



Utah Physicians for a Healthy Environment

423 W 800 S, Suite A108

Salt Lake City, UT 84101

801-502-5450

Summary of the Research on Exercise and Air Pollution...just the facts.

Exercise and air pollution have off-setting health effects. Exercise reduces the harm of air pollution exposure and pollution undermines the health benefits of exercise. Regular exercise reduces blood pressure, systemic inflammation, blood clot formation, improves nerve signaling of the heart and blood vessels, protects the lining of blood vessels, improves brain function, and prolongs life expectancy. **All of these beneficial effects are diminished or eliminated by breathing air pollution.** The precise level at which it does more harm than good to exercise cannot yet be determined. But for anything less than extreme exercise and high pollution levels, exercising in pollution will generally be more beneficial than not exercising at all. In fact, for people that are exposed to air pollution, exercising is probably even more important than for those fortunate enough to breathe clean air.

What are the effects of air pollution on the athlete?



- **Exercise changes the rate, mechanics and physiology of breathing in multiple ways, increasing a person's air pollution exposure. Total inhaled particles are increased by 300-450% during light exercise, and 600-1000% during high intensity exercise, with men having greater inhalation totals than women. During high intensity exercise respiratory defense mechanisms are reduced.**
- **During exercise, even low concentrations of airborne pollutants cause lung damage similar in magnitude to the damage caused by high concentrations of pollution in people who are not exercising.**
- **Research, primarily in animals, suggests that long term daily exercise may reduce some of the damaging effects of chronic air pollution exposure.**
- **Air pollution causes inflammation of heart muscle cells even in young, healthy adults**

- **Ozone (the primary summer time pollutant) reduces maximal exercise time, workload, oxygen consumption and performance.** Ozone impairs lung function and promotes lung inflammation in athletes and non-athletes, but has a significantly greater impact during high intensity efforts and on those with asthma.
- **For each 17 ppb (parts per billion) of ozone, aerobic fitness scores are reduced by 1.52%.** Ozone levels over 70 ppb are common during summer, with the highest levels occurring in late afternoon.
- **In school children living in high ozone areas, their risk of developing asthma is directly proportional to the time they spend outside, and much higher if they participate in three or more outdoor sports.**
- **Elevated ozone and temperature act synergistically to increase lung inflammation.** Time your exercise routine to avoid late afternoon summer time workouts.
- **Both acute and chronic particulate pollution (the primary winter time pollutant) impair lung function and promote lung inflammation.**
- **In dense pollution common to urban settings, carbon monoxide (CO) levels in the blood during exercise can approach the levels found in smokers.**
- **The air pollution you breathe before exercise matters.** Exposure before exercise elevates resting heart rate and can limit exercise ability.
- **Indoor air quality in some gyms can be a serious problem, producing high levels of particulate pollution and VOCs, especially in newer buildings and equipment.** Ask how much air in your gym is “recycled” (an indication of poor ventilation) and whether toxic cleaning products are used. Gyms can have very high levels of CO₂, which can temporarily impair brain function.
- **There is important genetic variability which determines sensitivity to pollution.**



Yes, air pollution affects us in many ways! Utah Physicians for a Healthy Environment is dedicated to protecting the health and well-being of the citizens of Utah by promoting science-based health education and interventions that result in progressive, measurable improvements to the environment.

Less air pollution means less health risks. Get involved with UPHE to help clean up our air and make your voice heard. We work with legislators and government agencies that make the decisions that affect our air quality and our overall environment. Your family's quality of life depends upon it!

**Utah Physicians for a Healthy Environment - 423 W 800 S Ste A108, Salt Lake City, Utah 84101
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