



HEALTHY HEARTS NEED CLEAN AIR



Heart disease kills 1 in 3 women.

Almost 300,000 women die each year from heart disease – more women by far than all forms of cancer, combined.

Each minute, one woman dies from heart disease. These women are all of us: mothers, daughters, sisters, and aunts.



How does air pollution harm the heart?

Because our hearts and lungs are so closely related, breathing polluted air harms our hearts.

When we inhale fine particles, our central nervous system elevates our heartbeat and increases blood pressure. This may be a simple reaction to the presence of foreign particles in the lungs. The immediate rise in blood pressure – also called hypertension – is a well-established risk factor for heart disease and stroke. Another reaction that harms our hearts is inflammation. Because of irritating chemicals such as ozone, and tiny particles lodging deep in the lungs, air pollution can trigger inflammation of the vascular system. That inflammation can increase the thickness of arteries over time, and cause the blood vessels to narrow. This increases the risk of heart attacks, stroke, and other problems.

What is cardiovascular disease?

Heart disease accounts for 1 in every 4 deaths, or about 600,000 each year. Heart disease is not a “man’s disease” – it’s the leading cause of death for American women too. Nor is it an “old person’s disease” – 150,000 heart disease deaths per year are in people under the age of 65.

The term “heart disease” refers to a group of related problems: plaque build-up in the arteries, heart failure, arrhythmia, and heart valve problems.

Closely related to heart disease, stroke kills about 130,000 Americans every year. A stroke is an interruption of blood supply to the brain, often due to plaque build-up in the arteries. While heart disease involves the blood vessels around the heart, stroke involves the blood vessels around the brain.

Stroke and heart disease are both considered cardiovascular diseases, and together comprise the first and fourth leading causes of death for all Americans.



Breathing dirty air increases the risk of death from cardiovascular problems, which include heart attack and stroke.

Dirty air harms our hearts by raising blood pressure and triggering inflammation.



What causes cardiovascular disease?

If cardiovascular disease runs in your family, you're more likely to get it. As you get older, you're also more likely to get it. These risk factors can't be changed. But the majority of risk factors for the leading cause of death in the US are somewhat within our control. Health researchers call these "modifiable" risk factors. These include hypertension, smoking, an unhealthy diet, lack of physical activity, high cholesterol, obesity, excessive alcohol consumption, and diabetes. Poverty, stress, depression, race, and ethnicity also increase the risk of cardiovascular disease. African Americans are more likely to be diagnosed with, and die from, cardiovascular disease than whites. Although it's not as well known a risk factor, breathing dirty air increases the risk of cardiovascular problems, such as heart attacks, and related deaths. The specific pollutants to blame for these deaths are fine particle pollution and ground level ozone, or smog.

Dirty air is a heartbreaker

Breathing dirty air harms our hearts both right away and over the long term. Within hours of a pollution spike, exposure to air pollution increases hospitalization rates and death from cardiovascular disease. Those most at risk are the elderly, people who already suffer from heart disease, and people sick with other health conditions. According to a 2010 scientific statement from the American Heart Association, an increase of 10 micrograms of fine particles per square meter of air "contributes on average to the premature death of approximately 1 susceptible person per day in a region of 5 million people." Although the dangers to an individual are small, "the public health burden derived from this ubiquitous risk is enormous." Short term increases in fine particle pollution lead to the death of tens of thousands of people every year in the US.

Longer-term exposure to fine particles (over the course of years instead of days) can shave months to years off of life expectancy in highly exposed populations. The American Heart Association reports that a long-term average increase of 10 micrograms of fine particles per square meter of air leads to a 10% increase in deaths from all causes. With this kind of long-term exposure, the relative risk of death specifically from cardiovascular disease increases by 3% to 76%. Even a 3% increase in risk of the leading cause of death has huge public health implications, and that's at the lower end of what experts estimate. Researchers studying large populations have found that air pollution increases the risk of death from cardiovascular disease even at levels below current federal and international standards. In matters of the heart, there is no safe level of particle pollution. This means that even after meeting federal guidelines for particle pollution and ozone, communities can reap health benefits by continuing to reduce pollution.

Small risk, big impact

Air pollution is a minor risk factor for cardiovascular disease (CVD), compared to traditional risk factors such as diet and physical activity. But because so many people die of CVD, even small risks have a big impact. Moreover, by identifying modifiable risk factors – things that are within our power as a society to change, such as air pollution – we can make a big difference in lives saved. Air pollution is estimated to cause over 3 million deaths each year worldwide, and, according to the World Health Organization, it accounts for 22% of the "disease burden" – years of life lost to illness and death – of ischemic heart disease, one of the cardiovascular diseases.

In the US, outdoor air pollution is responsible for 200,000 deaths each year, of which tens of thousands are due to cardiovascular-related deaths. With such a huge health problem, even a small risk factor has a big impact.



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About fine particle pollution

Fine particle pollution comes from vehicle emissions, power plants, and fires (grills, fireplaces, cigarettes, and wood stoves, as well as forest fires) – anywhere organic matter is burned. Fine particles are so small that the individual liquid droplets and solids are invisible to the naked eye, though they can form blankets of haze. Also called “PM 2.5,” fine particles are less than 2.5 microns in diameter – 1/30th the width of a human hair. This microscopic airborne pollution can lodge deep in the lungs, and even pass into the bloodstream.

Millions of people live in areas that are in violation of EPA's health based particle pollution standards. These 66 million Americans are breathing levels of fine particles at levels the EPA has deemed dangerous to human health. The impacts of particle pollution on the heart is just one of many potential health risks.

About ozone pollution

Exposure to ground level ozone, or smog, has also been linked to cardiovascular harm. Ozone is not emitted directly into the air, but is formed through the reaction, triggered by sunlight, of certain chemicals with oxygen in the atmosphere. Chemicals that undergo such reaction are known as “ozone precursors” and include volatile organic compounds (VOCs) such as methane and nitrogen oxides (NOx). You may have heard of “good” ozone high in our atmosphere, which acts as a protective layer against the sun's radiation. But ozone is a strong irritant, so at ground level it is harmful to breathe. Some of the major sources of ozone precursors are emissions from power plants and industrial facilities, motor vehicle exhaust, gasoline vapors, and chemical solvents.

A changing climate will increase heart-damaging air pollution

Both particle pollution and unhealthy ozone levels are predicted to increase with a changing climate, especially in areas already experiencing poor air quality. That's because climate change will increase temperatures, driving ozone production, which thrives on heat. It also will increase particle emissions, due to increases in energy demand. The levels of both fine particles and ozone are strongly influenced by shifts in the weather, and therefore will be affected by climate change. According to the 2013 report from the Intergovernmental Panel on Climate Change, “locally higher surface temperatures in polluted regions will trigger regional feedbacks in chemistry and local emissions that will increase peak levels of ozone and PM 2.5 [fine particle pollution].” In this way, climate change can be expected to increase the risk of death from cardiovascular disease. Increased temperatures will harm heart health in another way, too: higher temperatures contribute directly to cardiovascular mortality, especially in the elderly. Excessive heat can strain the cardiovascular system, triggering life-threatening heart attacks, among other health effects. Extreme weather events are already impacting communities around the world in just this way: According to the World Health Organization, the European heat wave of 2003 led to 70,000 excess deaths.



We need to be engaged citizens, and use the power of mother love to protect our hearts.



How can we protect our hearts and our air?

You can help protect your heart and the hearts of your loved ones by avoiding exposure to high levels of air pollution. Learn about the real-time air quality in your community through the AirNow.gov website and app. You can also limit your contribution to fine particle, ozone, and carbon pollution by driving less, insulating your home, maintaining your refrigerator, line-drying your clothes, and eating less meat. There's dozens of ways to make a difference.

But individual action will only get us so far. Join us in telling our politicians that we are deeply concerned about air pollution, climate change, and cardiovascular health, and they should be too.

Together, we can:

- Limit dangerous carbon pollution from power plants;
- Clean up pollution from cars and trucks;
- Reduce ozone pollution nationwide;
- Support renewable energy sources like wind and sunshine;
- Make America the most energy efficient nation in the world by 2035; and
- Reduce our risk of cardiovascular mortality.

Join us!

For sources, see momscleanairforce.org/heart

