

Episodic Air Pollution Exposures and Shale Gas Development

Residents living or working near shale gas development (SGD)—sometimes called fracking—are exposed to higher concentrations of air pollution.¹ Research shows there are significant associations between SGD and various health outcomes, including cardiovascular and respiratory complications, birth impacts, and hospitalizations.² Air pollution exposure can impact individuals differently based on a variety of factors: type and concentration of contaminants, duration of exposure, personal susceptibility, and lifestyle factors such as diet, exercise, alcohol consumption, or pre-existing medical conditions.³

WHAT TO KNOW ABOUT EPISODIC AIR POLLUTION EXPOSURES

An air pollution episode refers to a period of pollution or poor air quality that blankets a geographical area. These episodes of increased air pollution can be caused by short-term releases of air pollutants from SGD that are exacerbated by weather and topography.



AIR EMISSIONS ARE VARIABLE AND SOMETIMES EXTREME

SGD is a complex industry with many stages and processes. Each stage and process can emit different mixtures of pollutants at varied levels of intensity. Even during well development, chemicals used at each well pad may vary, and the gas produced from each well may have different chemical mixes. Because of this variability, it can be extremely difficult to understand what chemicals someone is being exposed to, the frequency or duration of the exposure, or the concentration of chemicals in the exposure.

WEATHER CAUSES PATTERNS OF VARIABILITY

Sunlight, rain, wind, and temperature can have an impact on concentrations of pollutants in an area. Higher air temperatures and sunshine can accelerate chemical reactions in the atmosphere, and rain can help wash away particulate matter and dissolvable pollutants. Wind speed and patterns can also impact how pollutants disperse.⁴

LOCAL GEOGRAPHY AFFECTS EXPOSURES

Pollutants tend to collect in valleys. Wind, cloud cover, and time of day affect how pollutants travel in valleys or over hills. Under certain conditions in valleys, air pollution can travel close to the ground for several miles. Temperature inversions are another concern of air pollution episodes. A temperature inversion is when a layer of warm air traps cool air near the Earth's surface, the inverse of what normally happens. An inversion concentrates any pollutants and prevents the pollution from dispersing into the atmosphere.

HOMES MAY BE CLOSE TO MULTIPLE SOURCES

The distance and direction of different pollution sources within a few miles of a residence will affect the variability of exposures on any given day or night. It's important to identify what types of shale gas facilities are located nearby, how many there are, and if related diesel truck traffic uses roads in the same vicinity. You can check locations of oil and gas facilities at oilandgasthreatmap.com/threat-map

WHAT CAN YOU DO?

- Locate SGD sources near your home, school, or work, including well pads, compressors stations and tanks, and processing plants.
- Learn which weather conditions will bring pollutants toward your home.
- Stay informed and watch the weather forecast for your area. You can sign up for air quality alerts at enviroflash.info or check daily air quality by visiting airnow.gov and entering your zip code.
- In the event of an unhealthy air quality day, children and other vulnerable populations (the elderly, those with existing health conditions, pregnant individuals) should stay inside or limit going outdoors to short intervals.
- On unhealthy outdoor air days, keep windows closed to minimize air pollution entering the building.
- Limit indoor pollutants, such as molds and chemical pollutants in air fresheners, cleaning supplies, and some paints. The [American Lung Association](https://www.americanlung.org) has compiled a list of safe household cleaning supplies.



Photo courtesy of Jacob Lund Photography from NounProject.com

- If possible, get an air filter to remove some particulate matter and chemicals from the air. Information on recommended air filters, as well as how to make your own filter at home, can be found on EHP's website.
- Talk to a trusted health professional and keep a health symptom diary.
- **Contact your elected officials.** Let them know what you are experiencing and advocate for stricter pollution controls.

For more recommendations about how to protect your health and monitor your air, water, and soil quality, visit [EHP's website](https://www.environmentalhealthproject.org).

¹ Gonzalez et al. (2021). Upstream oil and gas production and ambient air pollution in California. *Science of the total Environment*, 806. <https://www.sciencedirect.com/science/article/pii/S0048969721053754>

² Environmental Health Project. (2023). *Health Impacts of Shale Gas Development: A Collection of Research*. https://www.environmentalhealthproject.org/_files/ugd/a9ce25_feddfe7415ba4d3b894e94821aa40aab.pdf

³ U.S. Environmental Protection Agency. (2022, August 30). *Human Exposure and Health*. <https://www.epa.gov/report-environment/human-exposure-and-health>

⁴ NOAA National Weather Service. (n.d.). *Clearing the Air on Weather and Air Quality*. Retrieved May 3, 2023, from <https://www.weather.gov/wrn/summer-article-clearing-the-air>

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724.260.5504 ■ www.environmentalhealthproject.org ■ info@environmentalhealthproject.org