

Asthma is a chronic disease that affects breathing. Asthma attacks, also known as exacerbations, may be triggered by indoor and outdoor air pollution, stress, and other physical and environmental factors. During an exacerbation, various triggers cause the airway to become inflamed and narrowed, resulting in shortness of breath, cough, chest pain, and wheezing.

In the United States, more than 25 million people, including four million children, have asthma.¹ While the link between air pollution and asthma exacerbations is well understood, some research suggests that exposure to air pollution, especially early in life, may play a role in developing the disease in the first place.²

Since 2005, shale gas development (SGD) – also known as fracking – has grown rapidly. Construction and operation of shale gas infrastructure, often close to where people live, can release toxic emissions that can make asthma worse. According to The Oil & Gas Threat Map, over 17 million people live within a half mile of an oil and gas facility.³ Both air quality impacts and social/psychological effects are serious public health concerns for individuals with asthma living near SGD.



AIR POLLUTION

Air pollutants, such as carbon monoxide (CO), hydrogen sulfide (H₂S), nitrogen oxides (NO_x), particulate matter (PM), and volatile organic compounds (VOCs), are released from various stages of SGD. NO_x and VOCs mix in the presence of sunlight to form ground-level ozone, or smog. Exposure to air pollutants from SGD and smog may impair lung function and trigger asthma attacks.

Using publicly available data from the Pennsylvania Department of Health, Bushong et al. (2022) found a significant positive association between asthma hospitalization admission rates and geographic density of shale gas wells.⁴

Research conducted by Willis et al. (2018) found that children and adolescents exposed to newly built shale gas wells had 25% greater odds of being hospitalized for asthma compared to children and adolescents not exposed to shale gas wells. The study found increases in odds of hospitalizations for years after the initial SGD drilling began. These findings suggest that exposure continues even after drilling has ended and wells are in operation.⁵



Flaring in a residential area. Photo courtesy of Bob Donnan.

STRESS

Research also shows that stress can trigger asthma attacks. In communities located near SGD, stress may result from social upheaval, worries about family health, persistent noise and light pollution, and sleeplessness.

- Research conducted by Fisher et al. (2018) examined the quality-of-life impacts on 34 residents who lived and worked near SGD operations in Appalachian Eastern Ohio.⁶ The researchers reported quality-of-life impacts in five categories: psychological stress, social stress, environment, physical health, and traffic. Psychological stress was a significant theme for residents living near SGD, including:
 - Concern for the future related to SGD.
 - Frustration with interactions with industry officials.
 - Stress about noise or light pollution.
 - The need to leave the region or adapt to changes.
- Research conducted by Casey et al. (2018) evaluated the association between SGD and symptoms of depression.⁷ Medical records for over 4,000 adult primary care patients were reviewed for mild, moderate, moderately severe, or severe depression symptoms. Associations were observed between living closer to more and bigger wells and an increase in depression symptoms.

HOW TO BEST PROTECT LUNG HEALTH

- Be aware of changes in the air where you live, work, and play. You can check the air quality in your area by visiting [airnow.gov](https://www.airnow.gov) and entering your zip code.
- Identify the types and numbers of shale gas facilities located nearby and find out 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.

- Exposure risk may increase with the number of pollution sources: keep windows closed and stay indoors when the wind is blowing from pollution sources.
- When air is cooling and settling, such as at night, pollution becomes more concentrated closer to the ground. Keep windows closed and make use of indoor air filters to reduce exposure to indoor air pollution.
- Talk to a trusted health professional about your concerns related to shale gas exposure and asthma exacerbations.
- Keep a health diary of symptoms and environmental factors – such as odors and noises – that are evident, along with dates and times, that you can share with a health professional.

Air pollution from SGD tends to be episodic, so symptoms may come and go. Being able to identify what may cause asthma attacks can help you take appropriate steps to minimize exposure. For additional information on protecting your health and how to talk with a health professional if you have concerns, visit [our website](#).

¹ Centers for Disease Control and Prevention. (2022, December 13). *Most Recent National Asthma Data*. <https://www.cdc.gov/asthma/most-recent-national-asthma-data.htm>

² American Academy of Allergy Asthma and Immunology. *Your Questions Answered on Air Pollution and Asthma*. Retrieved April 20, 2023, from <https://www.aaaai.org/tools-for-the-public/conditions-library/asthma/your-questions-answered-on-air-pollution-and-asthma>

³ Earthworks, FrackTracker Alliance. *The Oil & Gas Threat Map*. Retrieved March 22, 2023, from <https://oilandgasthreatmap.com/threat-map/>

⁴ Bushong, A., McKeon, T. P., Boland, M. R., & Field, J. (2022). Publicly available data reveals association between asthma hospitalizations and unconventional natural gas development in Pennsylvania. *PLOS ONE*, 17(3), e0265513. <https://doi.org/10.1371/journal.pone.0265513>

⁵ Willis, M., Jusko, T., Halterman, J., Hill, E. (2018). Unconventional natural gas development and pediatric asthma hospitalizations in Pennsylvania. *Environmental Research*, 166, 402-408. <https://www.sciencedirect.com/science/article/abs/pii/S001393511830183X>

⁶ Fisher, M., Mayer, A., Vollet, K., Hill, E., Haynes, E. (2018). Psychosocial implications of unconventional natural gas development: Quality of life in Ohio's Guernsey and Noble Counties. *Journal of Environmental Psychology*, 55, 90-98. <https://www.sciencedirect.com/science/article/abs/pii/S0272494417301858?via%3Dihub>

⁷ Casey, J., Wilcox, H., Hirsch, A., Pollak, J., & Schwartz, B. (2018). Associations of unconventional natural gas development with depression symptoms and disordered sleep in Pennsylvania. *Scientific Reports*, 8, <https://www.nature.com/articles/s41598-018-29747-2>

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