

Short-Term Health Effects Associated with Exposure to Air Pollution During Exercise



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Air Resources Board



California Environmental Protection Agency

Athletes: A Vulnerable Population

- **During exercise people breathe:**
 - Faster
 - Through their mouths
 - Deeper
- **Athletes receive higher doses of air pollution than the general public**
 - Particularly those who exercise near traffic such as joggers, bicycle commuters, and pedestrians



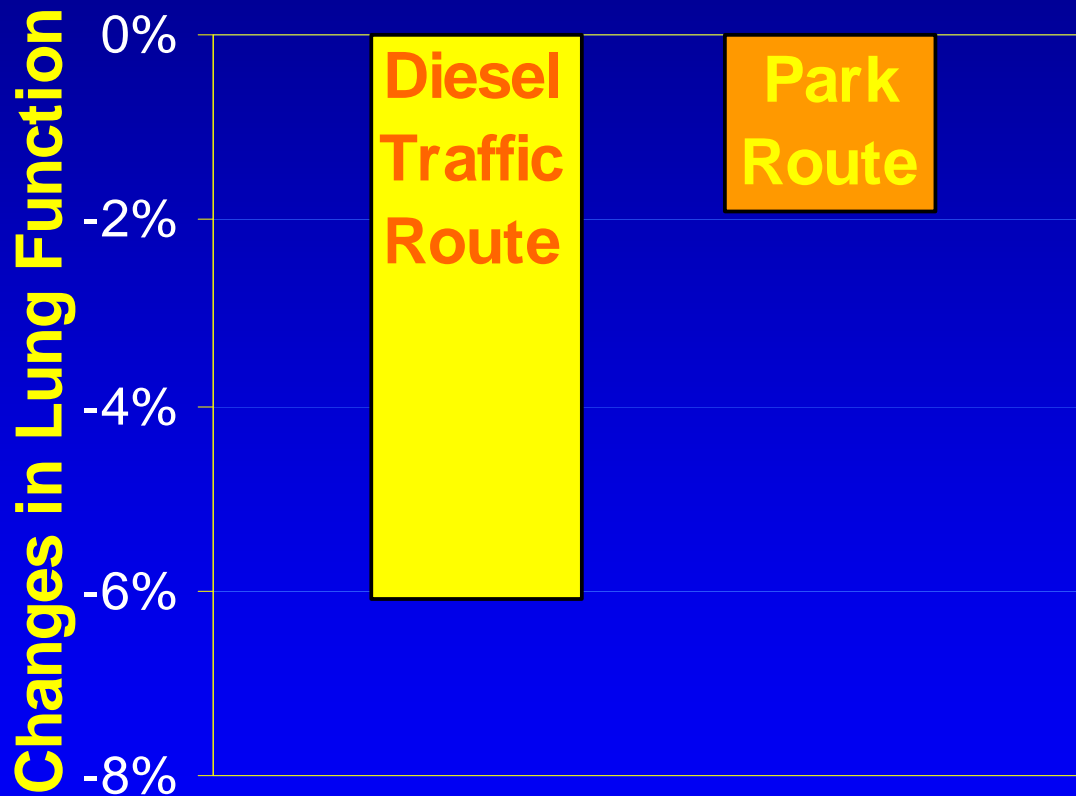
Respiratory Effects of Exposure to Diesel Traffic in Asthmatics

- 60 adults with mild or moderate asthma in London
- Walked 2 hours twice:
 - In an area of heavy diesel traffic
 - In an area of no traffic
- Real-time information on:
 - Pollution exposure
 - Physiological measurements



McCreanor J, et al. Respiratory effects of exposure to diesel traffic in persons with asthma. *N Engl J Med* 2007;357:2348-58. Supported by the Health Effects Institute.

Decreases in Lung Function among Asthmatic Adults after Exercise



Health Effects after Exercising in Air Pollution

- 4-X ↑ DNA damage after cycling in traffic
- 3-5% ↓ in lung function with ozone exposure while cycling
- 3-X ↓ in ability to deliver oxygen to the heart while exposed to diesel exhaust during exercise
- 3-X ↑ asthma development among children in high ozone areas who played multiple outdoor sports



ARB Projects

- **Current**

- Ultrafine particle exposure and short-term respiratory outcomes among bicycle commuters



- **Planned**

- Comparison of particulate matter exposure among different commuting modes

- **ARB's Bicycle Awareness Program**

<http://www.arb.ca.gov/planning/tsaq/bicycle/bicycle.htm>



Exercise Promotes Good Health

- **Increases clearance of pollutants**
- **Increases the body's antioxidant activity**
- **Improves quality of life**
 - Fewer sick days
 - Better cardiac and respiratory health
 - Live longer



Conclusions and Recommendations

Athletes should consider:

- Health advisory press releases
- Air quality advisories
- Route and location

● Communities should ensure:

- Air quality alerts reach their audience
- Land development includes plans to encourage cyclists and pedestrians

