



*Utah Department of*  
**Environmental Quality**

Department of Environmental Quality

# **AIR QUALITY AND OUTDOOR EXERCISE**

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# Benefits of Exercise

- Each year there are three million deaths due to physical inactivity in the US alone (5)
- Low levels of physical activity have been associated with increased risk of death (6)
- Poor air quality may be a deterrent to leisure-time physical activity. (5)



# What is Air Quality

- Air Quality is a reflection of the amount of foreign material in the air we breathe
- While many pollutants can be present in air, two commonly talked about pollutants are PM 2.5 and Ozone.
- PM 2.5 is made up of tiny solid or liquid particles that may include dust, dirt, soot, and smoke (1)
- Ozone is produced by nitrogen and organic compounds in the presence of sunlight (2)



# How Air Quality is Determined

- Air quality is measured under the direction of the Environmental Protection Agency (EPA) (3)
- There are air quality measuring stations throughout the US, including in Utah (4)
- Certain levels have been established by the EPA to determine the quantity of pollutants in the air in our community, although the potential health risks at any given level are unclear



# Air Quality Grading

Air Quality Index (AQI)	PM 2.5	Ozone
Good	0 - 12.0 $\mu\text{g}/\text{m}^3$	0 - 0.059 ppm
Moderate	12.1 - 35.4 $\mu\text{g}/\text{m}^3$	0.06 - 0.075 ppm
Unhealthy for Sensitive Groups	35.5 - 55.4 $\mu\text{g}/\text{m}^3$	0.076 - 0.095 ppm
Unhealthy	55.5 - 150.4 $\mu\text{g}/\text{m}^3$	0.096 - 0.115 ppm
Very Unhealthy	150.5 - 210.4 $\mu\text{g}/\text{m}^3$	0.116 - 0.374 ppm
Hazardous	Above 210.5 $\mu\text{g}/\text{m}^3$	Above 0.375 ppm

Based on a 24-hour average.      Based on an 8-hour average.



# What Air Quality Means

- When the amount of pollutants in the air increases, the “quality” of the air we breathe is reduced
- Some people, especially those who are sensitive to pollution, often stay inside or avoid outdoor exercise when pollution levels are high
- As there are many health benefits to an active lifestyle, continuing outdoor activity throughout the year may be the healthiest choice for most people



# Benefits of Exercise

- Regular exercise may result in a 30% reduction in all cause mortality with a 35% reduction in cardiovascular disease, coronary heart disease, and stroke (7)
- A recent study showed that the risk of death was 13% lower for every 1 MET increase in activity level (6)
- This suggests that the higher your activity level, the lower your risk for mortality



# Measuring activity level

- Amount of physical exertion is commonly measured as a Metabolic Equivalent of Task (MET)
- Scientifically defined as a set amount of oxygen used in relation to body weight
- 1 MET = energy required by the average adult while sitting quietly (8)
- A 2 MET activity requires twice as much energy expenditure as a 1 MET activity (8)



# METS for Common Activities

- Walking the Dog = 3.5 METS
- General Golf = 4.0 METS
- Skateboarding = 5.0 METS
- General Jogging = 7.0 METS
- General Tennis = 7.0 METS
- Snowshoeing = 8.0 METS
- Mountain Biking = 8.5 METS
- Rock Climbing, ascending = 11.0 METS (8)



# The Small Risk of Pollution

- There is a small, but identifiable risk to population level exposure to air pollution
- One study showed that a 10ppb increase in ozone only resulted in a 0.52% increase in daily mortality (9)
- Another study found increased mortality rate of 0.34% (in younger people) and 0.64% (in older people) with each measured increase in fine particulate matter (10)



# Recommendations

- Although there is a very small risk with exposure to air pollution, the positive effects of exercise outweigh those risks
- It is recommended that for most people, the large benefit of physical activity outweighs the small risk of exposure to air pollution, even on days with higher levels of pollution



# Additional Resources

- Air Quality Recess Guidance for Schools
- <http://health.utah.gov/asthma/air%20quality/Recess%20Guidance.html>
- Utah Department of Environmental Quality, Division of Air Quality
- <http://www.airquality.utah.gov>
- Recommendations for Outdoor Physical Activity During Ozone Season
- [http://health.utah.gov/asthma/air%20quality/ozone\\_recommendations.html](http://health.utah.gov/asthma/air%20quality/ozone_recommendations.html)
- Ozone and Your Patients' Health – Training for Health Care Providers
- <http://www.epa.gov/apti/ozonehealth/index.html>



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