,342	67	6,867	9,033	12,818
Totals	**3,588,184**	**743,826**	**602,410**	**95,918**	**305,315**	**164,082**	**2,076**	**212,750**	**277,650**	**338,651**

CONNECTICUT

American Lung Association in Connecticut

www.lung.org/connecticut

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Fairfield	52	17	0	25.8	F
Hartford	17	1	0	6.2	F
Litchfield	13	1	0	4.8	F
Middlesex	30	3	0	11.5	F
New Haven	32	10	0	15.7	F
New London	26	4	0	10.7	F
Tolland	14	0	0	4.7	F
Windham	10	1	0	3.8	F

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Fairfield	0	0	0	0	0.0	A	8.6	PASS
Hartford	0	0	0	0	0.0	A	8.2	PASS
Litchfield	1	0	0	0	0.3	B	4.6	PASS
Middlesex	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
New Haven	0	0	0	0	0.0	A	7.0	PASS
New London	0	0	0	0	0.0	A	5.5	PASS
Tolland	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Windham	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

DELAWARE

American Lung Association in Delaware

www.lung.org/delaware

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Kent	176,824	40,612	29,407	3,227	14,549	10,889	129	11,491	14,931	22,671
New Castle	559,793	121,394	84,505	9,646	46,974	34,546	409	35,664	46,805	72,551
Sussex	225,322	42,478	60,216	3,375	19,167	16,747	165	19,643	24,771	26,370
Totals	**961,939**	**204,484**	**174,128**	**16,248**	**80,689**	**62,183**	**703**	**66,799**	**86,507**	**121,592**

DELAWARE

American Lung Association in Delaware

www.lung.org/delaware

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Kent	3	0	0	1.0	C
New Castle	23	2	0	8.7	F
Sussex	7	0	0	2.3	D

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Kent	0	0	0	0	0.0	A	INC	INC
New Castle	5	0	0	0	1.7	C	INC	INC
Sussex	0	0	0	0	0.0	A	7.4	PASS

DISTRICT OF COLUMBIA

American Lung Association in the District of Columbia

www.lung.org/districtofcolumbia

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
District of Columbia	693,972	124,492	83,734	14,174	53,855	28,397	297	34,208	41,546	109,502
Totals	**693,972**	**124,492**	**83,734**	**14,174**	**53,855**	**28,397**	**297**	**34,208**	**41,546**	**109,502**

DISTRICT OF COLUMBIA

American Lung Association in the District of Columbia

www.lung.org/districtofcolumbia

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
District of Columbia	14	0	0	4.7	F

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
District of Columbia	2	0	0	0	0.7	B	9.2	PASS

FLORIDA

American Lung Association in Florida

www.lung.org/florida

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Alachua	266,944	47,915	36,299	3,509	16,474	14,418	148	16,543	17,614	53,816
Baker	28,283	6,826	3,917	500	1,633	1,559	16	1,849	2,008	3,900
Bay	183,563	39,612	30,867	2,901	10,914	10,937	102	13,355	14,427	26,663
Brevard	589,162	108,792	137,262	7,967	36,128	40,191	327	51,798	55,469	72,303
Broward	1,935,878	411,519	314,473	30,135	115,804	115,093	1,073	139,676	151,297	252,288
Citrus	145,647	21,780	52,302	1,595	9,073	11,709	81	16,247	17,004	20,654
Collier	372,880	64,749	117,384	4,741	22,634	27,539	207	37,424	39,164	43,075
Columbia	69,612	15,278	12,835	1,119	4,101	4,213	39	5,230	5,617	10,720
Duval	937,934	211,784	128,236	15,509	55,215	51,859	519	61,071	66,231	138,069
Escambia	313,512	65,715	51,659	4,812	18,725	18,309	174	22,168	23,832	48,602
Flagler	110,510	19,082	33,207	1,397	6,767	8,177	61	11,018	11,619	13,137
Highlands	102,883	17,876	35,789	1,309	6,186	7,823	57	10,842	11,261	20,051
Hillsborough	1,408,566	321,547	197,468	23,546	82,582	78,098	781	92,404	100,080	214,442
Holmes	19,558	3,912	3,856	286	1,180	1,233	11	1,543	1,656	3,756
Indian River	154,383	25,266	49,778	1,850	9,506	11,734	85	15,992	16,787	16,249
Lake	346,017	67,047	91,769	4,910	20,710	23,825	192	31,468	33,230	43,020
Lee	739,224	132,325	206,879	9,690	44,944	52,376	410	69,651	73,386	85,844
Leon	290,292	54,259	37,479	3,973	17,795	15,492	160	17,670	18,885	50,010
Liberty	8,242	1,491	1,192	109	513	482	5	568	616	1,449
Manatee	385,571	71,646	103,459	5,247	23,347	27,042	213	35,751	37,838	41,057
Marion	354,353	66,514	101,460	4,871	21,262	25,080	196	33,568	35,288	55,880
Martin	159,923	26,374	48,686	1,931	9,891	12,003	89	16,189	17,088	17,002
Miami-Dade	2,751,796	557,885	439,045	40,853	166,519	162,902	1,524	196,343	212,396	452,649
Okaloosa	202,970	45,065	31,858	3,300	11,949	11,591	113	13,956	15,032	21,667
Orange	1,348,975	301,983	157,506	22,114	79,714	71,188	748	81,377	88,428	201,528
Osceola	352,180	86,747	45,587	6,352	20,168	18,694	195	21,876	23,697	48,892
Palm Beach	1,471,150	283,212	346,685	20,739	88,725	97,482	815	125,803	133,570	170,868
Pasco	525,643	107,248	118,369	7,854	31,363	34,328	291	44,084	47,006	67,635
Pinellas	970,637	159,888	235,248	11,708	60,876	67,883	537	87,701	93,740	115,990
Polk	686,483	153,297	138,226	11,226	39,954	41,800	381	52,683	56,083	107,844
St. Lucie	313,506	62,999	74,017	4,613	18,726	20,771	174	26,886	28,584	39,839
Santa Rosa	174,272	38,606	27,256	2,827	10,325	10,222	97	12,358	13,419	17,183
Sarasota	419,119	60,303	151,299	4,416	26,246	33,710	232	46,758	48,856	38,065
Seminole	462,659	98,067	69,962	7,181	27,725	26,879	256	32,182	34,906	51,321
Volusia	538,692	95,946	129,802	7,026	33,148	36,806	299	47,594	50,693	79,877
Wakulla	32,120	6,882	4,854	504	1,925	1,891	18	2,271	2,474	3,746
Totals	**19,173,139**	**3,859,437**	**3,765,970**	**282,620**	**1,152,750**	**1,195,339**	**10,625**	**1,493,901**	**1,599,282**	**2,649,091**

FLORIDA

American Lung Association in Florida

www.lung.org/florida

	HIGH OZONE DAYS 2015–2017					HIGH PARTICLE POLLUTION DAYS 2015–2017							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Alachua	1	0	0	0.3	B	0	0	0	0	0.0	A	6.1	PASS
Baker	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Bay	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Brevard	0	0	0	0.0	A	0	0	0	0	0.0	A	5.7	PASS
Broward	6	0	0	2.0	C	0	0	0	0	0.0	A	6.6	PASS
Citrus	DNC	DNC	DNC	DNC	DNC	INC	INC	INC	INC	INC	INC	INC	INC
Collier	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Columbia	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Duval	1	0	0	0.3	B	1	0	0	0	0.3	B	INC	INC
Escambia	3	0	0	1.0	C	0	0	0	0	0.0	A	7.4	PASS
Flagler	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Highlands	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hillsborough	6	1	0	2.5	D	0	0	0	0	0.0	A	8.0	PASS
Holmes	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Indian River	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lake	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lee	1	0	0	0.3	B	0	0	0	0	0.0	A	6.1	PASS
Leon	0	0	0	0.0	A	0	0	0	0	0.0	A	7.4	PASS
Liberty	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Manatee	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Marion	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Martin	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Miami-Dade	5	0	0	1.7	C	1	0	0	0	0.3	B	7.5	PASS
Okaloosa	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Orange	3	0	0	1.0	C	0	0	0	0	0.0	A	7.1	PASS
Osceola	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Palm Beach	2	0	0	0.7	B	0	0	0	0	0.0	A	6.0	PASS
Pasco	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Pinellas	1	0	0	0.3	B	0	0	0	0	0.0	A	7.1	PASS
Polk	5	0	0	1.7	C	0	0	0	0	0.0	A	6.5	PASS
St. Lucie	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Santa Rosa	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Sarasota	3	0	0	1.0	C	0	0	0	0	0.0	A	6.4	PASS
Seminole	2	0	0	0.7	B	0	0	0	0	0.0	A	5.9	PASS
Volusia	0	0	0	0.0	A	0	0	0	0	0.0	A	6.1	PASS
Wakulla	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

GEORGIA

American Lung Association in Georgia

www.lung.org/georgia

				AT-RISK GROUPS						
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Bibb	152,862	37,803	23,431	3,438	9,636	8,357	94	10,011	13,547	36,728
Chatham	290,501	62,795	42,932	5,711	19,136	15,837	180	18,539	25,269	45,057
Chattooga	24,770	5,559	4,262	506	1,602	1,457	16	1,782	2,392	4,732
Clarke	127,064	22,144	13,378	2,014	8,940	6,122	79	6,423	9,124	31,067
Clayton	285,153	79,860	25,759	7,262	17,505	13,127	176	14,766	20,979	45,572
Cobb	755,754	181,097	89,337	16,469	48,667	39,047	469	45,395	63,193	71,120
Coffee	43,014	10,495	5,787	954	2,740	2,262	27	2,655	3,645	9,921
Columbia	151,579	38,835	19,715	3,532	9,506	7,885	94	9,292	12,783	9,942
Coweta	143,114	35,456	19,242	3,224	9,069	7,733	89	9,255	12,713	14,806
Dawson	24,379	5,064	4,810	461	1,601	1,539	15	1,923	2,553	2,258
DeKalb	753,253	175,289	90,367	15,941	48,935	38,740	465	44,632	62,077	112,844
Dougherty	89,502	21,781	13,783	1,981	5,672	4,883	55	5,825	7,880	24,373
Douglas	143,882	37,558	16,211	3,416	9,011	7,280	89	8,511	11,873	16,770
Floyd	97,613	22,759	16,178	2,070	6,251	5,547	61	6,705	9,017	17,913
Fulton	1,041,423	232,219	118,221	21,118	68,674	53,139	647	60,548	84,783	149,652
Glynn	85,282	18,931	16,580	1,722	5,498	5,226	53	6,491	8,601	14,304
Gwinnett	920,260	250,418	88,425	22,773	57,035	44,098	572	50,511	71,417	97,757
Hall	199,335	51,009	29,205	4,639	12,442	10,729	125	12,840	17,446	25,982
Henry	225,813	58,658	25,594	5,334	14,165	11,503	140	13,488	18,810	22,065
Houston	153,479	39,514	19,042	3,593	9,626	7,852	95	9,184	12,691	19,675
Lowndes	115,489	27,756	13,808	2,524	7,425	5,658	72	6,349	8,816	27,533
Murray	39,782	9,900	5,651	900	2,511	2,167	25	2,602	3,552	6,765
Muscogee	194,058	48,147	25,504	4,378	12,301	9,982	121	11,601	15,946	42,476
Paulding	159,445	42,357	16,451	3,852	9,951	7,866	99	9,111	12,808	13,225
Pike	18,217	4,225	2,869	384	1,172	1,050	11	1,281	1,735	1,920
Richmond	201,800	46,610	27,355	4,239	13,079	10,638	125	12,376	16,995	45,089
Rockdale	90,312	22,593	12,574	2,055	5,696	4,929	56	5,936	8,124	12,585
Sumter	29,847	6,771	4,925	616	1,928	1,689	18	2,028	2,729	7,169
Walker	68,939	15,160	12,638	1,379	4,472	4,167	43	5,145	6,865	10,520
Washington	20,313	4,508	3,439	410	1,320	1,194	13	1,459	1,963	4,966
Wilkinson	8,959	2,070	1,682	188	572	548	6	685	912	2,074
Totals	**6,655,193**	**1,617,341**	**809,155**	**147,080**	**426,136**	**342,252**	**4,129**	**397,349**	**551,239**	**946,860**

GEORGIA

American Lung Association in Georgia

www.lung.org/georgia

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Bibb	3	0	0	1.0	C
Chatham	0	0	0	0.0	A
Chattooga	0	0	0	0.0	A
Clarke	1	0	0	0.3	B
Clayton	DNC	DNC	DNC	DNC	DNC
Cobb	3	1	0	1.5	C
Coffee	DNC	DNC	DNC	DNC	DNC
Columbia	1	0	0	0.3	B
Coweta	2	1	0	1.2	C
Dawson	5	0	0	1.7	C
DeKalb	12	0	0	4.0	F
Dougherty	DNC	DNC	DNC	DNC	DNC
Douglas	8	1	0	3.2	D
Floyd	DNC	DNC	DNC	DNC	DNC
Fulton	25	3	0	9.8	F
Glynn	0	0	0	0.0	A
Gwinnett	9	1	0	3.5	F
Hall	DNC	DNC	DNC	DNC	DNC
Henry	13	1	0	4.8	F
Houston	DNC	DNC	DNC	DNC	DNC
Lowndes	DNC	DNC	DNC	DNC	DNC
Murray	1	1	0	0.8	B
Muscogee	1	0	0	0.3	B
Paulding	INC	INC	INC	INC	INC
Pike	7	1	0	2.8	D
Richmond	0	0	0	0.0	A
Rockdale	13	0	0	4.3	F
Sumter	1	0	0	0.3	B
Walker	DNC	DNC	DNC	DNC	DNC
Washington	DNC	DNC	DNC	DNC	DNC
Wilkinson	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Bibb	2	0	0	0	0.7	B	9.6	PASS
Chatham	1	0	0	0	0.3	B	8.2	PASS
Chattooga	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clarke	0	1	0	0	0.5	B	8.2	PASS
Clayton	1	0	0	0	0.3	B	9.6	PASS
Cobb	1	0	0	0	0.3	B	9.0	PASS
Coffee	INC	INC	INC	INC	INC	INC	INC	INC
Columbia	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Coweta	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dawson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
DeKalb	1	1	0	0	0.8	B	9.0	PASS
Dougherty	1	1	0	0	0.8	B	9.0	PASS
Douglas	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Floyd	0	0	0	0	0.0	A	INC	INC
Fulton	1	0	0	0	0.3	B	10.5	PASS
Glynn	2	0	0	0	0.7	B	7.5	PASS
Gwinnett	1	0	0	0	0.3	B	8.7	PASS
Hall	1	1	0	0	0.8	B	8.0	PASS
Henry	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Houston	1	0	0	0	0.3	B	8.3	PASS
Lowndes	1	0	0	0	0.3	B	7.8	PASS
Murray	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Muscogee	2	0	0	0	0.7	B	9.5	PASS
Paulding	0	0	0	0	0.0	A	INC	INC
Pike	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Richmond	1	1	0	0	0.8	B	9.3	PASS
Rockdale	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Sumter	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Walker	0	1	0	0	0.5	B	9.0	PASS
Washington	1	0	0	0	0.3	B	8.3	PASS
Wilkinson	INC	INC	INC	INC	INC	INC	INC	INC

HAWAII

American Lung Association in Hawaii

www.lung.org/hawaii

				AT-RISK GROUPS						
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Hawaii	200,381	43,658	40,185	4,283	15,244	6,172	90	11,128	18,713	29,604
Honolulu	988,650	209,809	170,319	20,582	76,876	28,309	443	49,586	84,098	79,084
Kauai	72,159	16,020	13,889	1,572	5,471	2,189	32	3,925	6,625	7,172
Maui	166,260	36,257	29,133	3,557	12,726	4,945	74	8,733	14,890	16,342
Totals	**1,427,450**	**305,744**	**253,526**	**29,993**	**110,317**	**41,615**	**639**	**73,372**	**124,326**	**132,202**

HAWAII

American Lung Association in Hawaii

www.lung.org/hawaii

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Hawaii	DNC	DNC	DNC	DNC	DNC
Honolulu	0	0	0	0.0	A
Kauai	DNC	DNC	DNC	DNC	DNC
Maui	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Hawaii	5	0	0	0	1.7	C	12.8	FAIL
Honolulu	0	0	0	0	0.0	A	4.2	PASS
Kauai	0	0	0	0	0.0	A	3.1	PASS
Maui	1	0	0	0	0.3	B	4.2	PASS

IDAHO

American Lung Association in Idaho

www.lung.org/idaho

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Ada	456,849	110,456	63,583	8,777	31,208	17,005	230	24,724	29,075	47,955
Bannock	85,269	22,717	11,899	1,805	5,597	3,006	43	4,418	5,128	11,846
Benewah	9,184	2,096	2,014	167	629	415	5	653	745	1,297
Butte	2,602	633	613	50	173	116	1	187	210	437
Canyon	216,699	62,811	29,216	4,991	13,802	7,493	109	10,988	12,811	33,022
Franklin	13,564	4,452	1,884	354	816	459	7	684	794	1,103
Idaho	16,369	3,202	4,423	254	1,149	803	8	1,314	1,463	2,400
Jerome	23,627	7,312	3,019	581	1,468	797	12	1,162	1,362	3,222
Lemhi	7,875	1,471	2,327	117	555	401	4	668	737	1,257
Shoshone	12,542	2,532	2,859	201	887	583	6	920	1,047	2,143
Totals	**844,580**	**217,682**	**121,837**	**17,296**	**56,282**	**31,077**	**425**	**45,718**	**53,372**	**104,682**

IDAHO

American Lung Association in Idaho

www.lung.org/idaho

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Ada	20	0	0	6.7	F
Bannock	DNC	DNC	DNC	DNC	DNC
Benewah	DNC	DNC	DNC	DNC	DNC
Butte	0	0	0	0.0	A
Canyon	DNC	DNC	DNC	DNC	DNC
Franklin	DNC	DNC	DNC	DNC	DNC
Idaho	INC	INC	INC	INC	INC
Jerome	DNC	DNC	DNC	DNC	DNC
Lemhi	DNC	DNC	DNC	DNC	DNC
Shoshone	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Ada	7	1	0	0	2.8	D	7.6	PASS
Bannock	5	4	0	0	3.7	F	7.7	PASS
Benewah	21	5	2	0	10.8	F	10.5	PASS
Butte	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Canyon	7	1	0	0	2.8	D	9.4	PASS
Franklin	5	3	0	0	3.2	D	7.0	PASS
Idaho	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jerome	5	1	0	0	2.2	D	INC	INC
Lemhi	18	7	0	0	9.5	F	12.6	FAIL
Shoshone	32	8	1	0	15.3	F	12.4	FAIL

ILLINOIS

American Lung Association in Illinois

www.lung.org/illinois

				AT-RISK GROUPS						
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Adams	66,234	14,911	13,155	850	4,226	3,787	43	4,474	6,191	8,608
Champaign	209,399	39,717	25,933	2,265	13,824	9,815	137	10,569	15,670	37,106
Clark	15,767	3,624	3,009	207	1,002	900	10	1,058	1,477	1,697
Cook	5,211,263	1,146,789	743,329	65,406	333,569	263,815	3,398	294,723	429,201	746,194
DuPage	930,128	212,491	139,351	12,119	59,139	49,049	607	55,489	80,518	56,794
Effingham	34,132	8,101	5,843	462	2,145	1,852	22	2,142	3,035	3,256
Hamilton	8,194	1,823	1,763	104	525	488	5	584	799	1,046
Jersey	21,941	4,467	4,200	255	1,442	1,285	14	1,504	2,112	2,164
Jo Daviess	21,594	4,201	5,881	240	1,437	1,450	14	1,794	2,379	1,980
Kane	534,667	138,340	70,160	7,890	32,637	26,277	350	29,301	43,097	48,756
Lake	703,520	171,620	96,469	9,788	43,852	35,842	460	40,150	58,925	52,630
Macon	105,801	23,524	20,614	1,342	6,772	6,006	69	7,068	9,813	14,566
Macoupin	45,446	9,651	8,886	550	2,953	2,657	30	3,125	4,364	6,152
Madison	265,428	58,298	44,448	3,325	17,062	14,511	173	16,666	23,782	37,768
McHenry	309,122	73,814	43,235	4,210	19,442	16,205	202	18,220	26,764	18,686
McLean	172,290	37,501	21,980	2,139	11,030	8,270	112	9,049	13,364	25,273
Peoria	183,011	43,611	30,204	2,487	11,456	9,605	119	11,033	15,660	27,364
Randolph	32,423	6,223	5,890	355	2,156	1,848	22	2,137	3,022	4,402
Rock Island	144,808	32,420	27,144	1,849	9,247	8,087	95	9,460	13,209	18,069
Sangamon	196,452	44,162	33,765	2,519	12,546	10,779	128	12,445	17,665	29,676
St. Clair	262,479	61,967	40,022	3,534	16,511	13,717	171	15,574	22,474	41,174
Will	692,661	174,819	87,293	9,971	42,675	34,140	453	37,823	56,106	47,639
Winnebago	284,778	66,743	48,725	3,807	17,961	15,467	186	17,878	25,343	39,766
Totals	**10,451,538**	**2,378,817**	**1,521,299**	**135,675**	**663,608**	**535,852**	**6,822**	**602,265**	**874,971**	**1,270,766**

ILLINOIS

American Lung Association in Illinois

www.lung.org/illinois

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Adams	1	0	0	0.3	B
Champaign	1	0	0	0.3	B
Clark	2	0	0	0.7	B
Cook	36	4	0	14.0	F
DuPage	11	0	0	3.7	F
Effingham	3	0	0	1.0	C
Hamilton	0	0	0	0.0	A
Jersey	9	0	0	3.0	D
Jo Daviess	1	0	0	0.3	B
Kane	9	0	0	3.0	D
Lake	18	0	0	6.0	F
Macon	3	0	0	1.0	C
Macoupin	0	0	0	0.0	A
Madison	23	0	0	7.7	F
McHenry	10	0	0	3.3	F
McLean	1	0	0	0.3	B
Peoria	5	0	0	1.7	C
Randolph	2	0	0	0.7	B
Rock Island	2	0	0	0.7	B
Sangamon	3	0	0	1.0	C
St. Clair	6	0	0	2.0	C
Will	1	0	0	0.3	B
Winnebago	4	0	0	1.3	C

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Adams	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Champaign	0	0	0	0	0.0	A	7.9	Pass
Clark	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cook	2	1	0	0	1.2	C	10.5	Pass
DuPage	1	0	0	0	0.3	B	8.3	Pass
Effingham	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hamilton	1	0	0	0	0.3	B	8.2	Pass
Jersey	0	0	0	0	0.0	A	INC	INC
Jo Daviess	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Kane	1	0	0	0	0.3	B	8.3	Pass
Lake	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Macon	0	0	0	0	0.0	A	8.4	Pass
Macoupin	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Madison	1	0	0	0	0.3	B	9.7	Pass
McHenry	0	0	0	0	0.0	A	INC	INC
McLean	0	0	0	0	0.0	A	8.0	Pass
Peoria	0	0	0	0	0.0	A	8.2	Pass
Randolph	0	0	0	0	0.0	A	8.5	Pass
Rock Island	0	0	0	0	0.0	A	8.1	Pass
Sangamon	0	0	0	0	0.0	A	8.2	Pass
St. Clair	1	0	0	0	0.3	B	9.8	Pass
Will	0	0	0	0	0.0	A	7.9	Pass
Winnebago	0	0	0	0	0.0	A	8.3	Pass

INDIANA

American Lung Association in Indiana

www.lung.org/indiana

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Allen	372,877	96,418	52,940	6,627	27,856	23,377	275	25,942	32,034	47,818
Bartholomew	82,040	19,505	13,152	1,341	6,278	5,409	61	6,101	7,463	8,555
Boone	65,875	17,531	8,585	1,205	4,884	4,136	49	4,547	5,656	3,707
Brown	15,035	2,752	3,546	189	1,214	1,246	11	1,493	1,771	1,614
Carroll	20,039	4,457	3,856	306	1,553	1,461	15	1,700	2,047	1,910
Clark	116,973	26,533	17,939	1,824	9,100	7,831	86	8,756	10,775	12,285
Delaware	115,184	21,400	19,387	1,471	9,423	7,764	85	8,698	10,654	22,020
Dubois	42,558	10,336	7,201	710	3,226	2,944	31	3,366	4,095	3,445
Elkhart	205,032	56,784	29,484	3,903	14,916	12,668	151	14,151	17,409	21,670
Floyd	77,071	17,540	12,131	1,206	5,983	5,271	57	5,930	7,278	7,971
Greene	32,177	7,114	6,166	489	2,498	2,358	24	2,742	3,304	3,696
Hamilton	323,747	88,657	38,382	6,094	23,817	19,643	239	21,297	26,699	12,284
Hancock	74,985	17,653	11,891	1,213	5,758	5,111	55	5,768	7,068	4,075
Hendricks	163,685	41,609	22,029	2,860	12,326	10,355	121	11,399	14,157	8,120
Henry	48,476	9,972	9,096	685	3,845	3,534	36	4,077	4,931	5,739
Howard	82,363	18,678	15,731	1,284	6,346	5,883	61	6,840	8,233	11,727
Huntington	36,337	7,872	6,093	541	2,855	2,536	27	2,876	3,513	3,570
Jackson	43,884	10,749	7,043	739	3,325	2,927	32	3,313	4,049	5,467
Johnson	153,897	38,252	21,965	2,629	11,656	9,789	114	10,851	13,411	13,267
Knox	37,508	8,013	6,469	551	2,956	2,567	28	2,916	3,551	6,587
Lake	485,640	115,082	78,166	7,910	37,193	32,673	357	36,931	45,171	76,220
LaPorte	110,029	23,793	19,204	1,635	8,635	7,732	82	8,824	10,734	15,005
Madison	129,498	28,315	23,179	1,946	10,119	9,101	96	10,435	12,657	21,478
Marion	950,082	234,906	116,958	16,146	72,461	57,127	699	61,569	77,233	163,573
Monroe	146,986	23,388	18,469	1,608	12,561	8,811	109	9,211	11,687	28,462
Montgomery	38,525	8,883	6,731	611	2,966	2,682	29	3,072	3,730	4,510
Morgan	69,713	15,857	11,465	1,090	5,403	4,929	52	5,597	6,842	6,799
Perry	19,081	4,056	3,483	279	1,502	1,364	14	1,568	1,900	2,130
Porter	168,404	37,477	26,811	2,576	13,157	11,495	124	12,931	15,863	17,078
Posey	25,595	5,675	4,600	390	1,991	1,853	19	2,132	2,585	2,290
St. Joseph	270,434	64,054	41,733	4,403	20,751	17,577	199	19,678	24,166	41,378
Shelby	44,395	10,140	7,438	697	3,434	3,114	33	3,544	4,324	3,666
Spencer	20,394	4,508	3,861	310	1,584	1,502	15	1,745	2,105	2,086
Sullivan	20,746	4,069	3,618	280	1,672	1,466	16	1,663	2,029	2,710
Tippecanoe	190,587	39,883	21,560	2,741	15,334	10,724	142	11,139	14,194	31,692
Vanderburgh	181,616	39,236	29,726	2,697	14,297	12,307	134	13,864	16,972	30,495

INDIANA (cont.)

American Lung Association in Indiana

www.lung.org/indiana

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Vigo	107,516	22,077	17,129	1,517	8,594	7,093	80	7,911	9,722	18,964
Wabash	31,443	6,563	6,411	451	2,474	2,320	23	2,718	3,257	3,913
Warrick	62,530	15,266	10,533	1,049	4,732	4,295	46	4,907	5,971	4,180
Whitley	33,756	7,768	5,908	534	2,600	2,379	25	2,728	3,313	2,822
Totals	**5,216,713**	**1,232,821**	**770,069**	**84,736**	**401,277**	**337,356**	**3,850**	**374,931**	**462,556**	**684,978**

INDIANA

American Lung Association in Indiana

www.lung.org/indiana

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Allen	4	0	0	1.3	C
Bartholomew	7	0	0	2.3	D
Boone	4	0	0	1.3	C
Brown	2	0	0	0.7	B
Carroll	2	0	0	0.7	B
Clark	11	1	0	4.2	F
Delaware	2	0	0	0.7	B
Dubois	DNC	DNC	DNC	DNC	DNC
Elkhart	7	0	0	2.3	D
Floyd	12	0	0	4.0	F
Greene	6	0	0	2.0	C
Hamilton	5	0	0	1.7	C
Hancock	INC	INC	INC	INC	INC
Hendricks	0	0	0	0.0	A
Henry	DNC	DNC	DNC	DNC	DNC
Howard	DNC	DNC	DNC	DNC	DNC
Huntington	1	0	0	0.3	B
Jackson	3	0	0	1.0	C
Johnson	0	0	0	0.0	A
Knox	4	0	0	1.3	C
Lake	12	0	0	4.0	F
LaPorte	13	0	0	4.3	F
Madison	1	0	0	0.3	B
Marion	11	0	0	3.7	F
Monroe	DNC	DNC	DNC	DNC	DNC
Montgomery	DNC	DNC	DNC	DNC	DNC
Morgan	1	0	0	0.3	B
Perry	6	0	0	2.0	C
Porter	17	0	0	5.7	F
Posey	5	0	0	1.7	C
St. Joseph	13	0	0	4.3	F
Shelby	2	0	0	0.7	B
Spencer	DNC	DNC	DNC	DNC	DNC
Sullivan	DNC	DNC	DNC	DNC	DNC
Tippecanoe	DNC	DNC	DNC	DNC	DNC
Vanderburgh	12	0	0	4.0	F

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Allen	1	1	0	0	0.8	B	8.9	PASS
Bartholomew	0	0	0	0	0.0	A	8.3	PASS
Boone	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Brown	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Carroll	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clark	0	0	0	0	0.0	A	9.6	PASS
Delaware	1	0	0	0	0.3	B	8.1	PASS
Dubois	0	0	0	0	0.0	A	8.9	PASS
Elkhart	5	0	0	0	1.7	C	9.1	PASS
Floyd	1	0	0	0	0.3	B	8.5	PASS
Greene	0	0	0	0	0.0	A	8.1	PASS
Hamilton	0	0	0	0	0.0	A	8.3	PASS
Hancock	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hendricks	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Henry	0	0	0	0	0.0	A	7.5	PASS
Howard	1	0	0	0	0.3	B	9.5	PASS
Huntington	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jackson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Johnson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Knox	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lake	2	2	1	0	2.3	D	9.3	PASS
LaPorte	0	0	0	0	0.0	A	8.1	PASS
Madison	0	0	0	0	0.0	A	8.2	PASS
Marion	6	1	0	0	2.5	D	10.5	PASS
Monroe	0	0	0	0	0.0	A	7.9	PASS
Montgomery	INC	INC	INC	INC	INC	INC	INC	INC
Morgan	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Perry	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Porter	1	1	0	0	0.8	B	8.3	PASS
Posey	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Joseph	1	0	0	0	0.3	B	8.7	PASS
Shelby	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Spencer	0	0	0	0	0.0	A	8.7	PASS
Sullivan	INC	INC	INC	INC	INC	INC	INC	INC
Tippecanoe	0	0	0	0	0.0	A	8.2	PASS
Vanderburgh	0	0	0	0	0.0	A	9.3	PASS

INDIANA (cont.)

American Lung Association in Indiana

www.lung.org/indiana

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Vigo	3	0	0	1.0	C
Wabash	8	0	0	2.7	D
Warrick	9	1	0	3.5	F
Whitley	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Vigo	0	1	0	0	0.5	B	9.0	PASS
Wabash	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Warrick	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Whitley	0	0	0	0	0.0	A	8.1	PASS

IOWA

American Lung Association in Iowa

www.lung.org/iowa

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Black Hawk	132,648	28,836	21,181	1,660	9,658	6,292	85	7,960	9,198	19,469
Bremer	24,911	5,577	4,813	321	1,783	1,270	16	1,669	1,913	1,661
Clinton	47,010	10,859	9,054	625	3,327	2,471	30	3,244	3,756	6,207
Delaware	17,153	4,073	3,219	234	1,204	903	11	1,181	1,375	1,571
Harrison	14,136	3,259	2,764	188	1,000	753	9	990	1,148	1,390
Johnson	149,210	30,215	16,719	1,739	11,210	6,252	96	7,374	8,612	21,574
Lee	34,295	7,362	6,731	424	2,479	1,838	22	2,412	2,793	4,621
Linn	224,115	52,619	34,453	3,029	15,938	10,700	143	13,491	15,752	19,688
Montgomery	10,137	2,293	2,146	132	719	555	6	740	853	1,239
Muscatine	42,880	10,796	6,952	621	2,972	2,072	27	2,649	3,088	4,522
Palo Alto	9,092	2,065	1,966	119	644	488	6	655	748	916
Polk	481,830	120,645	61,337	6,944	33,755	21,370	308	26,142	30,792	45,028
Pottawattamie	93,386	22,142	15,823	1,274	6,592	4,646	60	5,966	6,947	9,661
Scott	172,509	41,198	27,310	2,371	12,185	8,331	110	10,570	12,336	19,061
Story	97,502	16,127	11,330	928	7,679	4,113	63	4,832	5,584	14,508
Van Buren	7,157	1,639	1,526	94	505	392	5	525	604	1,000
Warren	50,163	12,367	7,785	712	3,507	2,405	32	3,046	3,563	2,950
Woodbury	102,429	26,840	15,095	1,545	7,028	4,690	66	5,907	6,892	13,330
Totals	**1,710,563**	**398,912**	**250,204**	**22,961**	**122,186**	**79,542**	**1,095**	**99,351**	**115,953**	**188,396**

IOWA

American Lung Association in Iowa

www.lung.org/iowa

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Black Hawk	DNC	DNC	DNC	DNC	DNC
Bremer	0	0	0	0.0	A
Clinton	1	0	0	0.3	B
Delaware	DNC	DNC	DNC	DNC	DNC
Harrison	1	0	0	0.3	B
Johnson	DNC	DNC	DNC	DNC	DNC
Lee	DNC	DNC	DNC	DNC	DNC
Linn	0	0	0	0.0	A
Montgomery	0	0	0	0.0	A
Muscatine	DNC	DNC	DNC	DNC	DNC
Palo Alto	0	0	0	0.0	A
Polk	0	0	0	0.0	A
Pottawattamie	DNC	DNC	DNC	DNC	DNC
Scott	2	0	0	0.7	B
Story	INC	INC	INC	INC	INC
Van Buren	0	0	0	0.0	A
Warren	0	0	0	0.0	A
Woodbury	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Black Hawk	0	0	0	0	0.0	A	7.9	PASS
Bremer	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clinton	1	0	0	0	0.3	B	8.6	PASS
Delaware	0	0	0	0	0.0	A	INC	INC
Harrison	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Johnson	1	0	0	0	0.3	B	7.7	PASS
Lee	0	0	0	0	0.0	A	8.4	PASS
Linn	2	0	0	0	0.7	B	8.1	PASS
Montgomery	0	0	0	0	0.0	A	6.5	PASS
Muscatine	1	0	0	0	0.3	B	8.3	PASS
Palo Alto	0	0	0	0	0.0	A	6.8	PASS
Polk	2	0	0	0	0.7	B	7.4	PASS
Pottawattamie	0	0	0	0	0.0	A	7.7	PASS
Scott	2	0	0	0	0.7	B	8.7	PASS
Story	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Van Buren	0	0	0	0	0.0	A	6.9	PASS
Warren	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Woodbury	0	0	0	0	0.0	A	INC	INC

KANSAS

American Lung Association in Kansas

www.lung.org/kansas

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Johnson	591,178	145,917	83,028	13,735	40,966	28,573	353	35,984	45,934	30,974
Leavenworth	81,095	19,311	11,348	1,818	5,687	3,937	49	4,945	6,318	5,490
Neosho	16,015	3,897	3,101	367	1,101	857	10	1,143	1,415	2,389
Sedgwick	513,687	132,966	72,113	12,516	35,006	24,203	307	30,564	38,886	72,015
Shawnee	178,187	42,524	31,353	4,003	12,379	9,256	106	12,113	15,146	20,386
Sumner	23,159	5,707	4,190	537	1,590	1,223	14	1,611	2,011	2,687
Trego	2,884	566	707	53	209	178	2	244	298	326
Wyandotte	165,288	46,268	19,813	4,355	10,989	7,284	99	8,994	11,577	30,151
Totals	**1,571,493**	**397,156**	**225,653**	**37,384**	**107,927**	**75,511**	**940**	**95,598**	**121,586**	**164,418**

KANSAS

American Lung Association in Kansas

www.lung.org/kansas

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Johnson	0	0	0	0.0	A
Leavenworth	0	0	0	0.0	A
Neosho	1	0	0	0.3	B
Sedgwick	0	1	0	0.5	B
Shawnee	1	0	0	0.3	B
Sumner	0	0	0	0.0	A
Trego	0	0	0	0.0	A
Wyandotte	3	0	0	1.0	C

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Johnson	0	0	0	0	0.0	A	7.3	PASS
Leavenworth	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Neosho	0	0	0	0	0.0	A	7.8	PASS
Sedgwick	0	0	0	0	0.0	A	7.9	PASS
Shawnee	0	0	0	0	0.0	A	7.7	PASS
Sumner	0	0	0	0	0.0	A	7.0	PASS
Trego	INC	INC	INC	INC	INC	INC	INC	INC
Wyandotte	0	0	0	0	0.0	A	8.8	PASS

KENTUCKY

American Lung Association in Kentucky

www.lung.org/kentucky

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Bell	26,894	5,668	5,067	445	2,312	2,710	25	2,897	2,910	9,494
Boone	130,728	34,416	16,976	2,700	10,442	11,535	119	11,614	11,876	9,250
Boyd	47,979	10,320	9,161	809	4,105	4,838	44	5,194	5,213	9,179
Bullitt	80,246	17,766	12,212	1,394	6,793	7,693	73	7,904	8,043	7,345
Campbell	92,488	19,452	13,999	1,526	7,905	8,752	84	8,941	9,079	9,700
Carter	27,144	6,143	4,967	482	2,286	2,668	25	2,847	2,860	7,430
Christian	70,416	19,007	8,572	1,491	5,463	5,450	65	5,357	5,406	12,545
Daviess	100,374	24,503	16,711	1,922	8,239	9,429	92	9,910	9,990	15,714
Edmonson	12,226	2,293	2,494	180	1,082	1,278	11	1,380	1,381	2,036
Fayette	321,959	67,492	41,564	5,294	27,247	28,153	294	27,726	28,210	50,981
Greenup	35,518	7,620	7,347	598	3,045	3,654	32	3,989	3,983	5,609
Hancock	8,801	2,281	1,450	179	710	826	8	871	880	1,065
Hardin	108,071	26,586	14,805	2,085	8,819	9,700	99	9,810	9,998	13,394
Henderson	45,928	10,687	7,805	838	3,835	4,433	42	4,668	4,712	7,288
Jefferson	771,158	171,882	121,282	13,482	64,853	72,279	702	74,610	75,467	105,999
Jessamine	53,375	13,128	7,751	1,030	4,360	4,852	49	4,963	5,042	7,559
Livingston	9,269	1,898	1,983	149	809	998	8	1,095	1,096	1,406
McCracken	65,385	14,586	12,653	1,144	5,532	6,521	59	7,033	7,042	9,743
Madison	91,226	19,041	12,246	1,494	7,736	8,065	83	8,004	8,129	14,330
Morgan	13,188	2,469	2,105	194	1,163	1,304	12	1,339	1,360	3,418
Oldham	66,415	16,892	8,408	1,325	5,388	6,022	61	6,036	6,204	3,106
Perry	26,553	6,060	4,358	475	2,234	2,586	24	2,702	2,739	6,706
Pike	58,883	12,159	10,696	954	5,096	5,973	54	6,334	6,390	16,502
Pulaski	64,449	14,451	11,981	1,134	5,450	6,414	59	6,864	6,897	15,049
Simpson	18,108	4,381	2,997	344	1,493	1,717	17	1,802	1,820	2,550
Trigg	14,444	3,133	3,209	246	1,241	1,538	13	1,707	1,702	2,011
Warren	128,845	29,322	16,373	2,300	10,647	10,965	118	10,806	10,981	19,562
Washington	12,126	2,828	2,132	222	1,013	1,183	11	1,255	1,265	1,792
Totals	**2,502,196**	**566,464**	**381,304**	**44,433**	**209,297**	**231,537**	**2,284**	**237,658**	**240,674**	**370,763**

KENTUCKY

American Lung Association in Kentucky

www.lung.org/kentucky

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Bell	0	0	0	0.0	A
Boone	1	0	0	0.3	B
Boyd	5	0	0	1.7	C
Bullitt	3	0	0	1.0	C
Campbell	10	0	0	3.3	F
Carter	0	0	0	0.0	A
Christian	0	0	0	0.0	A
Daviess	2	1	0	1.2	C
Edmonson	0	0	0	0.0	A
Fayette	4	0	0	1.3	C
Greenup	0	0	0	0.0	A
Hancock	8	0	0	2.7	D
Hardin	2	0	0	0.7	B
Henderson	6	0	0	2.0	C
Jefferson	22	4	0	9.3	F
Jessamine	2	0	0	0.7	B
Livingston	2	0	0	0.7	B
McCracken	2	0	0	0.7	B
Madison	DNC	DNC	DNC	DNC	DNC
Morgan	2	0	0	0.7	B
Oldham	8	0	0	2.7	D
Perry	0	0	0	0.0	A
Pike	0	0	0	0.0	A
Pulaski	0	0	0	0.0	A
Simpson	2	0	0	0.7	B
Trigg	0	0	0	0.0	A
Warren	0	0	0	0.0	A
Washington	2	0	0	0.7	B

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Bell	1	1	0	0	0.8	B	8.8	PASS
Boone	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Boyd	0	0	0	0	0.0	A	8.0	PASS
Bullitt	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Campbell	0	0	0	0	0.0	A	8.4	PASS
Carter	1	0	0	0	0.3	B	6.7	PASS
Christian	0	0	0	0	0.0	A	8.5	PASS
Daviess	0	0	0	0	0.0	A	8.8	PASS
Edmonson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Fayette	0	0	0	0	0.0	A	8.2	PASS
Greenup	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hancock	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hardin	0	0	0	0	0.0	A	8.5	PASS
Henderson	1	0	0	0	0.3	B	8.9	PASS
Jefferson	1	1	0	0	0.8	B	9.7	PASS
Jessamine	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Livingston	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
McCracken	1	0	0	0	0.3	B	8.6	PASS
Madison	0	0	0	0	0.0	A	7.7	PASS
Morgan	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Oldham	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Perry	0	1	0	0	0.5	B	8.0	PASS
Pike	2	0	0	0	0.7	B	7.4	PASS
Pulaski	0	0	0	0	0.0	A	7.9	PASS
Simpson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Trigg	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Warren	0	0	0	0	0.0	A	8.2	PASS
Washington	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

LOUISIANA

American Lung Association in Louisiana

www.lung.org/louisiana

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Ascension Parish	122,948	33,080	14,039	2,895	7,977	7,770	82	9,302	11,647	15,316
Bossier Parish	127,634	32,024	17,681	2,802	8,421	8,323	85	10,214	12,480	20,997
Caddo Parish	246,581	59,169	40,667	5,178	16,362	17,156	163	21,880	26,193	62,114
Calcasieu Parish	202,445	50,403	29,245	4,410	13,364	13,538	135	16,826	20,480	28,177
East Baton Rouge Parish	446,268	101,307	60,934	8,865	30,451	29,376	296	35,552	43,659	82,191
Iberville Parish	33,027	6,918	5,060	605	2,294	2,349	22	2,932	3,569	6,689
Jefferson Parish	439,036	96,191	72,595	8,417	29,975	31,444	292	39,975	48,065	74,274
Lafayette Parish	242,485	57,539	30,574	5,035	16,376	15,821	161	19,006	23,586	41,306
Lafourche Parish	98,426	23,053	14,789	2,017	6,618	6,817	66	8,536	10,375	15,279
Livingston Parish	138,228	35,800	17,629	3,133	9,053	8,954	92	10,895	13,466	15,669
Orleans Parish	393,292	79,030	55,284	6,915	27,747	27,145	260	32,993	40,598	99,613
Ouachita Parish	155,874	39,012	22,267	3,414	10,277	10,328	103	12,789	15,578	37,173
Pointe Coupee Parish	22,268	5,016	4,351	439	1,492	1,679	15	2,225	2,617	4,167
Rapides Parish	131,648	32,758	20,949	2,866	8,646	9,044	88	11,490	13,810	25,427
St. Bernard Parish	46,202	12,353	5,094	1,081	3,009	2,869	31	3,394	4,265	9,166
St. James Parish	21,367	4,915	3,471	430	1,439	1,533	14	1,956	2,358	3,532
St. John the Baptist Parish	43,441	10,781	5,942	943	2,879	2,939	29	3,636	4,469	7,777
St. Martin Parish	54,171	13,402	7,750	1,173	3,586	3,688	36	4,598	5,616	10,246
St. Tammany Parish	256,327	61,866	41,703	5,414	16,990	18,210	171	23,326	28,059	28,338
Tangipahoa Parish	132,497	32,651	18,468	2,857	8,794	8,759	88	10,776	13,177	26,919
Terrebonne Parish	112,086	28,724	15,422	2,513	7,342	7,429	75	9,185	11,249	21,712
West Baton Rouge Parish	26,265	6,399	3,504	560	1,754	1,751	18	2,143	2,641	3,471
Totals	**3,492,516**	**822,391**	**507,418**	**71,963**	**234,844**	**236,924**	**2,322**	**293,627**	**357,959**	**639,553**

LOUISIANA

American Lung Association in Louisiana

www.lung.org/louisiana

HIGH OZONE DAYS 2015–2017

Parish	Orange	Red	Purple	Wgt. Avg.	Grade
Ascension Parish	11	0	0	3.7	F
Bossier Parish	1	0	0	0.3	B
Caddo Parish	0	0	0	0.0	A
Calcasieu Parish	6	1	0	2.5	D
East Baton Rouge Parish	17	2	0	6.7	F
Iberville Parish	12	0	0	4.0	F
Jefferson Parish	3	0	0	1.0	C
Lafayette Parish	1	0	0	0.3	B
Lafourche Parish	0	0	0	0.0	A
Livingston Parish	7	0	0	2.3	D
Orleans Parish	DNC	DNC	DNC	DNC	DNC
Ouachita Parish	0	0	0	0.0	A
Pointe Coupee Parish	4	0	0	1.3	C
Rapides Parish	DNC	DNC	DNC	DNC	DNC
St. Bernard Parish	2	0	0	0.7	B
St. James Parish	2	0	0	0.7	B
St. John the Baptist Parish	3	0	0	1.0	C
St. Martin Parish	1	0	0	0.3	B
St. Tammany Parish	2	0	0	0.7	B
Tangipahoa Parish	DNC	DNC	DNC	DNC	DNC
Terrebonne Parish	DNC	DNC	DNC	DNC	DNC
West Baton Rouge Parish	8	0	0	2.7	D

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
Parish	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Ascension Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Bossier Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Caddo Parish	0	0	0	0	0.0	A	10.2	PASS
Calcasieu Parish	0	0	0	0	0.0	A	7.6	PASS
East Baton Rouge Parish	2	0	0	0	0.7	B	9.0	PASS
Iberville Parish	0	0	0	0	0.0	A	8.2	PASS
Jefferson Parish	0	0	0	0	0.0	A	7.5	PASS
Lafayette Parish	0	0	0	0	0.0	A	7.6	PASS
Lafourche Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Livingston Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Orleans Parish	0	0	0	0	0.0	A	8.2	PASS
Ouachita Parish	0	0	0	0	0.0	A	INC	INC
Pointe Coupee Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rapides Parish	0	0	0	0	0.0	A	INC	INC
St. Bernard Parish	0	0	0	0	0.0	A	8.5	PASS
St. James Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. John the Baptist Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Martin Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Tammany Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Tangipahoa Parish	0	0	0	0	0.0	A	7.5	PASS
Terrebonne Parish	0	0	0	0	0.0	A	7.1	PASS
West Baton Rouge Parish	0	0	0	0	0.0	A	9.1	PASS

MAINE

American Lung Association in Maine

www.lung.org/maine

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Androscoggin	107,651	23,469	18,496	1,880	9,412	6,272	76	7,658	8,613	12,975
Aroostook	67,653	12,398	15,773	993	6,156	4,518	48	5,761	6,316	9,499
Cumberland	292,500	55,311	52,146	4,430	26,513	17,581	206	21,506	24,117	22,900
Franklin	29,988	5,321	6,474	426	2,751	1,946	21	2,450	2,703	3,950
Hancock	54,497	9,430	12,972	755	5,020	3,692	38	4,716	5,163	5,914
Kennebec	121,821	23,726	23,288	1,900	10,959	7,558	86	9,322	10,447	14,707
Knox	39,790	7,129	9,721	571	3,635	2,686	28	3,462	3,760	4,099
Oxford	57,439	10,714	12,023	858	5,216	3,747	41	4,664	5,218	7,636
Penobscot	151,957	27,771	27,241	2,224	13,880	9,148	107	11,207	12,534	20,627
Sagadahoc	35,392	6,759	7,591	541	3,194	2,292	25	2,880	3,192	3,416
Washington	31,593	5,929	7,548	475	2,857	2,114	22	2,713	2,960	6,473
York	204,191	38,877	40,300	3,114	18,463	12,867	144	15,932	17,818	15,776
Totals	**1,194,472**	**226,834**	**233,573**	**18,167**	**108,055**	**74,423**	**843**	**92,272**	**102,840**	**127,972**

MAINE

American Lung Association in Maine

www.lung.org/maine

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Androscoggin	0	0	0	0.0	A
Aroostook	0	0	0	0.0	A
Cumberland	3	0	0	1.0	C
Franklin	DNC	DNC	DNC	DNC	DNC
Hancock	9	1	0	3.5	F
Kennebec	0	0	0	0.0	A
Knox	5	0	0	1.7	C
Oxford	0	0	0	0.0	A
Penobscot	0	0	0	0.0	A
Sagadahoc	INC	INC	INC	INC	INC
Washington	2	0	0	0.7	B
York	5	1	0	2.2	D

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Androscoggin	0	0	0	0	0.0	A	7.0	Pass
Aroostook	0	1	0	0	0.5	B	7.3	Pass
Cumberland	0	0	0	0	0.0	A	7.0	Pass
Franklin	INC	INC	INC	INC	INC	INC	INC	INC
Hancock	0	0	0	0	0.0	A	4.1	Pass
Kennebec	0	0	0	0	0.0	A	INC	INC
Knox	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Oxford	0	0	0	0	0.0	A	6.6	Pass
Penobscot	0	0	0	0	0.0	A	6.4	Pass
Sagadahoc	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Washington	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
York	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

MARYLAND

American Lung Association in Maryland

www.lung.org/maryland

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Anne Arundel	573,235	127,512	82,263	12,329	42,503	25,323	323	33,460	46,057	34,314
Baltimore	832,468	180,026	139,448	17,406	61,949	38,835	467	52,105	70,307	67,176
Calvert	91,502	21,405	13,194	2,070	6,619	4,144	52	5,516	7,672	5,415
Carroll	167,781	36,659	27,504	3,544	12,345	8,007	94	10,771	14,762	8,298
Cecil	102,746	23,470	15,672	2,269	7,495	4,713	58	6,295	8,668	9,862
Charles	159,700	38,648	19,386	3,737	11,530	6,724	90	8,787	12,403	11,823
Dorchester	32,162	6,802	6,781	658	2,373	1,670	18	2,302	3,037	4,962
Frederick	252,022	58,661	35,571	5,672	18,369	11,133	142	14,739	20,411	16,626
Garrett	29,233	5,503	6,369	532	2,218	1,571	16	2,166	2,861	3,377
Harford	252,160	56,494	39,773	5,462	18,510	11,674	142	15,624	21,391	17,620
Howard	321,113	78,588	42,981	7,598	23,082	13,768	181	18,152	25,229	18,895
Kent	19,384	3,081	5,104	298	1,523	1,126	11	1,575	2,016	2,312
Montgomery	1,058,810	246,303	158,187	23,814	77,262	47,152	595	62,695	85,851	73,280
Prince George's	912,756	203,066	116,434	19,634	68,009	38,678	512	50,438	70,300	76,564
Washington	150,578	33,247	25,321	3,215	11,104	7,080	85	9,524	12,890	19,017
Baltimore City	611,648	126,316	82,925	12,213	46,743	26,133	342	34,075	46,804	130,267
Totals	**5,567,298**	**1,245,781**	**816,913**	**120,450**	**411,636**	**247,727**	**3,127**	**328,225**	**450,660**	**499,808**

MARYLAND

American Lung Association in Maryland

www.lung.org/maryland

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Anne Arundel	18	0	0	6.0	F
Baltimore	41	5	1	16.8	F
Calvert	4	0	0	1.3	C
Carroll	7	0	0	2.3	D
Cecil	20	3	0	8.2	F
Charles	7	0	0	2.3	D
Dorchester	4	0	0	1.3	C
Frederick	6	0	0	2.0	C
Garrett	0	0	0	0.0	A
Harford	22	4	0	9.3	F
Howard	DNC	DNC	DNC	DNC	DNC
Kent	14	0	0	4.7	F
Montgomery	7	0	0	2.3	D
Prince George's	21	1	0	7.5	F
Washington	5	0	0	1.7	C
Baltimore City	12	1	0	4.5	F

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Anne Arundel	INC	INC	INC	INC	INC	INC	INC	INC
Baltimore	0	0	0	0	0.0	A	8.9	PASS
Calvert	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Carroll	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cecil	0	0	0	0	0.0	A	8.4	PASS
Charles	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dorchester	0	0	0	0	0.0	A	7.8	PASS
Frederick	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Garrett	0	0	0	0	0.0	A	5.5	PASS
Harford	1	0	0	0	0.3	B	8.1	PASS
Howard	0	0	0	0	0.0	A	9.1	PASS
Kent	0	0	0	0	0.0	A	7.9	PASS
Montgomery	0	0	0	0	0.0	A	7.4	PASS
Prince George's	0	0	0	0	0.0	A	8.4	PASS
Washington	1	0	0	0	0.3	B	8.6	PASS
Baltimore City	2	0	0	0	0.7	B	8.7	PASS

MASSACHUSETTS

American Lung Association in Massachusetts

www.lung.org/massachusetts

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Barnstable	213,444	32,333	63,768	5,124	19,938	12,769	133	18,656	22,266	15,846
Berkshire	126,313	21,550	28,800	3,415	11,767	6,552	79	9,338	11,420	12,744
Bristol	561,483	116,076	93,547	18,395	50,862	24,890	351	34,519	43,371	60,780
Dukes	17,325	3,051	4,049	483	1,597	914	11	1,304	1,599	1,299
Essex	785,205	168,153	130,723	26,647	70,408	34,672	490	48,103	60,460	78,610
Franklin	70,702	12,453	14,984	1,973	6,561	3,578	44	5,050	6,259	7,218
Hampden	469,818	101,902	77,379	16,148	42,097	20,272	293	28,214	35,150	77,905
Hampshire	161,834	23,974	26,801	3,799	15,927	7,063	101	9,851	12,062	14,206
Middlesex	1,602,947	319,236	240,158	50,590	147,883	67,184	1,002	92,577	116,162	124,404
Norfolk	700,322	147,936	116,110	23,444	63,074	30,882	437	42,831	53,814	45,495
Plymouth	515,142	111,411	90,682	17,655	45,814	23,574	322	32,780	41,318	36,645
Suffolk	797,939	133,837	93,737	21,209	78,053	29,324	498	39,971	49,271	134,360
Worcester	826,116	175,693	126,229	27,842	74,527	35,438	516	48,714	61,838	82,794
Totals	**6,848,590**	**1,367,605**	**1,106,967**	**216,725**	**628,507**	**297,113**	**4,278**	**411,908**	**514,991**	**692,306**

MASSACHUSETTS

American Lung Association in Massachusetts

www.lung.org/massachusetts

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Barnstable	10	0	0	3.3	F
Berkshire	DNC	DNC	DNC	DNC	DNC
Bristol	14	1	0	5.2	F
Dukes	6	2	0	3.0	D
Essex	9	0	0	3.0	D
Franklin	3	0	0	1.0	C
Hampden	12	1	0	4.5	F
Hampshire	10	1	0	3.8	F
Middlesex	2	0	0	0.7	B
Norfolk	8	1	0	3.2	D
Plymouth	6	0	0	2.0	C
Suffolk	4	0	0	1.3	C
Worcester	7	0	0	2.3	D

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Barnstable	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Berkshire	0	0	0	0	0.0	A	6.3	PASS
Bristol	0	0	0	0	0.0	A	6.1	PASS
Dukes	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Essex	0	0	0	0	0.0	A	5.3	PASS
Franklin	0	0	0	0	0.0	A	5.5	PASS
Hampden	0	0	0	0	0.0	A	6.9	PASS
Hampshire	0	0	0	0	0.0	A	INC	INC
Middlesex	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Norfolk	INC	INC	INC	INC	INC	INC	INC	INC
Plymouth	0	0	0	0	0.0	A	5.3	PASS
Suffolk	0	0	0	0	0.0	A	7.2	PASS
Worcester	0	0	0	0	0.0	A	5.9	PASS

MICHIGAN

American Lung Association in Michigan

www.lung.org/michigan

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Allegan	116,447	28,398	18,665	2,488	9,519	7,832	74	9,387	9,946	10,969
Bay	104,239	21,277	20,718	1,864	8,907	7,643	66	9,469	9,917	14,920
Benzie	17,573	3,239	4,486	284	1,519	1,437	11	1,862	1,929	1,627
Berrien	154,259	33,922	29,756	2,972	12,928	11,024	98	13,634	14,280	26,055
Cass	51,381	10,754	10,468	942	4,351	3,849	33	4,791	5,026	6,065
Chippewa	37,711	6,933	6,582	607	3,333	2,625	24	3,159	3,317	5,570
Clinton	78,443	17,645	12,819	1,546	6,575	5,380	50	6,443	6,824	5,718
Genesee	407,385	92,644	69,353	8,117	33,985	28,014	257	33,849	35,720	73,568
Huron	31,280	6,024	7,691	528	2,681	2,513	20	3,238	3,361	4,122
Ingham	290,186	57,751	38,008	5,060	25,466	17,576	183	20,086	21,203	53,746
Kalamazoo	262,985	57,117	38,344	5,004	22,440	16,386	166	19,208	20,206	35,561
Kent	648,594	158,211	85,882	13,862	53,497	39,764	410	46,021	48,892	66,316
Lenawee	98,623	20,970	18,160	1,837	8,365	6,992	63	8,552	8,985	9,679
Macomb	871,375	185,308	144,709	16,236	74,206	60,568	551	72,550	76,805	96,264
Manistee	24,427	4,290	6,140	376	2,138	1,996	16	2,573	2,668	3,110
Mason	29,073	5,901	6,648	517	2,469	2,241	18	2,856	2,969	3,798
Missaukee	14,998	3,472	3,034	304	1,234	1,089	10	1,363	1,425	2,100
Monroe	149,649	32,208	26,266	2,822	12,663	10,681	95	12,930	13,677	17,416
Muskegon	173,693	40,424	28,456	3,542	14,415	11,658	110	14,007	14,784	25,478
Oakland	1,250,836	265,817	204,842	23,290	106,599	86,715	791	103,581	109,764	95,968
Ottawa	286,383	69,249	41,775	6,067	23,619	17,829	181	21,019	22,168	22,831
St. Clair	159,350	33,599	29,085	2,944	13,533	11,644	101	14,181	14,994	19,533
Schoolcraft	8,049	1,351	2,127	118	708	688	5	892	927	1,151
Tuscola	52,764	10,890	10,459	954	4,492	3,927	33	4,859	5,105	7,375
Washtenaw	367,627	68,709	49,147	6,020	32,733	22,842	233	26,130	27,624	44,394
Wayne	1,753,616	416,178	265,150	36,465	145,113	114,437	1,107	135,536	143,598	392,205
Wexford	33,276	7,826	6,223	686	2,734	2,344	21	2,890	3,034	4,425
Totals	**7,474,222**	**1,660,107**	**1,184,993**	**145,455**	**630,222**	**499,691**	**4,724**	**595,065**	**629,146**	**1,049,964**

MICHIGAN

American Lung Association in Michigan

www.lung.org/michigan

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Allegan	17	0	0	5.7	F
Bay	DNC	DNC	DNC	DNC	DNC
Benzie	10	0	0	3.3	F
Berrien	18	0	0	6.0	F
Cass	17	0	0	5.7	F
Chippewa	1	0	0	0.3	B
Clinton	7	0	0	2.3	D
Genesee	11	0	0	3.7	F
Huron	7	0	0	2.3	D
Ingham	6	0	0	2.0	C
Kalamazoo	10	0	0	3.3	F
Kent	10	0	0	3.3	F
Lenawee	3	0	0	1.0	C
Macomb	15	0	0	5.0	F
Manistee	5	0	0	1.7	C
Mason	8	0	0	2.7	D
Missaukee	8	0	0	2.7	D
Monroe	DNC	DNC	DNC	DNC	DNC
Muskegon	15	3	0	6.5	F
Oakland	11	0	0	3.7	F
Ottawa	8	0	0	2.7	D
St. Clair	16	0	0	5.3	F
Schoolcraft	12	0	0	4.0	F
Tuscola	4	0	0	1.3	C
Washtenaw	9	0	0	3.0	D
Wayne	18	0	0	6.0	F
Wexford	7	0	0	2.3	D

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Allegan	0	0	0	0	0.0	A	7.5	PASS
Bay	0	0	0	0	0.0	A	7.1	PASS
Benzie	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Berrien	0	0	0	0	0.0	A	7.8	PASS
Cass	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Chippewa	0	0	0	0	0.0	A	INC	INC
Clinton	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Genesee	0	0	0	0	0.0	A	7.5	PASS
Huron	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Ingham	0	0	0	0	0.0	A	7.7	PASS
Kalamazoo	0	0	0	0	0.0	A	8.4	PASS
Kent	0	1	0	0	0.5	B	9.1	PASS
Lenawee	0	0	0	0	0.0	A	7.8	PASS
Macomb	0	1	0	0	0.5	B	8.2	PASS
Manistee	0	0	0	0	0.0	A	5.9	PASS
Mason	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Missaukee	0	0	0	0	0.0	A	5.1	PASS
Monroe	1	0	0	0	0.3	B	8.2	PASS
Muskegon	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Oakland	1	0	0	0	0.3	B	8.5	PASS
Ottawa	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Clair	0	0	0	0	0.0	A	8.4	PASS
Schoolcraft	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Tuscola	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Washtenaw	0	0	0	0	0.0	A	8.4	PASS
Wayne	5	0	0	0	1.7	C	11.2	PASS
Wexford	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

MINNESOTA

American Lung Association in Minnesota

www.lung.org/minnesota

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Anoka	351,373	84,276	47,582	3,812	19,583	11,534	203	17,283	20,335	18,795
Becker	34,098	8,350	6,884	378	1,873	1,266	20	2,079	2,271	3,909
Beltrami	46,513	11,777	7,239	533	2,545	1,495	27	2,317	2,620	8,329
Carlton	35,498	8,017	6,042	363	2,007	1,266	21	1,989	2,253	3,158
Cook	5,398	858	1,477	39	328	245	3	421	445	471
Crow Wing	64,424	14,059	14,155	636	3,659	2,528	37	4,199	4,546	6,220
Dakota	421,751	103,532	57,393	4,683	23,331	13,727	244	20,620	24,187	24,329
Goodhue	46,304	10,379	8,823	469	2,617	1,727	27	2,781	3,092	3,650
Hennepin	1,252,024	275,532	170,885	12,463	71,730	40,351	724	60,095	70,394	129,217
Lake	10,524	1,931	2,681	87	622	457	6	776	828	869
Lyon	25,831	6,485	3,936	293	1,417	841	15	1,297	1,480	3,027
Mille Lacs	25,872	6,276	4,632	284	1,429	927	15	1,479	1,654	2,782
Olmsted	154,930	37,946	23,252	1,716	8,571	5,081	89	7,795	8,942	12,737
Ramsey	547,974	127,779	77,087	5,780	30,855	17,434	316	26,234	30,402	74,390
St. Louis	200,000	38,171	37,558	1,727	11,819	7,422	116	11,801	13,165	27,827
Scott	145,827	40,626	15,199	1,838	7,737	4,288	84	6,143	7,493	5,759
Stearns	157,822	36,346	23,157	1,644	8,914	5,105	91	7,751	8,921	16,561
Washington	256,348	63,271	36,887	2,862	14,136	8,555	148	13,020	15,146	10,617
Wright	134,286	37,776	16,528	1,709	7,083	4,088	78	6,070	7,182	7,204
Totals	**3,916,797**	**913,387**	**561,397**	**41,315**	**220,257**	**128,337**	**2,264**	**194,152**	**225,357**	**359,851**

MINNESOTA

American Lung Association in Minnesota

www.lung.org/minnesota

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Anoka	1	0	0	0.3	B
Becker	0	0	0	0.0	A
Beltrami	DNC	DNC	DNC	DNC	DNC
Carlton	1	0	0	0.3	B
Cook	DNC	DNC	DNC	DNC	DNC
Crow Wing	0	0	0	0.0	A
Dakota	DNC	DNC	DNC	DNC	DNC
Goodhue	0	0	0	0.0	A
Hennepin	0	0	0	0.0	A
Lake	0	0	0	0.0	A
Lyon	1	0	0	0.3	B
Mille Lacs	0	0	0	0.0	A
Olmsted	0	0	0	0.0	A
Ramsey	DNC	DNC	DNC	DNC	DNC
St. Louis	0	0	0	0.0	A
Scott	0	0	0	0.0	A
Stearns	0	0	0	0.0	A
Washington	0	0	0	0.0	A
Wright	1	0	0	0.3	B

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Anoka	2	0	0	0	0.7	B	6.7	PASS
Becker	2	0	0	0	0.7	B	4.8	PASS
Beltrami	2	0	0	0	0.7	B	5.2	PASS
Carlton	1	0	0	0	0.3	B	INC	INC
Cook	INC	INC	INC	INC	INC	INC	INC	INC
Crow Wing	2	0	0	0	0.7	B	5.8	PASS
Dakota	1	0	0	0	0.3	B	6.7	PASS
Goodhue	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hennepin	2	0	0	0	0.7	B	8.0	PASS
Lake	1	0	0	0	0.3	B	4.0	PASS
Lyon	1	0	0	0	0.3	B	5.0	PASS
Mille Lacs	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Olmsted	2	0	0	0	0.7	B	6.7	PASS
Ramsey	3	1	0	0	1.5	C	7.5	PASS
St. Louis	1	0	0	0	0.3	B	5.2	PASS
Scott	0	0	0	0	0.0	A	6.4	PASS
Stearns	0	1	0	0	0.5	B	5.7	PASS
Washington	2	0	0	0	0.7	B	6.4	PASS
Wright	1	0	0	0	0.3	B	6.3	PASS

MISSISSIPPI

American Lung Association in Mississippi

www.lung.org/mississippi

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Bolivar	31,945	7,778	4,875	885	1,989	1,975	24	2,739	3,391	9,765
DeSoto	178,751	46,276	22,578	5,264	10,913	10,635	133	14,352	18,220	15,440
Forrest	75,471	17,411	10,080	1,981	4,716	4,439	56	5,985	7,458	16,401
Grenada	21,087	4,999	3,713	569	1,340	1,398	16	1,987	2,442	4,246
Hancock	47,053	9,956	8,996	1,133	3,114	3,330	35	4,775	5,873	7,921
Harrison	205,027	49,384	29,702	5,618	12,824	12,680	153	17,424	21,775	39,266
Hinds	239,497	58,754	32,519	6,683	14,822	14,370	177	19,537	24,493	46,575
Jackson	142,152	33,494	21,935	3,810	9,015	9,137	106	12,688	15,847	20,359
Lauderdale	76,155	18,009	12,810	2,049	4,820	4,936	57	6,956	8,567	14,922
Lee	84,933	21,629	12,281	2,460	5,234	5,232	63	7,213	9,027	11,739
Yalobusha	12,497	2,829	2,427	322	809	865	9	1,248	1,521	2,626
Totals	**1,114,568**	**270,519**	**161,916**	**30,772**	**69,597**	**68,997**	**829**	**94,902**	**118,615**	**189,260**

MISSISSIPPI

American Lung Association in Mississippi

www.lung.org/mississippi

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Bolivar	0	0	0	0.0	A
DeSoto	1	0	0	0.3	B
Forrest	DNC	DNC	DNC	DNC	DNC
Grenada	DNC	DNC	DNC	DNC	DNC
Hancock	0	0	0	0.0	A
Harrison	3	0	0	1.0	C
Hinds	0	0	0	0.0	A
Jackson	1	0	0	0.3	B
Lauderdale	0	0	0	0.0	A
Lee	0	0	0	0.0	A
Yalobusha	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Bolivar	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
DeSoto	0	0	0	0	0.0	A	8.1	Pass
Forrest	0	0	0	0	0.0	A	8.9	Pass
Grenada	0	0	0	0	0.0	A	7.2	Pass
Hancock	0	0	0	0	0.0	A	8.1	Pass
Harrison	0	0	0	0	0.0	A	8.1	Pass
Hinds	0	0	0	0	0.0	A	8.9	Pass
Jackson	0	0	0	0	0.0	A	8.3	Pass
Lauderdale	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lee	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Yalobusha	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

MISSOURI

American Lung Association in Missouri

www.lung.org/missouri

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Andrew	17,555	4,017	3,273	390	1,257	1,243	13	1,522	1,539	1,378
Boone	178,271	36,168	21,123	3,508	13,350	10,135	128	11,807	11,976	25,432
Buchanan	89,065	20,244	13,891	1,963	6,420	5,764	65	6,925	7,022	13,197
Callaway	45,032	9,458	7,102	917	3,318	2,996	33	3,591	3,651	5,033
Cass	103,724	25,297	17,126	2,453	7,298	6,921	75	8,372	8,501	9,435
Cedar	14,073	3,367	3,255	327	991	1,053	10	1,331	1,324	2,377
Clay	242,874	58,948	33,562	5,717	17,174	15,060	175	17,855	18,230	17,794
Clinton	20,554	4,833	3,660	469	1,460	1,435	15	1,747	1,772	2,229
Greene	289,805	60,664	46,801	5,883	21,415	18,549	209	22,412	22,529	45,036
Jackson	698,895	165,940	101,792	16,093	49,749	44,002	503	52,487	53,407	94,910
Jasper	120,217	30,199	18,329	2,929	8,403	7,461	87	8,987	9,083	19,719
Jefferson	223,810	52,350	32,419	5,077	15,971	14,737	162	17,482	17,954	23,704
Lincoln	56,183	14,315	7,430	1,388	3,904	3,520	41	4,146	4,269	5,436
Monroe	8,612	1,888	1,968	183	622	662	6	831	831	1,146
Perry	19,225	4,513	3,380	438	1,368	1,320	14	1,607	1,627	1,837
St. Charles	395,504	93,319	58,031	9,050	28,175	25,517	285	30,393	31,049	20,661
Ste. Genevieve	17,843	3,899	3,372	378	1,294	1,306	13	1,595	1,619	1,885
St. Louis	996,726	219,750	176,498	21,311	72,298	68,716	716	83,637	84,555	97,993
Taney	55,355	11,669	11,758	1,132	4,059	4,003	40	4,997	4,978	7,401
St. Louis City	308,626	59,774	40,262	5,797	23,304	19,101	222	22,385	22,853	64,108
Totals	**3,901,949**	**880,612**	**605,032**	**85,402**	**281,829**	**253,501**	**2,811**	**304,108**	**308,769**	**460,711**

MISSOURI

American Lung Association in Missouri

www.lung.org/missouri

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Andrew	1	0	0	0.3	B
Boone	0	0	0	0.0	A
Buchanan	DNC	DNC	DNC	DNC	DNC
Callaway	1	0	0	0.3	B
Cass	2	0	0	0.7	B
Cedar	0	0	0	0.0	A
Clay	9	0	0	3.0	D
Clinton	5	0	0	1.7	C
Greene	0	0	0	0.0	A
Jackson	DNC	DNC	DNC	DNC	DNC
Jasper	0	0	0	0.0	A
Jefferson	3	0	0	1.0	C
Lincoln	2	0	0	0.7	B
Monroe	0	0	0	0.0	A
Perry	2	0	0	0.7	B
St. Charles	17	2	0	6.7	F
Ste. Genevieve	4	0	0	1.3	C
St. Louis	11	0	0	3.7	F
Taney	0	0	0	0.0	A
St. Louis City	3	0	0	1.0	C

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Andrew	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Boone	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Buchanan	1	0	0	0	0.3	B	8.8	PASS
Callaway	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cass	1	0	0	0	0.3	B	7.3	PASS
Cedar	0	0	0	0	0.0	A	6.8	PASS
Clay	2	0	0	0	0.7	B	7.1	PASS
Clinton	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Greene	0	0	0	0	0.0	A	INC	INC
Jackson	3	0	0	0	1.0	C	9.0	PASS
Jasper	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jefferson	3	0	0	0	1.0	C	9.3	PASS
Lincoln	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Monroe	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Perry	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Charles	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Ste. Genevieve	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Louis	2	0	0	0	0.7	B	9.5	PASS
Taney	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Louis City	3	2	0	0	2.0	C	9.0	PASS

MONTANA

American Lung Association in Montana

www.lung.org/montana

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Fergus	11,291	2,380	2,664	204	800	620	6	792	789	1,396
Flathead	100,000	22,100	18,805	1,895	7,038	5,066	52	6,196	6,399	10,824
Gallatin	107,810	21,733	13,075	1,864	8,000	4,523	56	5,011	5,415	10,195
Lewis and Clark	67,773	14,599	12,239	1,252	4,817	3,390	35	4,106	4,266	5,474
Lincoln	19,440	3,540	5,401	304	1,410	1,194	10	1,564	1,542	3,001
Missoula	117,441	22,463	17,656	1,926	8,760	5,358	61	6,195	6,528	16,351
Phillips	4,119	985	886	84	281	218	2	276	279	585
Powder River	1,752	294	446	25	130	105	1	135	136	209
Ravalli	42,563	8,262	10,661	708	3,063	2,458	22	3,165	3,151	5,275
Richland	11,039	2,823	1,580	242	748	497	6	580	620	957
Rosebud	9,248	2,688	1,391	230	596	408	5	486	512	1,577
Silver Bow	34,602	7,026	6,420	602	2,506	1,736	18	2,106	2,173	5,487
Yellowstone	158,980	37,545	26,229	3,220	11,065	7,452	83	8,905	9,288	15,983
Totals	**686,058**	**146,438**	**117,453**	**12,557**	**49,213**	**33,026**	**359**	**39,518**	**41,098**	**77,314**

MONTANA

American Lung Association in Montana

www.lung.org/montana

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Fergus	0	0	0	0.0	A
Flathead	0	0	0	0.0	A
Gallatin	DNC	DNC	DNC	DNC	DNC
Lewis and Clark	0	0	0	0.0	A
Lincoln	DNC	DNC	DNC	DNC	DNC
Missoula	0	0	0	0.0	A
Phillips	0	0	0	0.0	A
Powder River	0	0	0	0.0	A
Ravalli	DNC	DNC	DNC	DNC	DNC
Richland	0	0	0	0.0	A
Rosebud	0	0	0	0.0	A
Silver Bow	DNC	DNC	DNC	DNC	DNC
Yellowstone	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Fergus	11	5	0	0	6.2	F	5.1	PASS
Flathead	8	12	3	0	10.7	F	9.1	PASS
Gallatin	8	3	0	1	5.0	F	INC	INC
Lewis and Clark	32	17	0	0	19.2	F	9.8	PASS
Lincoln	13	18	2	0	14.7	F	13.0	FAIL
Missoula	16	21	1	0	16.5	F	11.4	PASS
Phillips	7	4	0	0	4.3	F	5.7	PASS
Powder River	8	6	0	0	5.7	F	7.8	PASS
Ravalli	42	28	2	0	29.3	F	11.7	PASS
Richland	4	4	0	0	3.3	F	INC	INC
Rosebud	8	6	0	0	5.7	F	6.5	PASS
Silver Bow	24	10	0	0	13.0	F	10.3	PASS
Yellowstone	7	0	0	0	2.3	D	INC	INC

NEBRASKA

American Lung Association in Nebraska

www.lung.org/nebraska

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Douglas	561,620	144,522	71,090	8,860	34,655	22,403	328	30,638	39,392	62,619
Hall	61,519	16,758	9,003	1,027	3,694	2,572	36	3,626	4,535	7,247
Knox	8,472	2,058	2,060	126	516	451	5	693	800	1,034
Lancaster	314,358	72,148	42,403	4,423	20,118	12,714	184	17,460	22,295	33,985
Sarpy	181,439	50,162	20,488	3,075	10,937	6,944	106	9,353	12,213	9,108
Scotts Bluff	36,363	9,109	6,750	558	2,228	1,688	21	2,473	2,982	4,733
Washington	20,721	4,928	3,642	302	1,295	984	12	1,421	1,742	1,458
Totals	**2,556,608**	**592,561**	**390,342**	**43,487**	**171,868**	**113,808**	**1,409**	**144,701**	**166,157**	**274,812**

NEBRASKA

American Lung Association in Nebraska

www.lung.org/nebraska

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Douglas	1	0	0	0.3	B
Hall	DNC	DNC	DNC	DNC	DNC
Knox	1	0	0	0.3	B
Lancaster	0	0	0	0.0	A
Sarpy	DNC	DNC	DNC	DNC	DNC
Scotts Bluff	DNC	DNC	DNC	DNC	DNC
Washington	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Douglas	3	0	0	0	1.0	C	8.9	PASS
Hall	0	0	0	0	0.0	A	5.9	PASS
Knox	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lancaster	0	0	0	0	0.0	A	6.4	PASS
Sarpy	2	0	0	0	0.7	B	8.7	PASS
Scotts Bluff	1	0	0	0	0.3	B	INC	INC
Washington	0	0	0	0	0.0	A	6.6	PASS

NEVADA

American Lung Association in Nevada

www.lung.org/nevada

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Churchill	24,230	5,536	4,501	429	1,937	1,412	11	1,732	2,106	2,747
Clark	2,204,079	514,192	317,010	39,891	176,845	115,546	1,026	139,163	169,997	305,802
Douglas	48,309	8,336	13,128	647	4,073	3,518	22	4,418	5,351	3,931
Elko	52,649	14,476	5,705	1,123	4,021	2,477	24	2,948	3,640	5,476
Lyon	54,122	11,736	11,425	910	4,368	3,373	25	4,172	5,064	5,779
Washoe	460,587	100,677	73,095	7,811	37,552	25,464	214	30,861	37,681	50,261
White Pine	9,592	1,915	1,667	149	799	556	4	677	825	1,131
Carson City	54,745	11,065	11,026	858	4,515	3,386	25	4,171	5,073	5,679
Totals	**2,908,313**	**667,933**	**437,557**	**51,818**	**234,109**	**155,732**	**1,354**	**188,143**	**229,737**	**380,806**

NEVADA

American Lung Association in Nevada

www.lung.org/nevada

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Churchill	6	0	0	2.0	C
Clark	63	2	0	22.0	F
Douglas	DNC	DNC	DNC	DNC	DNC
Elko	INC	INC	INC	INC	INC
Lyon	8	0	0	2.7	D
Washoe	21	0	0	7.0	F
White Pine	2	0	0	0.7	B
Carson City	2	0	0	0.7	B

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Churchill	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clark	9	1	0	0	3.5	F	9.8	PASS
Douglas	8	3	0	0	4.2	F	7.9	PASS
Elko	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lyon	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Washoe	3	0	0	0	1.0	C	7.6	PASS
White Pine	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Carson City	2	1	0	0	1.2	C	5.0	PASS

NEW HAMPSHIRE

American Lung Association in New Hampshire

www.lung.org/newhampshire

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Belknap	60,785	11,326	13,093	817	6,487	3,584	38	3,948	4,601	4,953
Cheshire	75,960	13,720	14,671	990	8,259	4,256	48	4,554	5,346	6,687
Coos	31,634	5,230	7,339	377	3,452	1,937	20	2,160	2,503	3,415
Grafton	89,386	14,701	17,925	1,060	9,913	5,083	56	5,464	6,387	7,770
Hillsborough	409,697	84,639	62,856	6,105	43,549	21,362	258	21,780	26,177	31,832
Merrimack	149,216	28,806	26,517	2,078	16,015	8,180	94	8,608	10,204	10,392
Rockingham	306,363	60,226	52,881	4,344	32,694	16,927	193	17,714	21,136	15,533
Totals	**1,123,041**	**218,648**	**195,282**	**15,771**	**120,369**	**61,328**	**707**	**64,228**	**76,354**	**80,582**

NEW HAMPSHIRE

American Lung Association in New Hampshire

www.lung.org/newhampshire

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Belknap	0	0	0	0.0	A
Cheshire	1	0	0	0.3	B
Coos	7	0	0	2.3	D
Grafton	0	0	0	0.0	A
Hillsborough	6	0	0	2.0	C
Merrimack	1	0	0	0.3	B
Rockingham	6	0	0	2.0	C

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Belknap	0	0	0	0	0.0	A	4.7	PASS
Cheshire	0	1	0	0	0.5	B	6.5	PASS
Coos	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Grafton	0	0	0	0	0.0	A	5.8	PASS
Hillsborough	0	0	0	0	0.0	A	4.6	PASS
Merrimack	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rockingham	0	0	0	0	0.0	A	5.8	PASS

NEW JERSEY

American Lung Association in New Jersey

www.lung.org/newjersey

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Atlantic	269,918	58,018	46,703	4,815	18,161	13,282	151	16,693	24,389	38,092
Bergen	948,406	201,468	159,694	16,722	63,972	46,413	531	57,970	84,999	62,037
Camden	510,719	116,529	77,865	9,672	33,579	23,760	286	29,143	42,972	58,696
Cumberland	152,538	36,267	22,819	3,010	9,864	6,929	86	8,468	12,445	26,129
Essex	808,285	190,779	107,641	15,835	52,391	35,904	452	42,909	64,082	123,806
Gloucester	292,206	64,660	44,846	5,367	19,477	13,865	164	17,046	25,261	19,238
Hudson	691,643	139,805	79,986	11,604	46,041	29,693	388	33,859	50,884	96,125
Hunterdon	125,059	24,795	22,251	2,058	8,722	6,511	70	8,253	12,216	4,793
Mercer	374,733	79,884	55,346	6,630	25,058	17,480	210	21,204	31,409	40,622
Middlesex	842,798	182,065	122,235	15,111	56,101	38,962	472	47,106	69,849	69,518
Monmouth	626,351	133,890	106,513	11,113	42,459	31,155	351	39,131	57,649	45,085
Morris	499,693	106,917	82,840	8,874	33,787	24,576	280	30,686	45,267	24,225
Ocean	597,943	142,047	133,920	11,790	39,051	30,783	334	40,996	57,414	60,406
Passaic	512,607	122,618	72,866	10,177	33,108	23,036	287	27,900	41,309	82,865
Union	563,892	131,357	79,612	10,903	36,831	25,655	316	31,045	46,198	52,052
Warren	106,798	21,523	18,811	1,786	7,358	5,430	60	6,848	10,069	7,770
Totals	**7,923,589**	**1,752,622**	**1,233,948**	**145,467**	**525,962**	**373,433**	**4,436**	**459,257**	**676,415**	**811,459**

NEW JERSEY

American Lung Association in New Jersey

www.lung.org/newjersey

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Atlantic	3	0	0	1.0	C
Bergen	25	1	0	8.8	F
Camden	31	1	0	10.8	F
Cumberland	3	0	0	1.0	C
Essex	9	0	0	3.0	D
Gloucester	18	0	0	6.0	F
Hudson	20	1	0	7.2	F
Hunterdon	14	1	0	5.2	F
Mercer	26	1	0	9.2	F
Middlesex	26	1	0	9.2	F
Monmouth	9	1	0	3.5	F
Morris	8	1	0	3.2	D
Ocean	17	2	0	6.7	F
Passaic	13	0	0	4.3	F
Union	DNC	DNC	DNC	DNC	DNC
Warren	5	0	0	1.7	C

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Atlantic	0	0	0	0	0.0	A	7.3	PASS
Bergen	1	0	0	0	0.3	B	8.5	PASS
Camden	4	0	0	0	1.3	C	10.3	PASS
Cumberland	INC	INC	INC	INC	INC	INC	INC	INC
Essex	0	0	0	0	0.0	A	8.6	PASS
Gloucester	0	0	0	0	0.0	A	INC	INC
Hudson	0	0	0	0	0.0	A	8.4	PASS
Hunterdon	INC	INC	INC	INC	INC	INC	INC	INC
Mercer	0	0	0	0	0.0	A	7.7	PASS
Middlesex	0	0	0	0	0.0	A	INC	INC
Monmouth	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Morris	0	0	0	0	0.0	A	6.4	PASS
Ocean	1	0	0	0	0.3	B	6.9	PASS
Passaic	0	0	0	0	0.0	A	8.0	PASS
Union	1	0	0	0	0.3	B	9.7	PASS
Warren	0	0	0	0	0.0	A	8.6	PASS

NEW MEXICO

American Lung Association in New Mexico

www.lung.org/newmexico

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Bernalillo	676,773	149,686	106,580	13,930	55,794	30,803	261	37,640	54,895	97,103
Doña Ana	215,579	53,579	33,137	4,986	17,191	9,093	83	11,210	16,280	55,541
Eddy	56,997	15,018	8,259	1,398	4,450	2,443	22	2,972	4,349	9,492
Lea	68,759	20,682	7,743	1,925	5,157	2,606	27	3,097	4,623	10,704
Rio Arriba	39,159	9,292	7,313	865	3,114	1,905	15	2,378	3,403	11,221
Sandoval	142,507	33,537	24,348	3,121	11,440	6,718	55	8,289	11,977	21,684
San Juan	126,926	34,390	18,090	3,200	9,812	5,377	49	6,536	9,570	28,936
Santa Fe	148,750	27,436	34,519	2,553	12,500	8,106	57	10,350	14,553	17,838
Taos	32,795	5,926	8,297	551	2,747	1,858	13	2,398	3,342	7,405
Valencia	75,940	17,961	13,049	1,672	6,084	3,579	29	4,421	6,382	12,951
Totals	**1,584,185**	**367,507**	**261,335**	**34,201**	**128,289**	**72,486**	**611**	**89,291**	**129,375**	**272,875**

NEW MEXICO

American Lung Association in New Mexico

www.lung.org/newmexico

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Bernalillo	8	0	0	2.7	D
Doña Ana	34	1	0	11.8	F
Eddy	10	0	0	3.3	F
Lea	3	0	0	1.0	C
Rio Arriba	3	0	0	1.0	C
Sandoval	1	0	0	0.3	B
San Juan	9	0	0	3.0	D
Santa Fe	0	0	0	0.0	A
Taos	DNC	DNC	DNC	DNC	DNC
Valencia	1	0	0	0.3	B

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Bernalillo	0	0	0	0	0.0	A	7.2	PASS
Doña Ana	4	1	0	0	1.8	C	9.0	PASS
Eddy	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lea	1	1	0	0	0.8	B	7.5	PASS
Rio Arriba	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Sandoval	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
San Juan	INC	INC	INC	INC	INC	INC	INC	INC
Santa Fe	INC	INC	INC	INC	INC	INC	INC	INC
Taos	INC	INC	INC	INC	INC	INC	INC	INC
Valencia	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

NEW YORK

American Lung Association in New York

www.lung.org/newyork

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Albany	309,612	57,509	50,798	5,144	23,122	13,035	186	18,432	25,773	33,186
Bronx	1,471,160	365,774	181,313	32,719	101,218	53,635	884	73,061	104,165	400,473
Chautauqua	129,046	26,352	25,231	2,357	9,481	5,881	78	8,606	11,869	21,835
Dutchess	295,568	56,452	50,271	5,050	22,098	13,199	179	18,752	26,313	28,178
Erie	925,528	188,721	161,921	16,881	67,901	40,362	557	57,885	80,619	130,831
Essex	37,956	6,189	8,508	554	2,941	1,900	23	2,821	3,866	3,778
Franklin	51,116	9,856	8,257	882	3,799	2,189	31	3,087	4,337	8,454
Hamilton	4,485	620	1,359	55	361	265	3	412	553	436
Herkimer	62,240	12,990	12,448	1,162	4,555	2,877	38	4,228	5,824	8,679
Jefferson	114,187	27,383	14,936	2,449	7,915	4,119	69	5,665	8,001	16,133
Kings	2,648,771	605,655	356,714	54,177	186,719	99,106	1,592	136,596	193,116	518,422
Monroe	747,642	156,669	124,996	14,014	54,402	31,790	450	45,289	63,257	105,493
New York	1,664,727	239,543	266,384	21,427	129,929	69,024	1,000	96,435	135,001	262,605
Niagara	211,328	42,453	39,168	3,797	15,622	9,636	127	13,933	19,371	25,656
Onondaga	465,398	99,681	77,203	8,917	33,697	19,794	280	28,177	39,403	61,647
Orange	382,226	97,396	52,106	8,712	26,265	14,949	231	20,730	29,439	40,379
Oswego	118,478	24,948	18,786	2,232	8,640	5,086	72	7,167	10,099	18,492
Putnam	99,323	19,847	16,583	1,775	7,380	4,522	60	6,403	9,033	5,305
Queens	2,358,582	473,915	354,809	42,392	173,188	97,117	1,421	135,506	191,211	285,222
Richmond	479,458	104,843	75,801	9,378	34,548	20,178	289	28,491	40,053	56,434
Rockland	328,868	91,816	50,897	8,213	21,833	12,850	198	18,353	25,608	43,147
Saratoga	229,869	46,829	40,141	4,189	16,924	10,253	139	14,675	20,513	14,898
Steuben	96,281	20,897	18,463	1,869	6,973	4,368	58	6,380	8,819	12,161
Suffolk	1,492,953	319,381	244,461	28,569	108,549	65,009	901	92,167	129,563	102,014
Tompkins	104,802	15,466	14,454	1,383	8,107	4,017	63	5,466	7,727	17,027
Wayne	90,670	19,550	16,561	1,749	6,594	4,126	55	5,964	8,307	10,866
Westchester	980,244	217,479	162,696	19,454	70,420	41,972	590	59,811	83,718	81,192
Totals	**15,900,518**	**3,348,214**	**2,445,265**	**299,503**	**1,153,180**	**651,261**	**9,575**	**914,492**	**1,285,558**	**2,312,943**

NEW YORK

American Lung Association in New York

www.lung.org/newyork

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Albany	2	0	0	0.7	B
Bronx	11	0	0	3.7	F
Chautauqua	10	0	0	3.3	F
Dutchess	8	0	0	2.7	D
Erie	11	0	0	3.7	F
Essex	2	0	0	0.7	B
Franklin	4	0	0	1.3	C
Hamilton	2	0	0	0.7	B
Herkimer	4	0	0	1.3	C
Jefferson	3	0	0	1.0	C
Kings	DNC	DNC	DNC	DNC	DNC
Monroe	5	0	0	1.7	C
New York	10	0	0	3.3	F
Niagara	5	0	0	1.7	C
Onondaga	2	0	0	0.7	B
Orange	5	0	0	1.7	C
Oswego	2	0	0	0.7	B
Putnam	9	1	0	3.5	F
Queens	16	1	0	5.8	F
Richmond	26	1	0	9.2	F
Rockland	10	0	0	3.3	F
Saratoga	4	0	0	1.3	C
Steuben	2	0	0	0.7	B
Suffolk	29	2	0	10.7	F
Tompkins	2	0	0	0.7	B
Wayne	3	0	0	1.0	C
Westchester	20	0	0	6.7	F

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Albany	0	0	0	0	0.0	A	7.0	PASS
Bronx	0	0	0	0	0.0	A	8.6	PASS
Chautauqua	0	0	0	0	0.0	A	6.6	PASS
Dutchess	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Erie	0	0	0	0	0.0	A	7.8	PASS
Essex	0	0	0	0	0.0	A	3.9	PASS
Franklin	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hamilton	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Herkimer	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jefferson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Kings	0	0	0	0	0.0	A	8.2	PASS
Monroe	0	0	0	0	0.0	A	7.0	PASS
New York	0	0	0	0	0.0	A	9.7	PASS
Niagara	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Onondaga	0	0	0	0	0.0	A	5.5	PASS
Orange	0	0	0	0	0.0	A	6.6	PASS
Oswego	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Putnam	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Queens	0	0	0	0	0.0	A	7.3	PASS
Richmond	0	0	0	0	0.0	A	7.7	PASS
Rockland	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Saratoga	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Steuben	0	0	0	0	0.0	A	5.0	PASS
Suffolk	0	0	0	0	0.0	A	6.9	PASS
Tompkins	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wayne	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Westchester	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

NORTH CAROLINA

American Lung Association in North Carolina

www.lung.org/northcarolina

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Alamance	162,391	36,657	27,212	4,212	11,665	10,064	111	12,119	14,808	22,721
Alexander	37,286	7,596	7,405	873	2,774	2,536	26	3,098	3,723	4,182
Avery	17,536	2,696	3,719	310	1,379	1,243	12	1,517	1,816	2,806
Buncombe	257,607	48,446	49,934	5,567	19,394	17,163	176	20,841	25,102	28,715
Caldwell	81,981	16,785	15,861	1,929	6,104	5,574	56	6,800	8,211	13,222
Carteret	68,881	12,361	16,698	1,420	5,324	5,227	47	6,495	7,647	9,050
Caswell	22,646	4,244	4,724	488	1,726	1,607	16	1,970	2,363	4,117
Catawba	157,974	35,595	27,317	4,090	11,400	10,029	108	12,126	14,783	19,427
Chatham	71,472	14,542	16,959	1,671	5,359	5,265	49	6,545	7,693	7,305
Cumberland	332,546	81,988	39,113	9,422	22,737	16,899	229	19,583	24,755	58,888
Davidson	165,466	36,710	29,586	4,219	12,033	10,762	114	13,059	15,882	24,941
Duplin	59,039	14,282	10,521	1,641	4,166	3,710	41	4,504	5,449	12,119
Durham	311,640	65,988	39,429	7,583	22,401	17,034	213	19,843	25,045	47,090
Edgecombe	52,747	12,107	9,965	1,391	3,792	3,438	36	4,193	5,047	13,222
Forsyth	376,320	87,349	58,535	10,038	26,728	22,469	257	26,874	33,092	60,638
Franklin	66,168	14,750	10,821	1,695	4,794	4,162	46	5,009	6,159	10,129
Gaston	220,182	50,111	34,831	5,759	15,785	13,440	151	16,112	19,843	32,751
Graham	8,541	1,765	1,989	203	636	616	6	765	899	1,518
Granville	59,557	12,156	9,953	1,397	4,424	3,849	41	4,634	5,702	7,037
Guilford	526,953	118,163	78,185	13,579	37,688	30,930	360	36,766	45,558	73,862
Haywood	61,084	11,189	14,927	1,286	4,685	4,584	42	5,698	6,683	8,779
Jackson	42,973	7,354	8,218	845	3,272	2,794	30	3,372	4,060	6,656
Johnston	196,708	50,573	25,622	5,812	13,533	11,025	135	13,040	16,377	29,365
Lee	60,430	14,657	9,615	1,684	4,246	3,633	41	4,363	5,353	8,760
Lenoir	56,883	12,711	11,013	1,461	4,127	3,773	39	4,610	5,540	13,882
Lincoln	82,403	17,576	14,385	2,020	6,069	5,404	57	6,541	8,001	10,218
McDowell	45,159	9,278	9,068	1,066	3,355	3,085	31	3,775	4,530	7,138
Macon	34,732	6,567	9,778	755	2,653	2,747	24	3,463	3,976	5,585
Martin	22,789	4,628	5,107	532	1,708	1,645	16	2,034	2,410	4,645
Mecklenburg	1,076,837	257,248	117,564	29,562	74,835	55,776	737	64,438	82,535	120,634
Mitchell	15,072	2,768	3,759	318	1,157	1,143	10	1,424	1,666	2,466
Montgomery	27,435	6,184	5,475	711	1,984	1,827	19	2,238	2,676	4,719
New Hanover	227,198	42,857	39,318	4,925	16,972	14,269	155	17,112	20,869	34,283
Person	39,370	8,380	7,501	963	2,902	2,648	27	3,230	3,903	5,882
Pitt	179,042	38,559	22,879	4,431	12,767	9,629	122	11,209	14,099	37,388

NORTH CAROLINA (cont.)

American Lung Association in North Carolina

www.lung.org/northcarolina

				AT-RISK GROUPS						
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Rockingham	90,949	18,577	18,119	2,135	6,788	6,275	62	7,678	9,242	14,628
Rowan	140,644	31,530	24,068	3,623	10,145	8,849	97	10,682	13,031	20,790
Swain	14,294	3,189	2,702	366	1,033	927	10	1,129	1,358	2,226
Union	231,366	63,059	28,554	7,246	15,632	12,755	159	15,068	19,025	20,824
Wake	1,072,203	259,375	120,454	29,806	74,531	56,725	735	65,869	84,159	93,924
Watauga	55,121	7,198	8,628	827	4,338	3,309	38	3,878	4,801	10,129
Wayne	124,172	29,112	20,039	3,345	8,785	7,444	85	8,931	10,932	24,577
Yancey	17,744	3,291	4,483	378	1,359	1,348	12	1,682	1,963	2,903
Totals	**6,971,541**	**1,580,151**	**1,024,033**	**181,584**	**497,181**	**407,636**	**4,777**	**484,318**	**600,768**	**944,141**

NORTH CAROLINA

American Lung Association in North Carolina

www.lung.org/northcarolina

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Alamance	DNC	DNC	DNC	DNC	DNC
Alexander	0	0	0	0.0	A
Avery	3	0	0	1.0	C
Buncombe	1	0	0	0.3	B
Caldwell	0	0	0	0.0	A
Carteret	0	0	0	0.0	A
Caswell	0	0	0	0.0	A
Catawba	DNC	DNC	DNC	DNC	DNC
Chatham	INC	INC	INC	INC	INC
Cumberland	0	0	0	0.0	A
Davidson	DNC	DNC	DNC	DNC	DNC
Duplin	DNC	DNC	DNC	DNC	DNC
Durham	0	0	0	0.0	A
Edgecombe	0	0	0	0.0	A
Forsyth	6	0	0	2.0	C
Franklin	INC	INC	INC	INC	INC
Gaston	DNC	DNC	DNC	DNC	DNC
Graham	1	0	0	0.3	B
Granville	0	0	0	0.0	A
Guilford	5	0	0	1.7	C
Haywood	3	0	0	1.0	C
Jackson	4	0	0	1.3	C
Johnston	0	0	0	0.0	A
Lee	0	0	0	0.0	A
Lenoir	0	0	0	0.0	A
Lincoln	2	1	0	1.2	C
McDowell	DNC	DNC	DNC	DNC	DNC
Macon	1	0	0	0.3	B
Martin	0	0	0	0.0	A
Mecklenburg	18	0	0	6.0	F
Mitchell	DNC	DNC	DNC	DNC	DNC
Montgomery	0	0	0	0.0	A
New Hanover	0	0	0	0.0	A
Person	1	0	0	0.3	B
Pitt	0	0	0	0.0	A
Rockingham	2	0	0	0.7	B

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Alamance	INC	INC	INC	INC	INC	INC	INC	INC
Alexander	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Avery	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Buncombe	3	4	0	0	3.0	D	7.4	PASS
Caldwell	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Carteret	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Caswell	INC	INC	INC	INC	INC	INC	INC	INC
Catawba	1	2	0	0	1.3	C	8.7	PASS
Chatham	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cumberland	0	0	0	0	0.0	A	8.3	PASS
Davidson	0	0	0	0	0.0	A	8.4	PASS
Duplin	INC	INC	INC	INC	INC	INC	INC	INC
Durham	1	0	0	0	0.3	B	8.8	PASS
Edgecombe	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Forsyth	0	0	0	0	0.0	A	7.6	PASS
Franklin	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Gaston	INC	INC	INC	INC	INC	INC	INC	INC
Graham	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Granville	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Guilford	1	0	0	0	0.3	B	8.2	PASS
Haywood	INC	INC	INC	INC	INC	INC	INC	INC
Jackson	3	2	0	0	2.0	C	7.8	PASS
Johnston	1	0	0	0	0.3	B	7.4	PASS
Lee	INC	INC	INC	INC	INC	INC	INC	INC
Lenoir	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lincoln	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
McDowell	INC	INC	INC	INC	INC	INC	INC	INC
Macon	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Martin	INC	INC	INC	INC	INC	INC	INC	INC
Mecklenburg	0	0	0	0	0.0	A	8.7	PASS
Mitchell	1	3	0	0	1.8	C	7.5	PASS
Montgomery	0	0	0	0	0.0	A	6.5	PASS
New Hanover	0	0	0	0	0.0	A	5.7	PASS
Person	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Pitt	0	0	0	0	0.0	A	6.9	PASS
Rockingham	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

NORTH CAROLINA (cont.)

American Lung Association in North Carolina

www.lung.org/northcarolina

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Rowan	1	0	0	0.3	B
Swain	0	0	0	0.0	A
Union	5	0	0	1.7	C
Wake	2	0	0	0.7	B
Watauga	DNC	DNC	DNC	DNC	DNC
Wayne	DNC	DNC	DNC	DNC	DNC
Yancey	3	0	0	1.0	C

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Rowan	INC	INC	INC	INC	INC	INC	INC	INC
Swain	8	4	0	0	4.7	F	8.1	PASS
Union	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wake	4	0	0	0	1.3	C	8.8	PASS
Watauga	INC	INC	INC	INC	INC	INC	INC	INC
Wayne	INC	INC	INC	INC	INC	INC	INC	INC
Yancey	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

NORTH DAKOTA

American Lung Association in North Dakota

www.lung.org/northdakota

				AT-RISK GROUPS						
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Billings	940	182	199	12	64	43	1	70	79	86
Burke	2,131	529	431	34	135	94	1	154	174	193
Burleigh	95,030	22,123	14,657	1,439	6,226	3,723	52	5,782	6,761	6,666
Cass	177,787	39,710	20,735	2,584	11,957	6,129	97	9,079	10,927	14,859
Dunn	4,289	989	665	64	280	176	2	272	322	444
McKenzie	12,724	3,918	1,187	255	758	400	7	579	718	1,066
Mercer	8,465	1,917	1,570	125	550	377	5	600	695	518
Oliver	1,940	482	417	31	122	90	1	147	166	181
Ward	68,946	16,108	8,534	1,048	4,573	2,385	38	3,582	4,259	6,670
Williams	33,349	9,310	3,265	606	2,073	1,078	18	1,562	1,928	2,184
Totals	**405,601**	**95,268**	**51,660**	**6,199**	**26,738**	**14,495**	**222**	**21,827**	**26,029**	**32,867**

NORTH DAKOTA

American Lung Association in North Dakota

www.lung.org/northdakota

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Billings	0	0	0	0.0	A
Burke	0	0	0	0.0	A
Burleigh	0	0	0	0.0	A
Cass	0	0	0	0.0	A
Dunn	1	0	0	0.3	B
McKenzie	0	0	0	0.0	A
Mercer	0	0	0	0.0	A
Oliver	1	0	0	0.3	B
Ward	INC	INC	INC	INC	INC
Williams	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Billings	4	2	0	0	2.3	D	INC	INC
Burke	6	4	0	0	4.0	F	4.3	PASS
Burleigh	8	2	0	0	3.7	F	5.4	PASS
Cass	3	0	0	0	1.0	C	INC	INC
Dunn	10	2	0	0	4.3	F	5.8	PASS
McKenzie	5	3	0	0	3.2	D	3.7	PASS
Mercer	6	3	0	0	3.5	F	INC	INC
Oliver	5	2	0	0	2.7	D	4.9	PASS
Ward	INC	INC	INC	INC	INC	INC	INC	INC
Williams	7	2	0	0	3.3	F	4.1	PASS

OHIO

American Lung Association in Ohio

www.lung.org/ohio

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Allen	103,198	23,897	17,781	2,065	7,862	6,655	71	7,981	9,023	14,723
Ashtabula	97,807	21,702	18,163	1,876	7,536	6,716	67	8,125	9,142	18,127
Athens	66,597	9,680	8,346	837	5,699	3,860	46	4,307	5,067	16,259
Belmont	68,029	12,941	13,776	1,119	5,442	4,873	47	5,952	6,662	7,114
Butler	380,604	90,111	54,537	7,788	28,986	23,237	261	26,998	31,056	39,242
Clark	134,557	30,415	25,602	2,629	10,291	9,083	92	11,068	12,404	20,082
Clermont	204,214	47,652	32,195	4,119	15,592	13,229	140	15,590	17,794	17,597
Clinton	42,009	9,795	7,021	847	3,200	2,733	29	3,256	3,694	5,314
Cuyahoga	1,248,514	260,986	221,994	22,558	97,925	83,455	852	100,086	113,146	221,287
Delaware	200,464	53,779	26,487	4,648	14,674	12,036	138	13,872	16,029	9,502
Fayette	28,752	6,801	5,040	588	2,176	1,889	20	2,272	2,565	4,370
Franklin	1,291,981	302,103	151,356	26,111	99,238	72,604	885	81,536	95,583	201,260
Geauga	93,918	21,760	18,498	1,881	7,129	6,625	64	8,106	9,065	5,933
Greene	166,752	34,438	27,949	2,977	13,143	10,805	114	12,827	14,581	15,587
Hamilton	813,822	187,514	122,312	16,207	62,400	50,352	556	58,923	67,512	128,431
Jefferson	66,359	12,833	13,955	1,109	5,277	4,798	45	5,906	6,584	11,251
Knox	61,261	13,966	10,858	1,207	4,686	4,014	42	4,833	5,451	6,165
Lake	230,117	46,727	44,804	4,039	18,141	16,266	158	19,767	22,186	19,693
Lawrence	60,249	13,200	11,175	1,141	4,658	4,099	41	4,960	5,580	11,563
Licking	173,448	40,335	28,043	3,486	13,242	11,251	119	13,320	15,165	15,130
Lorain	307,924	68,598	54,876	5,929	23,729	20,681	211	24,860	28,068	40,404
Lucas	430,887	99,506	68,150	8,601	32,969	27,291	295	32,211	36,733	75,376
Madison	44,036	9,066	6,639	784	3,491	2,865	31	3,332	3,831	3,743
Mahoning	229,796	46,179	47,159	3,991	18,112	16,282	157	19,998	22,318	40,879
Medina	178,371	40,393	30,798	3,491	13,705	12,038	122	14,384	16,294	10,629
Miami	105,122	24,259	19,231	2,097	8,005	7,051	72	8,533	9,599	9,387
Montgomery	531,542	118,015	93,680	10,200	40,982	34,770	363	41,781	47,183	81,984
Noble	14,406	2,662	3,821	230	1,146	1,168	10	1,493	1,631	1,893
Portage	162,277	30,724	25,845	2,656	13,103	10,566	111	12,379	14,174	18,263
Preble	41,120	9,303	7,704	804	3,148	2,813	28	3,413	3,834	4,017
Scioto	75,929	16,421	13,581	1,419	5,897	5,038	52	6,059	6,839	15,481
Stark	372,542	80,517	70,724	6,959	28,882	25,488	255	30,961	34,759	51,852
Summit	541,228	114,124	94,518	9,864	42,396	36,312	370	43,392	49,150	68,434
Trumbull	200,380	41,218	42,012	3,563	15,684	14,324	137	17,671	19,674	30,109
Warren	228,882	57,420	32,371	4,963	17,131	14,277	157	16,575	19,075	10,548
Washington	60,418	11,974	12,430	1,035	4,779	4,311	41	5,291	5,907	8,560
Wood	130,492	26,445	19,459	2,286	10,367	7,964	89	9,265	10,649	13,328
Totals	**9,188,004**	**2,037,459**	**1,502,890**	**176,102**	**710,824**	**591,816**	**6,290**	**701,285**	**798,008**	**1,273,517**

OHIO

American Lung Association in Ohio

www.lung.org/ohio

	HIGH OZONE DAYS 2015–2017					HIGH PARTICLE POLLUTION DAYS 2015–2017							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Allen	5	0	0	1.7	C	0	0	0	0	0.0	A	8.3	PASS
Ashtabula	11	0	0	3.7	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Athens	DNC	DNC	DNC	DNC	DNC	0	0	0	0	0.0	A	6.7	PASS
Belmont	DNC	DNC	DNC	DNC	DNC	0	0	0	0	0.0	A	INC	INC
Butler	20	0	0	6.7	F	0	0	0	0	0.0	A	11.1	PASS
Clark	12	0	0	4.0	F	0	0	0	0	0.0	A	8.5	PASS
Clermont	10	0	0	3.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clinton	10	0	0	3.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cuyahoga	13	0	0	4.3	F	1	0	0	0	0.3	B	11.7	PASS
Delaware	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Fayette	5	0	0	1.7	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Franklin	16	0	0	5.3	F	1	0	0	0	0.3	B	9.0	PASS
Geauga	21	0	0	7.0	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Greene	6	0	0	2.0	C	0	0	0	0	0.0	A	7.8	PASS
Hamilton	21	1	0	7.5	F	0	0	0	0	0.0	A	10.1	PASS
Jefferson	1	0	0	0.3	B	5	0	0	0	1.7	C	10.7	PASS
Knox	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lake	23	0	0	7.7	F	0	0	0	0	0.0	A	7.4	PASS
Lawrence	6	0	0	2.0	C	1	0	0	0	0.3	B	6.8	PASS
Licking	5	0	0	1.7	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lorain	3	0	0	1.0	C	0	0	0	0	0.0	A	7.6	PASS
Lucas	7	0	0	2.3	D	2	0	0	0	0.7	B	9.0	PASS
Madison	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Mahoning	1	0	0	0.3	B	0	0	0	0	0.0	A	9.0	PASS
Medina	1	0	0	0.3	B	5	0	0	0	1.7	C	8.4	PASS
Miami	6	0	0	2.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Montgomery	9	0	0	3.0	D	0	0	0	0	0.0	A	8.9	PASS
Noble	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Portage	0	0	0	0.0	A	0	0	0	0	0.0	A	7.8	PASS
Preble	3	0	0	1.0	C	0	0	0	0	0.0	A	7.7	PASS
Scioto	DNC	DNC	DNC	DNC	DNC	1	0	0	0	0.3	B	INC	INC
Stark	14	0	0	4.7	F	1	0	0	0	0.3	B	10.1	PASS
Summit	1	0	0	0.3	B	1	0	0	0	0.3	B	10.2	PASS
Trumbull	9	0	0	3.0	D	1	0	0	0	0.3	B	INC	INC
Warren	14	0	0	4.7	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Washington	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wood	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

OKLAHOMA

American Lung Association in Oklahoma

www.lung.org/oklahoma

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Adair	21,909	5,712	3,473	560	1,559	1,454	15	1,870	2,153	5,905
Bryan	46,319	10,850	8,263	1,063	3,405	3,178	31	4,133	4,676	8,219
Caddo	29,173	7,330	4,819	718	2,101	1,955	20	2,525	2,888	5,733
Canadian	139,926	36,477	17,884	3,574	9,975	8,570	95	10,756	12,663	10,231
Carter	48,190	12,290	7,813	1,204	3,455	3,226	33	4,157	4,773	8,014
Cherokee	48,888	11,035	7,906	1,081	3,637	3,224	33	4,139	4,731	9,987
Choctaw	14,863	3,596	3,015	352	1,082	1,098	10	1,449	1,625	3,842
Cleveland	279,641	61,145	35,977	5,991	21,040	17,184	191	21,451	25,194	31,096
Comanche	121,526	28,849	14,890	2,827	8,928	7,263	83	9,040	10,656	18,665
Cotton	5,823	1,296	1,112	127	436	435	4	569	647	1,062
Creek	71,704	17,320	12,402	1,697	5,234	5,017	49	6,499	7,438	11,514
Dewey	4,878	1,340	934	131	339	339	3	447	501	645
Jefferson	6,183	1,477	1,283	145	452	461	4	610	681	1,384
Johnston	11,060	2,598	2,088	255	813	787	8	1,030	1,162	1,929
Kay	44,544	11,192	8,456	1,097	3,200	3,116	30	4,093	4,595	7,168
Lincoln	35,142	8,579	6,287	841	2,556	2,507	24	3,261	3,724	5,616
Love	10,034	2,487	1,887	244	724	703	7	922	1,037	1,328
McClain	39,343	10,079	6,009	988	2,819	2,601	27	3,328	3,856	4,078
Mayes	40,921	9,649	7,432	945	3,007	2,914	28	3,793	4,315	6,923
Oklahoma	787,958	202,850	104,689	19,876	56,360	48,247	536	60,798	71,072	122,953
Osage	47,233	10,507	9,059	1,030	3,532	3,502	32	4,578	5,197	7,642
Ottawa	31,312	7,832	5,673	767	2,255	2,158	21	2,818	3,183	6,007
Pittsburg	44,184	9,811	8,710	961	3,299	3,224	30	4,233	4,757	7,376
Sequoyah	41,252	9,417	7,634	923	3,061	2,972	28	3,874	4,400	8,360
Tulsa	646,266	164,013	90,426	16,071	46,450	40,683	439	51,539	60,031	91,757
Washington	51,932	12,439	9,954	1,219	3,791	3,706	35	4,863	5,473	7,277
Totals	**2,670,204**	**660,170**	**388,075**	**64,686**	**193,509**	**170,525**	**1,819**	**216,775**	**251,430**	**394,711**

OKLAHOMA

American Lung Association in Oklahoma

www.lung.org/oklahoma

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Adair	0	0	0	0.0	A
Bryan	INC	INC	INC	INC	INC
Caddo	0	0	0	0.0	A
Canadian	1	0	0	0.3	B
Carter	INC	INC	INC	INC	INC
Cherokee	0	0	0	0.0	A
Choctaw	INC	INC	INC	INC	INC
Cleveland	3	0	0	1.0	C
Comanche	1	0	0	0.3	B
Cotton	INC	INC	INC	INC	INC
Creek	0	0	0	0.0	A
Dewey	0	0	0	0.0	A
Jefferson	INC	INC	INC	INC	INC
Johnston	INC	INC	INC	INC	INC
Kay	2	0	0	0.7	B
Lincoln	INC	INC	INC	INC	INC
Love	INC	INC	INC	INC	INC
McClain	2	0	0	0.7	B
Mayes	1	0	0	0.3	B
Oklahoma	9	0	0	3.0	D
Osage	INC	INC	INC	INC	INC
Ottawa	0	0	0	0.0	A
Pittsburg	0	0	0	0.0	A
Sequoyah	0	0	0	0.0	A
Tulsa	3	1	0	1.5	C
Washington	INC	INC	INC	INC	INC

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Adair	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Bryan	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Caddo	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Canadian	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Carter	INC	INC	INC	INC	INC	INC	INC	INC
Cherokee	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Choctaw	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cleveland	0	0	0	0	0.0	A	7.9	PASS
Comanche	0	0	0	0	0.0	A	7.1	PASS
Cotton	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Creek	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dewey	2	0	0	0	0.7	B	INC	INC
Jefferson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Johnston	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Kay	2	0	0	0	0.7	B	INC	INC
Lincoln	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Love	INC	INC	INC	INC	INC	INC	INC	INC
McClain	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Mayes	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Oklahoma	0	0	0	0	0.0	A	8.1	PASS
Osage	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Ottawa	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Pittsburg	0	0	0	0	0.0	A	7.7	PASS
Sequoyah	0	0	0	0	0.0	A	8.1	PASS
Tulsa	2	0	0	0	0.7	B	8.8	PASS
Washington	INC	INC	INC	INC	INC	INC	INC	INC

OREGON

American Lung Association in Oregon

www.lung.org/oregon

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Clackamas	412,672	89,732	71,997	5,184	35,218	17,795	204	25,922	31,663	34,173
Columbia	51,782	11,110	9,462	642	4,426	2,294	26	3,386	4,134	6,326
Crook	23,123	4,537	5,667	262	2,011	1,136	11	1,799	2,065	3,062
Deschutes	186,875	38,285	36,269	2,212	16,185	8,364	92	12,465	14,878	17,932
Harney	7,289	1,544	1,707	89	622	347	4	545	627	1,122
Jackson	217,479	45,040	46,790	2,602	18,748	9,994	107	15,309	17,806	30,774
Josephine	86,352	16,927	21,945	978	7,507	4,290	43	6,857	7,797	15,143
Klamath	66,935	14,458	13,907	835	5,706	3,029	33	4,613	5,407	12,659
Lake	7,863	1,545	1,905	89	683	386	4	610	705	1,405
Lane	374,748	70,090	70,206	4,049	33,306	16,508	185	24,127	28,664	60,773
Marion	341,286	84,787	52,060	4,899	28,095	13,459	169	19,030	23,285	50,264
Multnomah	807,555	154,317	105,006	8,916	71,917	31,903	399	42,297	53,703	114,241
Umatilla	76,985	19,573	11,695	1,131	6,286	3,023	38	4,281	5,245	11,330
Wasco	26,437	5,933	5,289	343	2,232	1,168	13	1,765	2,074	3,567
Washington	588,957	137,047	76,183	7,918	49,647	22,624	291	30,491	38,745	46,428
Totals	**3,276,338**	**694,925**	**530,088**	**40,150**	**282,591**	**136,320**	**1,619**	**193,497**	**236,799**	**409,199**

OREGON

American Lung Association in Oregon

www.lung.org/oregon

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Clackamas	9	1	1	4.2	F
Columbia	1	1	0	0.8	B
Crook	DNC	DNC	DNC	DNC	DNC
Deschutes	INC	INC	INC	INC	INC
Harney	DNC	DNC	DNC	DNC	DNC
Jackson	6	1	0	2.5	D
Josephine	DNC	DNC	DNC	DNC	DNC
Klamath	DNC	DNC	DNC	DNC	DNC
Lake	DNC	DNC	DNC	DNC	DNC
Lane	6	2	0	3.0	D
Marion	7	0	0	2.3	D
Multnomah	1	1	0	0.8	B
Umatilla	11	0	0	3.7	F
Wasco	INC	INC	INC	INC	INC
Washington	4	2	0	2.3	D

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Clackamas	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Columbia	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Crook	6	5	0	0	4.5	F	9.2	PASS
Deschutes	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Harney	6	1	0	0	2.5	D	9.2	PASS
Jackson	7	5	2	0	6.2	F	11.6	PASS
Josephine	0	3	0	1	2.3	D	10.0	PASS
Klamath	6	3	0	0	3.5	F	9.3	PASS
Lake	7	5	0	0	4.8	F	8.6	PASS
Lane	9	4	0	1	5.8	F	9.5	PASS
Marion	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Multnomah	2	1	0	0	1.2	C	6.9	PASS
Umatilla	INC	INC	INC	INC	INC	INC	INC	INC
Wasco	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Washington	4	1	0	0	1.8	C	7.4	PASS

PENNSYLVANIA

American Lung Association in Pennsylvania

www.lung.org/pennsylvania

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Adams	102,336	20,711	20,161	1,840	8,162	5,754	66	8,963	9,153	8,041
Allegheny	1,223,048	230,313	225,605	20,457	101,080	65,853	786	101,908	103,941	132,929
Armstrong	65,642	12,615	14,016	1,120	5,243	3,860	42	6,067	6,181	8,359
Beaver	166,140	32,434	34,818	2,881	13,289	9,563	107	15,034	15,295	18,164
Berks	417,854	94,013	70,792	8,350	32,971	21,635	269	33,150	34,010	47,405
Blair	123,457	25,496	24,954	2,265	9,798	6,859	79	10,776	10,950	17,382
Bradford	60,853	13,368	12,731	1,187	4,697	3,442	39	5,433	5,521	7,956
Bucks	628,341	129,881	113,655	11,536	50,090	34,932	405	53,524	55,121	38,058
Cambria	133,054	25,569	29,285	2,271	10,645	7,725	86	12,264	12,416	19,126
Centre	162,660	24,799	22,286	2,203	14,721	7,671	106	11,408	11,699	24,611
Chester	519,293	118,914	82,069	10,562	40,859	26,764	335	40,453	41,811	31,826
Clearfield	79,685	14,595	15,972	1,296	6,518	4,569	52	7,112	7,263	11,130
Cumberland	250,066	50,972	45,244	4,527	20,263	13,231	161	20,467	20,882	17,244
Dauphin	275,710	61,922	45,591	5,500	21,825	14,177	177	21,637	22,232	32,684
Delaware	564,696	123,993	90,774	11,013	45,182	28,845	363	43,808	45,084	53,255
Elk	30,197	5,845	6,535	519	2,391	1,815	19	2,849	2,910	2,937
Erie	274,541	59,063	47,541	5,246	21,960	14,313	177	21,999	22,522	41,288
Franklin	154,234	34,442	29,597	3,059	12,030	8,298	99	12,974	13,206	14,759
Greene	36,770	7,114	6,737	632	3,005	2,008	24	3,095	3,168	4,965
Indiana	84,953	15,436	16,022	1,371	7,087	4,575	55	7,114	7,233	11,763
Lackawanna	210,761	42,870	41,312	3,808	16,886	11,566	136	18,086	18,399	29,008
Lancaster	542,903	129,134	94,984	11,470	42,083	27,532	350	42,676	43,500	52,380
Lawrence	87,069	17,430	18,785	1,548	6,895	5,020	56	7,945	8,059	11,300
Lebanon	139,754	31,982	26,708	2,841	10,843	7,404	90	11,603	11,788	14,717
Lehigh	366,494	83,327	60,030	7,401	28,999	18,536	236	28,324	29,054	44,362
Luzerne	317,343	62,153	62,299	5,521	25,669	17,597	205	27,462	27,970	42,326
Lycoming	113,841	23,368	21,377	2,076	9,138	6,170	73	9,579	9,775	13,968
Mercer	111,750	22,010	23,515	1,955	8,930	6,379	72	10,057	10,211	13,040
Monroe	168,046	33,409	28,089	2,967	13,661	9,200	108	13,901	14,395	15,190
Montgomery	826,075	178,573	143,176	15,861	65,724	43,743	532	67,049	68,838	47,041
Northampton	303,405	60,865	56,361	5,406	24,527	16,503	195	25,537	26,101	29,356
Philadelphia	1,580,863	345,077	211,624	30,651	130,354	72,721	1,014	108,369	111,616	388,221
Somerset	74,501	13,516	16,298	1,201	6,042	4,393	48	6,938	7,045	8,795
Tioga	40,793	8,111	8,737	720	3,245	2,335	26	3,694	3,745	5,936
Washington	207,298	40,480	41,638	3,596	16,666	11,781	134	18,389	18,761	18,913
Westmoreland	352,627	65,057	78,037	5,779	28,347	21,067	227	33,274	33,827	34,404
York	446,078	98,853	76,155	8,780	35,229	23,533	288	35,986	37,003	40,966
Totals	**11,243,131**	**2,357,710**	**1,963,510**	**209,418**	**905,052**	**591,369**	**7,237**	**908,905**	**930,683**	**1,353,805**

PENNSYLVANIA

American Lung Association in Pennsylvania

www.lung.org/pennsylvania

	HIGH OZONE DAYS 2015–2017					HIGH PARTICLE POLLUTION DAYS 2015–2017							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Adams	6	0	0	2.0	C	1	0	0	0	0.3	B	8.3	PASS
Allegheny	25	0	0	8.3	F	27	3	0	0	10.5	F	13.0	FAIL
Armstrong	8	0	0	2.7	D	0	0	0	0	0.0	A	10.4	PASS
Beaver	10	0	0	3.3	F	1	0	0	0	0.3	B	9.5	PASS
Berks	14	0	0	4.7	F	4	0	0	0	1.3	C	9.1	PASS
Blair	4	0	0	1.3	C	0	0	0	0	0.0	A	9.2	PASS
Bradford	0	0	0	0.0	A	INC	INC	INC	INC	INC	INC	INC	INC
Bucks	35	1	0	12.2	F	INC	INC	INC	INC	INC	INC	INC	INC
Cambria	0	0	0	0.0	A	0	0	0	0	0.0	A	10.8	PASS
Centre	4	0	0	1.3	C	0	0	0	0	0.0	A	8.0	PASS
Chester	15	1	0	5.5	F	0	0	0	0	0.0	A	10.1	PASS
Clearfield	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cumberland	DNC	DNC	DNC	DNC	DNC	3	0	0	0	1.0	C	8.7	PASS
Dauphin	8	0	0	2.7	D	7	0	0	0	2.3	D	9.5	PASS
Delaware	15	0	0	5.0	F	1	0	0	0	0.3	B	10.3	PASS
Elk	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Erie	5	0	0	1.7	C	0	0	0	0	0.0	A	8.3	PASS
Franklin	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Greene	5	0	0	1.7	C	INC	INC	INC	INC	INC	INC	INC	INC
Indiana	8	0	0	2.7	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lackawanna	7	0	0	2.3	D	0	0	0	0	0.0	A	9.1	PASS
Lancaster	10	0	0	3.3	F	10	0	0	0	3.3	F	10.8	PASS
Lawrence	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lebanon	14	0	0	4.7	F	6	0	0	0	2.0	C	10.1	PASS
Lehigh	9	0	0	3.0	D	INC	INC	INC	INC	INC	INC	INC	INC
Luzerne	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lycoming	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Mercer	7	0	0	2.3	D	0	1	0	0	0.5	B	9.8	PASS
Monroe	4	0	0	1.3	C	0	0	0	0	0.0	A	7.1	PASS
Montgomery	18	0	0	6.0	F	INC	INC	INC	INC	INC	INC	INC	INC
Northampton	11	0	0	3.7	F	4	0	0	0	1.3	C	9.0	PASS
Philadelphia	31	4	0	12.3	F	2	0	0	0	0.7	B	10.6	PASS
Somerset	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Tioga	2	0	0	0.7	B	0	0	0	0	0.0	A	8.5	PASS
Washington	9	0	0	3.0	D	1	0	0	0	0.3	B	9.4	PASS
Westmoreland	8	0	0	2.7	D	0	0	0	0	0.0	A	9.4	PASS
York	12	0	0	4.0	F	2	0	0	0	0.7	B	9.6	PASS

RHODE ISLAND

American Lung Association in Rhode Island

www.lung.org/rhodeisland

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Kent	163,760	31,015	30,085	3,204	16,407	10,455	115	11,455	12,525	13,853
Providence	637,357	131,447	95,553	13,579	62,618	36,642	448	37,804	42,548	90,056
Washington	126,150	21,244	25,080	2,195	12,900	8,312	89	9,153	9,939	10,592
Totals	**927,267**	**183,706**	**150,718**	**18,977**	**91,925**	**55,409**	**652**	**58,411**	**65,012**	**114,501**

RHODE ISLAND

American Lung Association in Rhode Island

www.lung.org/rhodeisland

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Kent	12	1	0	4.5	F
Providence	11	1	0	4.2	F
Washington	14	2	0	5.7	F

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Kent	0	0	0	0	0.0	A	4.8	PASS
Providence	0	1	0	0	0.5	B	9.1	PASS
Washington	0	0	0	0	0.0	A	5.7	PASS

SOUTH CAROLINA

American Lung Association in South Carolina

www.lung.org/southcarolina

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Abbeville	24,722	5,107	5,242	406	1,839	1,694	16	2,192	2,876	4,850
Aiken	168,179	36,954	31,803	2,936	12,254	10,925	111	13,916	18,476	24,465
Anderson	198,759	45,659	35,473	3,628	14,292	12,607	131	15,945	21,302	28,083
Berkeley	217,937	52,296	29,847	4,155	15,298	12,443	144	15,127	20,797	25,085
Charleston	401,438	79,756	63,510	6,337	29,685	24,507	265	30,203	41,001	51,780
Cherokee	57,105	13,376	9,303	1,063	4,070	3,498	38	4,365	5,892	11,258
Chesterfield	45,948	10,325	8,088	820	3,338	2,961	30	3,734	5,012	9,993
Colleton	37,611	8,465	7,364	673	2,732	2,485	25	3,186	4,214	8,325
Darlington	67,265	15,047	12,509	1,196	4,883	4,360	44	5,544	7,378	14,391
Edgefield	26,693	4,945	4,843	393	2,031	1,780	18	2,237	3,006	4,146
Florence	138,566	33,090	22,700	2,629	9,808	8,425	91	10,531	14,184	25,235
Greenville	506,837	117,631	77,985	9,347	36,089	30,308	334	37,461	50,878	61,200
Horry	333,268	61,339	76,686	4,874	25,507	23,844	220	31,129	40,528	52,862
Lexington	290,642	67,908	44,629	5,396	20,734	17,613	192	21,780	29,639	33,761
Oconee	77,270	15,535	17,597	1,234	5,803	5,468	51	7,150	9,305	12,237
Pickens	123,479	23,703	19,954	1,883	9,180	7,531	82	9,296	12,577	17,775
Richland	411,592	88,508	50,663	7,033	29,515	22,622	271	26,874	37,424	64,234
Spartanburg	306,854	71,079	49,168	5,648	21,906	18,654	202	23,202	31,374	41,025
York	266,439	65,024	37,198	5,167	18,725	15,604	175	19,062	26,204	29,456
Totals	**3,700,604**	**815,747**	**604,562**	**64,817**	**267,690**	**227,328**	**2,440**	**282,932**	**382,067**	**520,161**

SOUTH CAROLINA

American Lung Association in South Carolina

www.lung.org/southcarolina

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Abbeville	INC	INC	INC	INC	INC
Aiken	0	0	0	0.0	A
Anderson	0	0	0	0.0	A
Berkeley	0	0	0	0.0	A
Charleston	1	0	0	0.3	B
Cherokee	INC	INC	INC	INC	INC
Chesterfield	1	0	0	0.3	B
Colleton	0	0	0	0.0	A
Darlington	0	0	0	0.0	A
Edgefield	2	0	0	0.7	B
Florence	DNC	DNC	DNC	DNC	DNC
Greenville	2	0	0	0.7	B
Horry	INC	INC	INC	INC	INC
Lexington	DNC	DNC	DNC	DNC	DNC
Oconee	1	0	0	0.3	B
Pickens	1	0	0	0.3	B
Richland	4	0	0	1.3	C
Spartanburg	3	0	0	1.0	C
York	2	0	0	0.7	B

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Abbeville	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Aiken	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Anderson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Berkeley	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Charleston	2	2	0	0	1.7	C	7.1	PASS
Cherokee	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Chesterfield	0	0	0	0	0.0	A	7.2	PASS
Colleton	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Darlington	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Edgefield	1	1	0	0	0.8	B	8.3	PASS
Florence	0	0	0	0	0.0	A	INC	INC
Greenville	4	2	0	0	2.3	D	9.1	PASS
Horry	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lexington	0	2	0	0	1.0	C	8.8	PASS
Oconee	0	0	0	0	0.0	A	INC	INC
Pickens	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Richland	0	2	0	0	1.0	C	8.1	PASS
Spartanburg	0	0	0	0	0.0	A	8.3	PASS
York	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

SOUTH DAKOTA

American Lung Association in South Dakota

www.lung.org/southdakota

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Brookings	34,255	7,013	4,000	557	1,920	1,063	20	1,954	2,459	3,998
Brown	39,178	9,469	6,522	752	2,175	1,385	22	2,751	3,309	4,141
Codington	28,099	6,808	4,787	541	1,567	1,009	16	2,017	2,417	3,114
Custer	8,691	1,369	2,487	109	556	418	5	886	1,028	957
Hughes	17,666	4,249	2,954	338	987	632	10	1,261	1,512	1,742
Jackson	3,289	1,064	446	85	163	101	2	199	240	1,174
Meade	28,018	6,509	4,107	517	1,562	951	16	1,851	2,252	2,476
Minnehaha	188,616	47,882	24,161	3,805	10,210	6,056	108	11,665	14,268	16,492
Pennington	110,141	25,591	19,101	2,033	6,211	4,001	63	7,989	9,581	13,866
Union	15,029	3,608	2,714	287	845	556	9	1,122	1,337	903
Totals	**472,982**	**113,562**	**71,279**	**9,023**	**26,195**	**16,173**	**271**	**31,694**	**38,404**	**48,863**

SOUTH DAKOTA

American Lung Association in South Dakota

www.lung.org/southdakota

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Brookings	1	0	0	0.3	B
Brown	DNC	DNC	DNC	DNC	DNC
Codington	DNC	DNC	DNC	DNC	DNC
Custer	0	0	0	0.0	A
Hughes	DNC	DNC	DNC	DNC	DNC
Jackson	0	0	0	0.0	A
Meade	0	0	0	0.0	A
Minnehaha	2	0	0	0.7	B
Pennington	DNC	DNC	DNC	DNC	DNC
Union	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Brookings	1	0	0	0	0.3	B	5.0	PASS
Brown	0	0	0	0	0.0	A	5.8	PASS
Codington	1	0	0	0	0.3	B	6.5	PASS
Custer	4	1	0	0	1.8	C	3.7	PASS
Hughes	1	1	0	0	0.8	B	4.1	PASS
Jackson	4	0	0	0	1.3	C	3.5	PASS
Meade	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Minnehaha	2	0	0	0	0.7	B	6.9	PASS
Pennington	6	1	0	0	2.5	D	7.7	PASS
Union	4	0	0	0	1.3	C	6.8	PASS

TENNESSEE

American Lung Association in Tennessee

www.lung.org/tennessee

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Anderson	76,257	16,138	15,095	1,572	6,068	6,129	60	7,787	8,665	11,482
Blount	129,929	26,549	25,578	2,586	10,428	10,555	102	13,384	14,905	15,425
Claiborne	31,609	6,031	6,177	587	2,581	2,555	25	3,229	3,602	6,801
Davidson	691,243	145,667	82,484	14,187	54,810	45,262	541	53,785	61,914	97,343
DeKalb	19,852	4,328	3,582	422	1,564	1,555	16	1,955	2,186	3,342
Dyer	37,463	8,976	6,490	874	2,871	2,796	29	3,508	3,928	6,360
Hamilton	361,613	75,521	62,052	7,355	28,831	27,266	283	33,972	38,175	44,007
Jefferson	53,804	10,727	10,545	1,045	4,345	4,378	42	5,544	6,178	7,304
Knox	461,860	97,811	71,210	9,526	36,650	33,243	362	40,855	46,228	62,320
Lawrence	43,396	10,912	7,650	1,063	3,275	3,240	34	4,082	4,561	6,684
Loudon	52,152	10,238	13,521	997	4,255	4,625	41	6,077	6,656	6,496
Madison	97,643	21,994	16,173	2,142	7,620	7,225	76	8,988	10,106	16,341
Maury	92,163	21,703	14,288	2,114	7,088	6,688	72	8,267	9,323	9,474
McMinn	52,877	11,286	10,298	1,099	4,196	4,242	41	5,380	5,991	11,621
Montgomery	200,182	53,780	18,130	5,238	14,690	11,363	158	13,165	15,356	25,124
Putnam	77,674	16,479	12,728	1,605	6,173	5,558	61	6,880	7,761	14,277
Roane	53,036	10,055	11,916	979	4,342	4,621	42	5,948	6,575	7,955
Sevier	97,638	20,345	18,699	1,981	7,793	7,841	77	9,915	11,056	12,135
Shelby	936,961	234,376	122,917	22,826	70,577	63,214	731	76,682	87,296	173,777
Sullivan	157,158	30,652	33,782	2,985	12,782	13,177	123	16,877	18,707	24,258
Sumner	183,545	43,699	28,290	4,256	14,061	13,409	144	16,575	18,688	15,921
Williamson	226,257	62,134	29,058	6,051	16,447	15,696	177	19,128	21,703	8,667
Wilson	136,442	32,651	20,964	3,180	10,433	10,005	107	12,368	13,943	11,336
Totals	**4,270,754**	**972,052**	**641,627**	**94,670**	**331,878**	**304,647**	**3,343**	**374,351**	**423,505**	**598,450**

TENNESSEE

American Lung Association in Tennessee

www.lung.org/tennessee

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Anderson	0	0	0	0.0	A
Blount	5	0	0	1.7	C
Claiborne	1	0	0	0.3	B
Davidson	5	0	0	1.7	C
DeKalb	0	0	0	0.0	A
Dyer	DNC	DNC	DNC	DNC	DNC
Hamilton	7	0	0	2.3	D
Jefferson	4	0	0	1.3	C
Knox	3	0	0	1.0	C
Lawrence	DNC	DNC	DNC	DNC	DNC
Loudon	7	0	0	2.3	D
Madison	DNC	DNC	DNC	DNC	DNC
Maury	DNC	DNC	DNC	DNC	DNC
McMinn	DNC	DNC	DNC	DNC	DNC
Montgomery	DNC	DNC	DNC	DNC	DNC
Putnam	DNC	DNC	DNC	DNC	DNC
Roane	DNC	DNC	DNC	DNC	DNC
Sevier	3	0	0	1.0	C
Shelby	12	1	0	4.5	F
Sullivan	2	0	0	0.7	B
Sumner	2	0	0	0.7	B
Williamson	1	0	0	0.3	B
Wilson	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Anderson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Blount	1	2	0	0	1.3	C	8.0	PASS
Claiborne	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Davidson	1	0	0	0	0.3	B	8.9	PASS
DeKalb	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dyer	0	0	0	0	0.0	A	6.9	PASS
Hamilton	0	1	0	0	0.5	B	8.7	PASS
Jefferson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Knox	2	3	0	0	2.2	D	10.0	PASS
Lawrence	0	0	0	0	0.0	A	6.7	PASS
Loudon	0	2	0	0	1.0	C	INC	INC
Madison	0	0	0	0	0.0	A	6.9	PASS
Maury	0	0	0	0	0.0	A	INC	INC
McMinn	0	1	0	0	0.5	B	8.3	PASS
Montgomery	0	0	0	0	0.0	A	8.1	PASS
Putnam	0	0	0	0	0.0	A	7.3	PASS
Roane	0	1	0	0	0.5	B	8.1	PASS
Sevier	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Shelby	0	0	0	0	0.0	A	7.6	PASS
Sullivan	1	0	0	0	0.3	B	7.5	PASS
Sumner	0	0	0	0	0.0	A	7.9	PASS
Williamson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wilson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

TEXAS

American Lung Association in Texas

www.lung.org/texas

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Bell	347,833	96,935	36,863	7,671	18,239	10,992	176	18,079	27,381	46,542
Bexar	1,958,578	505,510	231,882	40,002	106,687	67,366	987	110,579	167,811	299,023
Bowie	94,012	22,236	15,350	1,760	5,366	3,806	48	6,335	9,479	13,959
Brazoria	362,457	96,832	41,560	7,662	19,724	12,793	183	20,734	31,876	31,735
Brewster	9,337	1,813	2,033	143	567	438	5	743	1,091	1,298
Cameron	423,725	130,648	55,795	10,338	21,628	14,427	213	23,997	35,927	116,191
Collin	969,603	254,823	104,176	20,164	53,239	34,328	488	55,105	85,551	56,725
Dallas	2,618,148	692,168	274,524	54,772	141,524	87,471	1,319	141,909	217,948	382,477
Denton	836,210	210,065	82,286	16,623	46,261	28,595	421	45,809	71,269	58,411
Ellis	173,620	46,632	21,911	3,690	9,493	6,399	87	10,409	15,943	14,521
El Paso	840,410	231,103	100,456	18,287	44,744	28,471	423	46,880	70,918	172,972
Galveston	335,036	82,095	46,324	6,496	18,964	13,049	169	21,301	32,509	39,606
Gregg	123,367	31,905	18,739	2,525	6,817	4,749	62	7,887	11,826	19,769
Harris	4,652,980	1,249,484	473,982	98,873	249,914	153,431	2,347	248,554	382,312	733,605
Harrison	66,661	17,003	10,983	1,345	3,737	2,717	34	4,511	6,766	11,315
Hidalgo	860,661	284,190	93,379	22,488	42,062	26,180	433	43,309	65,206	251,593
Hood	58,273	12,406	14,262	982	3,515	2,923	29	4,977	7,277	6,074
Hunt	93,872	22,445	14,840	1,776	5,371	3,834	47	6,328	9,550	15,389
Jefferson	256,299	61,474	36,082	4,865	14,483	9,781	130	16,109	24,362	44,734
Johnson	167,301	43,550	23,305	3,446	9,266	6,396	84	10,483	15,932	17,019
Kaufman	122,883	33,956	14,654	2,687	6,621	4,372	62	7,105	10,893	11,316
McLennan	251,259	62,200	35,605	4,922	13,917	9,198	126	15,319	22,904	42,008
Montgomery	570,934	151,044	73,407	11,952	31,439	21,339	288	34,708	53,166	50,397
Navarro	48,701	12,774	8,205	1,011	2,709	1,994	25	3,318	4,967	8,105
Nueces	361,221	89,636	50,806	7,093	20,144	13,557	182	22,399	33,766	57,008
Orange	85,047	21,241	13,258	1,681	4,796	3,421	43	5,648	8,521	11,526
Parker	133,463	32,972	20,359	2,609	7,604	5,476	67	8,964	13,642	10,515
Polk	49,162	10,096	9,172	799	2,975	2,254	25	3,731	5,614	8,060
Randall	134,442	32,318	19,619	2,557	7,566	5,109	68	8,474	12,723	11,635
Rockwall	96,788	26,335	11,939	2,084	5,286	3,583	49	5,798	8,928	5,039
Smith	227,727	56,132	36,913	4,442	12,797	9,040	114	15,087	22,510	34,767
Tarrant	2,054,475	546,088	226,582	43,213	111,609	71,096	1,033	115,154	177,153	234,362
Travis	1,226,698	271,230	117,274	21,463	69,459	40,385	621	65,331	100,634	139,071
Victoria	92,084	23,636	14,427	1,870	5,099	3,574	46	5,958	8,901	14,191
Webb	274,794	91,739	25,354	7,259	13,347	8,016	138	13,071	19,972	74,061
Totals	**20,978,061**	**5,554,714**	**2,376,306**	**439,552**	**1,136,966**	**720,559**	**10,572**	**1,174,104**	**1,795,224**	**3,045,019**

TEXAS

American Lung Association in Texas

www.lung.org/texas

	HIGH OZONE DAYS 2015–2017					HIGH PARTICLE POLLUTION DAYS 2015–2017							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Bell	10	0	0	3.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Bexar	20	4	0	8.7	F	1	0	0	0	0.3	B	8.4	PASS
Bowie	DNC	DNC	DNC	DNC	DNC	0	0	0	0	0.0	A	INC	INC
Brazoria	20	5	0	9.2	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Brewster	0	0	0	0.0	A	INC	INC	INC	INC	INC	INC	INC	INC
Cameron	0	0	0	0.0	A	1	0	0	0	0.3	B	INC	INC
Collin	20	0	0	6.7	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dallas	20	0	0	6.7	F	0	0	0	0	0.0	A	8.9	PASS
Denton	37	4	0	14.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Ellis	6	0	0	2.0	C	0	0	0	0	0.0	A	8.7	PASS
El Paso	23	0	0	7.7	F	1	0	0	0	0.3	B	8.9	PASS
Galveston	27	3	0	10.5	F	0	0	0	0	0.0	A	6.7	PASS
Gregg	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Harris	57	14	1	26.7	F	3	0	0	0	1.0	C	10.7	PASS
Harrison	0	0	0	0.0	A	0	0	0	0	0.0	A	8.6	PASS
Hidalgo	0	0	0	0.0	A	0	0	0	0	0.0	A	10.2	PASS
Hood	10	1	0	3.8	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hunt	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jefferson	15	1	0	5.5	F	INC	INC	INC	INC	INC	INC	INC	INC
Johnson	17	1	0	6.2	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Kaufman	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
McLennan	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Montgomery	16	0	0	5.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Navarro	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Nueces	2	0	0	0.7	B	0	0	0	0	0.0	A	9.3	PASS
Orange	1	0	0	0.3	B	INC	INC	INC	INC	INC	INC	INC	INC
Parker	18	1	0	6.5	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Polk	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Randall	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rockwall	8	0	0	2.7	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Smith	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Tarrant	43	3	0	15.8	F	0	0	0	0	0.0	A	8.7	PASS
Travis	14	0	0	4.7	F	1	0	0	0	0.3	B	9.6	PASS
Victoria	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Webb	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

UTAH

American Lung Association in Utah

www.lung.org/utah

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Box Elder	54,079	17,343	6,890	1,057	3,259	1,529	14	2,501	2,889	4,253
Cache	124,438	37,922	11,447	2,310	7,729	3,093	32	4,549	5,281	18,068
Carbon	20,295	5,355	3,440	326	1,318	664	5	1,151	1,308	3,016
Davis	347,637	113,071	34,226	6,889	20,926	9,074	90	13,851	16,298	18,584
Duchesne	20,026	6,880	2,338	419	1,168	536	5	864	1,000	2,625
Garfield	5,078	1,186	1,159	72	340	189	1	353	392	484
Salt Lake	1,135,649	312,338	120,002	19,029	73,451	31,885	294	48,668	57,300	103,384
San Juan	15,356	4,708	2,096	287	943	454	4	753	869	3,895
Tooele	67,456	22,383	6,092	1,364	4,027	1,735	17	2,602	3,096	4,541
Uintah	35,150	11,692	3,729	712	2,089	928	9	1,450	1,694	4,434
Utah	606,425	205,468	45,755	12,518	35,909	13,900	157	19,644	23,090	62,063
Washington	165,662	44,018	34,810	2,682	10,643	5,657	43	10,437	11,513	18,252
Weber	251,769	71,894	28,838	4,380	16,016	7,154	65	11,207	13,104	26,782
Totals	**2,849,020**	**854,258**	**300,822**	**52,045**	**177,819**	**76,799**	**737**	**118,028**	**137,835**	**270,381**

UTAH

American Lung Association in Utah

www.lung.org/utah

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Box Elder	5	0	0	1.7	C
Cache	2	0	0	0.7	B
Carbon	2	0	0	0.7	B
Davis	33	0	0	11.0	F
Duchesne	13	6	0	7.3	F
Garfield	INC	INC	INC	INC	INC
Salt Lake	63	0	0	21.0	F
San Juan	1	0	0	0.3	B
Tooele	25	1	0	8.8	F
Uintah	9	11	4	11.2	F
Utah	23	1	0	8.2	F
Washington	4	0	0	1.3	C
Weber	33	0	0	11.0	F

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Box Elder	15	1	0	0	5.5	F	7.2	PASS
Cache	23	5	0	0	10.2	F	7.5	PASS
Carbon	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Davis	17	0	0	0	5.7	F	7.8	PASS
Duchesne	2	0	0	0	0.7	B	6.1	PASS
Garfield	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Salt Lake	26	6	0	0	11.7	F	8.7	PASS
San Juan	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Tooele	INC	INC	INC	INC	INC	INC	INC	INC
Uintah	0	0	0	0	0.0	A	INC	INC
Utah	15	4	0	0	7.0	F	8.2	PASS
Washington	0	0	0	0	0.0	A	4.9	PASS
Weber	22	2	0	0	8.3	F	8.8	PASS

VERMONT

American Lung Association in Vermont

www.lung.org/vermont

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Bennington	35,594	6,774	7,930	495	3,346	2,036	22	2,679	2,611	4,201
Chittenden	162,372	29,221	23,620	2,135	16,268	7,657	99	9,363	9,409	16,489
Rutland	59,087	10,539	12,644	770	5,665	3,366	36	4,380	4,290	6,106
Totals	**257,053**	**46,534**	**44,194**	**3,400**	**25,279**	**13,060**	**157**	**16,422**	**16,310**	**26,796**

VERMONT

American Lung Association in Vermont

www.lung.org/vermont

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Bennington	2	0	0	0.7	B
Chittenden	0	0	0	0.0	A
Rutland	INC	INC	INC	INC	INC

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Bennington	0	0	0	0	0.0	A	5.5	PASS
Chittenden	0	0	0	0	0.0	A	5.6	PASS
Rutland	3	0	0	0	1.0	C	7.5	PASS

VIRGINIA

American Lung Association in Virginia

www.lung.org/virginia

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Albemarle	107,702	21,636	19,153	1,719	7,565	6,096	60	7,727	9,288	8,015
Arlington	234,965	41,976	24,214	3,335	17,211	11,442	131	13,063	16,367	13,284
Caroline	30,461	7,141	4,876	567	2,056	1,672	17	2,104	2,565	2,859
Charles City	7,004	1,091	1,644	87	516	480	4	637	763	835
Chesterfield	343,599	81,895	49,565	6,507	23,149	18,381	191	22,774	28,055	22,626
Fairfax	1,148,433	269,030	150,075	21,376	78,010	59,927	640	72,952	90,614	75,911
Fauquier	69,465	16,253	11,150	1,291	4,695	3,929	39	4,966	6,097	3,947
Frederick	86,484	20,091	14,555	1,596	5,845	4,848	48	6,156	7,481	5,723
Giles	16,837	3,503	3,642	278	1,164	1,036	9	1,366	1,623	1,900
Hanover	105,923	23,560	18,271	1,872	7,251	6,129	59	7,813	9,522	5,655
Henrico	327,898	75,050	49,189	5,963	22,339	17,646	182	21,917	26,842	30,836
Loudoun	398,080	113,312	35,607	9,003	25,450	18,346	222	21,361	27,292	11,895
Madison	13,277	2,703	2,885	215	923	830	7	1,096	1,306	1,488
Page	23,731	4,761	4,983	378	1,659	1,467	13	1,923	2,298	3,618
Prince Edward	22,703	3,770	3,689	300	1,670	1,234	13	1,517	1,823	4,392
Prince William	463,023	126,361	43,886	10,040	30,053	21,607	258	25,239	32,058	28,074
Roanoke	93,730	18,887	19,552	1,501	6,543	5,718	52	7,481	8,920	6,681
Rockbridge	22,659	3,938	5,728	313	1,625	1,509	13	2,032	2,385	2,787
Rockingham	80,227	17,679	14,933	1,405	5,487	4,623	45	5,949	7,146	6,611
Stafford	146,649	38,437	14,782	3,054	9,653	7,086	82	8,353	10,595	6,522
Wythe	28,882	5,764	6,095	458	2,021	1,791	16	2,350	2,808	3,959
Bristol City	16,790	3,428	3,507	272	1,167	1,005	9	1,314	1,559	3,206
Hampton City	134,669	28,278	20,276	2,247	9,400	7,225	75	8,912	10,872	20,069
Lynchburg City	80,995	15,690	11,669	1,247	5,769	4,038	45	4,857	5,835	13,132
Norfolk City	244,703	48,483	26,519	3,852	17,467	11,652	137	13,417	16,648	44,181
Richmond City	227,032	40,328	28,999	3,204	16,576	11,707	126	13,871	17,107	51,609
Salem City	25,862	5,200	4,798	413	1,814	1,496	14	1,913	2,296	2,567
Suffolk City	90,237	22,197	12,586	1,764	6,023	4,747	50	5,859	7,232	10,067
Virginia Beach City	450,435	100,136	61,631	7,957	31,023	23,332	251	28,394	34,905	36,669
Totals	**5,042,455**	**1,160,578**	**668,459**	**92,216**	**344,125**	**260,998**	**2,806**	**317,313**	**392,300**	**429,118**

VIRGINIA

American Lung Association in Virginia

www.lung.org/virginia

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Albemarle	1	0	0	0.3	B
Arlington	15	0	0	5.0	F
Caroline	1	0	0	0.3	B
Charles City	2	0	0	0.7	B
Chesterfield	1	0	0	0.3	B
Fairfax	10	0	0	3.3	F
Fauquier	0	0	0	0.0	A
Frederick	0	0	0	0.0	A
Giles	2	0	0	0.7	B
Hanover	2	0	0	0.7	B
Henrico	6	1	0	2.5	D
Loudoun	5	0	0	1.7	C
Madison	1	0	0	0.3	B
Page	INC	INC	INC	INC	INC
Prince Edward	1	0	0	0.3	B
Prince William	3	0	0	1.0	C
Roanoke	0	0	0	0.0	A
Rockbridge	0	0	0	0.0	A
Rockingham	1	0	0	0.3	B
Stafford	1	0	0	0.3	B
Wythe	0	0	0	0.0	A
Bristol City	DNC	DNC	DNC	DNC	DNC
Hampton City	2	0	0	0.7	B
Lynchburg City	DNC	DNC	DNC	DNC	DNC
Norfolk City	DNC	DNC	DNC	DNC	DNC
Richmond City	DNC	DNC	DNC	DNC	DNC
Salem City	DNC	DNC	DNC	DNC	DNC
Suffolk City	2	0	0	0.7	B
Virginia Beach City	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Albemarle	0	0	0	0	0.0	A	6.9	PASS
Arlington	1	0	0	0	0.3	B	8.1	PASS
Caroline	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Charles City	0	0	0	0	0.0	A	7.0	PASS
Chesterfield	0	0	0	0	0.0	A	INC	INC
Fairfax	1	0	0	0	0.3	B	7.2	PASS
Fauquier	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Frederick	0	0	0	0	0.0	A	8.0	PASS
Giles	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hanover	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Henrico	0	0	0	0	0.0	A	7.4	PASS
Loudoun	0	0	0	0	0.0	A	7.8	PASS
Madison	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Page	INC	INC	INC	INC	INC	INC	INC	INC
Prince Edward	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Prince William	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Roanoke	0	0	0	0	0.0	A	7.0	PASS
Rockbridge	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rockingham	0	0	0	0	0.0	A	7.5	PASS
Stafford	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wythe	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Bristol City	1	0	0	0	0.3	B	7.6	PASS
Hampton City	0	0	0	0	0.0	A	6.6	PASS
Lynchburg City	0	0	0	0	0.0	A	6.8	PASS
Norfolk City	0	0	0	0	0.0	A	7.1	PASS
Richmond City	0	0	0	0	0.0	A	INC	INC
Salem City	0	0	0	0	0.0	A	7.7	PASS
Suffolk City	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Virginia Beach City	0	0	0	0	0.0	A	7.1	PASS

WASHINGTON

American Lung Association in Washington

www.lung.org/washington

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Benton	198,171	53,089	28,617	3,881	15,345	8,367	106	11,058	13,293	23,587
Chelan	76,533	18,277	14,061	1,336	6,096	3,595	41	4,946	5,770	10,059
Clallam	75,474	13,094	21,730	957	6,363	4,365	40	6,487	7,125	12,090
Clark	474,643	115,420	70,927	8,437	37,971	21,017	253	27,769	33,474	48,088
King	2,188,649	447,350	283,909	32,700	185,713	94,736	1,167	120,716	149,098	200,415
Kitsap	266,414	54,934	46,087	4,016	22,258	12,560	142	16,933	20,046	21,357
Kittitas	46,205	7,948	7,262	581	4,061	2,081	25	2,734	3,273	6,185
Okanogan	41,742	9,696	8,840	709	3,324	2,090	22	2,952	3,381	8,415
Pierce	876,764	206,931	117,898	15,126	71,199	37,482	467	48,456	59,270	87,596
Skagit	125,619	27,508	25,393	2,011	10,225	6,172	67	8,616	9,934	14,061
Snohomish	801,633	182,237	104,535	13,321	65,891	35,107	427	45,016	55,645	58,157
Spokane	506,152	112,391	79,709	8,216	41,600	22,819	270	30,317	36,282	69,334
Thurston	280,588	60,724	46,769	4,439	23,170	12,952	149	17,378	20,647	29,034
Whatcom	221,404	43,256	37,381	3,162	18,805	10,197	118	13,661	16,177	28,131
Yakima	250,193	74,414	33,654	5,440	18,628	9,904	133	13,019	15,674	44,726
Totals	**6,430,184**	**1,427,269**	**926,772**	**104,331**	**530,649**	**283,442**	**3,427**	**370,057**	**449,092**	**661,235**

WASHINGTON

American Lung Association in Washington

www.lung.org/washington

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Benton	14	0	0	4.7	F
Chelan	DNC	DNC	DNC	DNC	DNC
Clallam	0	0	0	0.0	A
Clark	4	0	0	1.3	C
King	11	6	0	6.7	F
Kitsap	DNC	DNC	DNC	DNC	DNC
Kittitas	DNC	DNC	DNC	DNC	DNC
Okanogan	DNC	DNC	DNC	DNC	DNC
Pierce	2	0	0	0.7	B
Skagit	0	0	0	0.0	A
Snohomish	DNC	DNC	DNC	DNC	DNC
Spokane	2	0	0	0.7	B
Thurston	1	1	0	0.8	B
Whatcom	0	0	0	0.0	A
Yakima	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Benton	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Chelan	1	0	0	0	0.3	B	INC	INC
Clallam	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clark	5	5	0	0	4.2	F	INC	INC
King	9	2	0	0	4.0	F	8.7	PASS
Kitsap	5	0	0	0	1.7	C	4.7	PASS
Kittitas	13	2	2	0	6.7	F	7.6	PASS
Okanogan	INC	INC	INC	INC	INC	INC	INC	INC
Pierce	11	6	0	0	6.7	F	7.4	PASS
Skagit	0	0	0	0	0.0	A	5.9	PASS
Snohomish	25	5	0	0	10.8	F	7.4	PASS
Spokane	11	2	3	0	6.7	F	INC	INC
Thurston	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Whatcom	4	0	0	0	1.3	C	5.5	PASS
Yakima	25	9	3	0	14.8	F	9.5	PASS

WEST VIRGINIA

American Lung Association in West Virginia

www.lung.org/westvirginia

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Berkeley	114,920	27,115	16,614	2,553	11,159	12,675	91	11,521	12,500	13,394
Brooke	22,443	3,982	5,202	375	2,358	2,872	18	2,861	2,986	2,864
Cabell	94,958	18,856	17,345	1,775	9,540	10,922	75	10,281	10,791	23,726
Gilmer	8,005	1,135	1,375	107	856	952	7	868	918	1,632
Greenbrier	35,287	6,940	7,980	653	3,621	4,411	28	4,395	4,588	6,381
Hancock	29,448	5,676	6,536	534	3,052	3,726	23	3,695	3,886	4,337
Harrison	67,811	14,595	12,859	1,374	6,788	8,036	54	7,717	8,185	11,220
Kanawha	183,293	36,950	36,642	3,479	18,639	22,154	144	21,443	22,621	32,592
Marion	56,337	11,363	10,740	1,070	5,683	6,629	45	6,328	6,661	8,882
Marshall	31,190	6,114	6,742	576	3,213	3,895	25	3,840	4,040	5,823
Monongalia	105,030	17,140	12,708	1,614	10,782	11,213	84	9,425	10,121	16,945
Ohio	42,035	8,079	8,918	761	4,314	5,151	33	5,039	5,274	5,072
Raleigh	75,022	15,723	15,018	1,480	7,519	8,899	60	8,624	9,047	14,153
Tucker	6,915	1,176	1,741	111	737	917	6	931	968	1,088
Wood	85,104	17,947	16,924	1,690	8,576	10,238	67	9,933	10,496	15,268
Totals	**957,798**	**192,791**	**177,344**	**18,151**	**96,836**	**112,690**	**758**	**106,902**	**113,082**	**163,377**

WEST VIRGINIA

American Lung Association in West Virginia

www.lung.org/westvirginia

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Berkeley	1	0	0	0.3	B
Brooke	DNC	DNC	DNC	DNC	DNC
Cabell	4	0	0	1.3	C
Gilmer	1	0	0	0.3	B
Greenbrier	0	0	0	0.0	A
Hancock	2	0	0	0.7	B
Harrison	DNC	DNC	DNC	DNC	DNC
Kanawha	4	0	0	1.3	C
Marion	DNC	DNC	DNC	DNC	DNC
Marshall	DNC	DNC	DNC	DNC	DNC
Monongalia	2	0	0	0.7	B
Ohio	5	0	0	1.7	C
Raleigh	DNC	DNC	DNC	DNC	DNC
Tucker	2	0	0	0.7	B
Wood	5	0	0	1.7	C

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Berkeley	0	0	0	0	0.0	A	9.3	PASS
Brooke	0	0	0	0	0.0	A	9.8	PASS
Cabell	0	0	0	0	0.0	A	8.2	PASS
Gilmer	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Greenbrier	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hancock	0	0	0	0	0.0	A	8.7	PASS
Harrison	0	0	0	0	0.0	A	8.0	PASS
Kanawha	0	0	0	0	0.0	A	8.2	PASS
Marion	0	0	0	0	0.0	A	INC	INC
Marshall	0	0	0	0	0.0	A	9.6	PASS
Monongalia	0	0	0	0	0.0	A	7.6	PASS
Ohio	0	0	0	0	0.0	A	8.8	PASS
Raleigh	INC	INC	INC	INC	INC	INC	INC	INC
Tucker	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wood	0	0	0	0	0.0	A	8.5	PASS

WISCONSIN

American Lung Association in Wisconsin

www.lung.org/wisconsin

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Ashland	15,500	3,403	2,954	252	1,150	645	9	907	1,173	2,238
Brown	262,052	62,930	37,533	4,656	19,254	9,572	153	12,677	17,456	24,743
Columbia	57,248	12,385	9,912	916	4,287	2,329	34	3,220	4,244	4,241
Dane	536,416	110,838	70,829	8,200	41,573	18,954	313	23,963	34,500	59,174
Dodge	87,786	17,737	14,988	1,312	6,710	3,581	52	4,912	6,530	7,001
Door	27,483	4,530	7,931	335	2,118	1,430	16	2,162	2,582	2,092
Eau Claire	103,671	21,146	15,864	1,564	8,010	3,832	60	4,988	6,952	14,304
Fond du Lac	102,548	22,170	18,495	1,640	7,672	4,191	60	5,817	7,625	8,544
Forest	8,970	1,787	2,040	132	675	410	5	595	743	1,321
Grant	51,999	10,695	8,735	791	3,984	2,003	31	2,676	3,631	6,385
Jefferson	84,832	18,099	14,008	1,339	6,405	3,367	50	4,586	6,136	7,012
Kenosha	168,521	39,039	23,096	2,888	12,536	6,196	98	8,169	11,327	18,729
Kewaunee	20,445	4,439	4,068	328	1,515	876	12	1,247	1,593	1,614
La Crosse	118,274	23,563	18,835	1,743	9,166	4,493	69	5,923	8,157	13,535
Manitowoc	79,175	16,411	15,801	1,214	5,943	3,436	46	4,886	6,250	7,178
Marathon	135,732	31,123	23,231	2,303	10,005	5,393	79	7,435	9,820	13,353
Milwaukee	952,085	228,621	126,081	16,915	70,423	33,105	554	42,577	60,294	177,959
Outagamie	186,059	44,166	26,555	3,268	13,713	6,856	109	9,102	12,516	13,045
Ozaukee	88,429	18,924	17,003	1,400	6,597	3,750	52	5,295	6,823	4,244
Racine	196,071	45,713	31,455	3,382	14,426	7,615	114	10,389	13,887	20,857
Rock	162,309	37,933	26,162	2,806	11,940	6,264	95	8,524	11,412	19,338
Sauk	63,981	14,570	11,523	1,078	4,713	2,585	37	3,596	4,701	6,266
Sheboygan	115,344	25,882	20,148	1,915	8,546	4,646	67	6,430	8,459	8,789
Taylor	20,321	4,853	3,809	359	1,466	843	12	1,196	1,535	2,083
Vilas	21,683	3,686	6,596	273	1,648	1,162	13	1,782	2,098	2,979
Walworth	103,082	21,777	17,627	1,611	7,797	4,118	60	5,625	7,493	10,618
Waukesha	400,621	87,072	72,379	6,442	29,869	16,586	234	23,166	30,218	19,090
Totals	**4,170,637**	**933,492**	**647,658**	**69,065**	**312,141**	**158,239**	**2,434**	**211,845**	**288,152**	**476,732**

WISCONSIN

American Lung Association in Wisconsin

www.lung.org/wisconsin

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Ashland	0	0	0	0.0	A
Brown	4	0	0	1.3	C
Columbia	3	0	0	1.0	C
Dane	0	0	0	0.0	A
Dodge	3	0	0	1.0	C
Door	16	0	0	5.3	F
Eau Claire	0	0	0	0.0	A
Fond du Lac	3	0	0	1.0	C
Forest	0	0	0	0.0	A
Grant	DNC	DNC	DNC	DNC	DNC
Jefferson	4	0	0	1.3	C
Kenosha	29	2	0	10.7	F
Kewaunee	10	0	0	3.3	F
La Crosse	0	0	0	0.0	A
Manitowoc	16	0	0	5.3	F
Marathon	0	0	0	0.0	A
Milwaukee	14	1	0	5.2	F
Outagamie	2	0	0	0.7	B
Ozaukee	21	1	0	7.5	F
Racine	20	1	0	7.2	F
Rock	5	0	0	1.7	C
Sauk	1	0	0	0.3	B
Sheboygan	33	3	0	12.5	F
Taylor	0	0	0	0.0	A
Vilas	0	0	0	0.0	A
Walworth	6	0	0	2.0	C
Waukesha	1	0	0	0.3	B

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Ashland	0	0	0	0	0.0	A	4.1	PASS
Brown	0	0	0	0	0.0	A	7.0	PASS
Columbia	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dane	0	0	0	0	0.0	A	8.0	PASS
Dodge	2	0	0	0	0.7	B	6.8	PASS
Door	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Eau Claire	0	0	0	0	0.0	A	6.6	PASS
Fond du Lac	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Forest	0	0	0	0	0.0	A	4.6	PASS
Grant	0	0	0	0	0.0	A	7.2	PASS
Jefferson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Kenosha	0	1	0	0	0.5	B	7.4	PASS
Kewaunee	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
La Crosse	0	0	0	0	0.0	A	6.7	PASS
Manitowoc	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Marathon	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Milwaukee	0	0	0	0	0.0	A	8.3	PASS
Outagamie	0	0	0	0	0.0	A	6.6	PASS
Ozaukee	0	0	0	0	0.0	A	6.8	PASS
Racine	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rock	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Sauk	0	0	0	0	0.0	A	6.6	PASS
Sheboygan	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Taylor	0	0	0	0	0.0	A	5.5	PASS
Vilas	0	0	0	0	0.0	A	4.5	PASS
Walworth	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Waukesha	0	0	0	0	0.0	A	8.3	PASS

WYOMING

American Lung Association in Wyoming

www.lung.org/wyoming

		AT-RISK GROUPS								
				Lung Diseases						
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	Cardiovascular Disease	Diabetes	Poverty
Albany	38,332	6,312	4,286	542	2,957	1,669	16	1,906	2,160	7,075
Big Horn	11,906	3,013	2,441	259	810	666	5	879	915	1,433
Campbell	46,242	12,841	4,287	1,103	3,095	1,947	20	2,309	2,712	4,271
Carbon	15,303	3,576	2,485	307	1,076	789	6	1,001	1,085	1,723
Converse	13,809	3,466	2,208	298	949	712	6	909	991	1,260
Fremont	39,803	10,149	7,050	872	2,712	2,090	17	2,701	2,876	6,291
Goshen	13,378	2,684	2,893	231	974	787	6	1,036	1,076	1,572
Laramie	98,327	22,984	15,309	1,975	6,916	4,943	42	6,218	6,766	9,294
Natrona	79,547	19,288	11,679	1,657	5,538	3,910	34	4,891	5,373	8,631
Park	29,568	6,128	6,577	526	2,133	1,770	12	2,346	2,432	2,694
Sheridan	30,210	6,540	6,058	562	2,160	1,725	13	2,256	2,377	2,673
Sublette	9,799	2,248	1,795	193	691	539	4	698	747	643
Sweetwater	43,534	11,544	4,952	992	2,954	1,939	18	2,350	2,677	4,253
Teton	23,265	4,373	3,349	376	1,740	1,186	10	1,462	1,628	1,348
Uinta	20,495	5,987	2,703	514	1,335	942	9	1,175	1,305	2,067
Weston	6,927	1,445	1,345	124	501	399	3	520	555	699
Totals	**520,445**	**122,578**	**79,417**	**10,531**	**36,540**	**26,012**	**220**	**32,658**	**35,673**	**55,927**

WYOMING

American Lung Association in Wyoming

www.lung.org/wyoming

HIGH OZONE DAYS 2015–2017

County	Orange	Red	Purple	Wgt. Avg.	Grade
Albany	1	0	0	0.3	B
Big Horn	0	0	0	0.0	A
Campbell	2	0	0	0.7	B
Carbon	1	0	0	0.3	B
Converse	0	0	0	0.0	A
Fremont	0	0	0	0.0	A
Goshen	INC	INC	INC	INC	INC
Laramie	1	0	0	0.3	B
Natrona	0	0	0	0.0	A
Park	DNC	DNC	DNC	DNC	DNC
Sheridan	INC	INC	INC	INC	INC
Sublette	8	0	0	2.7	D
Sweetwater	5	0	0	1.7	C
Teton	0	0	0	0.0	A
Uinta	2	0	0	0.7	B
Weston	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2015–2017

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Albany	0	1	0	0	0.5	B	4.3	PASS
Big Horn	INC	INC	INC	INC	INC	INC	INC	INC
Campbell	3	3	0	0	2.5	D	4.8	PASS
Carbon	INC	INC	INC	INC	INC	INC	INC	INC
Converse	4	0	0	0	1.3	C	INC	INC
Fremont	2	0	0	0	0.7	B	6.8	PASS
Goshen	INC	INC	INC	INC	INC	INC	INC	INC
Laramie	0	3	0	0	1.5	C	4.2	PASS
Natrona	2	0	0	0	0.7	B	4.9	PASS
Park	0	0	0	0	0.0	A	4.3	PASS
Sheridan	5	1	0	0	2.2	D	7.3	PASS
Sublette	2	0	0	0	0.7	B	5.1	PASS
Sweetwater	0	0	0	0	0.0	A	5.1	PASS
Teton	1	0	0	0	0.3	B	4.6	PASS
Uinta	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Weston	INC	INC	INC	INC	INC	INC	INC	INC

About the American Lung Association

The American Lung Association is the leading organization working to save lives by improving lung health and preventing lung disease, through research, education and advocacy. The work of the American Lung Association is focused on four strategic imperatives: to defeat lung cancer; to improve the air we breathe; to reduce the burden of lung disease on individuals and their families; and to eliminate tobacco use and tobacco-related diseases. For more information about the American Lung Association, a holder of the Better Business Bureau Wise Giving Guide Seal, or to support the work it does, call 1-800-LUNGUSA (1-800-586-4872) or visit: www.Lung.org.

AMERICAN LUNG ASSOCIATION.