

Featured Research Review:

Bushong, A., McKeon, T., Boland, M.R., Field (2022). Publicly available data reveals association between asthma hospitalizations and shale gas development in Pennsylvania.

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Terms to know:

- [Hospitalization admission rates \(HAR\)](#) — the number (and mean/average) of hospital admissions per person per year. Severe asthma exacerbations are recorded in the form of hospital admissions.
- [Asthma](#) — chronic airway disease marked by spasms in the bronchi of the lungs, causing difficulty in breathing.
- [Severe asthma exacerbations](#) — during an asthma attack, also known as asthma exacerbation, the airways become swollen and inflamed.

With over 12,000 shale gas development (SGD) wells drilled in Pennsylvania, many researchers have looked to understand the potential health impacts on nearby residents. Prior studies have shown associations between someone's proximity to SGD and medical conditions such as heart failure, low birth weight, preterm birth, and asthma. Researchers examine severe asthma exacerbation because they already understand that this condition can be triggered by environmental factors such as poor air quality. Previous research has shown that SGD can release a variety of environmental toxicants, such as volatile organic compounds (VOCs), nitrogen dioxide (NO_x), silica dust, and particulate matter (PM_{2.5}).

A new study (Bushong, A., McKeon, T., Boland, M.R., Field. 2022. Publicly available data reveals association between asthma hospitalizations and unconventional natural gas development in Pennsylvania) attempted to understand whether there is an association between SGD and severe asthma exacerbations by examining hospital admission rates (HAR) for asthma. Researchers used public data from the PA Department of Health to gain access to asthma HAR. Data for active SGD wells was sourced from the PA Department of Environmental Protection and used to determine the number of wells drilled each year in various counties. Due to limitations in the available data prior to 2005, and a change in medical coding after 2014, the researchers looked at data between 2005-2014.

The modeling in the study showed a significant relationship between asthma HAR and annual shale gas well density.

- A 0.01 increase in annual well density correlated with a 3% increase in asthma HAR overall for urban and rural areas combined.
 - Factors that were seen to have a big impact on asthma HAR include median income, percentage of the population in urban areas, and PM_{2.5} levels.

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- More specifically, a 0.01 increase in annual well density correlated with a 3.31% increase in asthma HAR for rural counties.
 - Factors that were seen to have a big impact on asthma HAR include median income, percentage of white population, and PM_{2.5} levels.
- The conclusion reached by the authors is that available county-level data support an association between an increase in SGD with asthma HAR in rural counties in Pennsylvania.

To learn more about this study, explore these links:

- Bushong, A., McKeon, T., Regina Boland, M., & 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>
- Croft, D. P., Zhang, W., Lin, S., Thurston, S. W., Hopke, P. K., Masiol, M., Squizzato, S., van Wijngaarden, E., Utell, M. J., & Rich, D. Q. (2018). The Association between Respiratory Infection and Air Pollution in the Setting of Air Quality Policy and Economic Change. *Annals of the American Thoracic Society*. <https://doi.org/10.1513/annalsats.201810-691oc>
- McKenzie, L. M., Blair, B., Hughes, J., Allshouse, W. B., Blake, N. J., Helmig, D., Milmoie, P., Halliday, H., Blake, D. R., & Adgate, J. L. (2018). Ambient Nonmethane Hydrocarbon Levels Along Colorado's Northern Front Range: Acute and Chronic Health Risks. *Environmental Science & Technology*, 52(8), 4514–4525. <https://doi.org/10.1021/acs.est.7b05983>
- Rasmussen, S. G., Ogburn, E. L., McCormack, M., Casey, J. A., Bandeen-Roche, K., Mercer, D. G., & Schwartz, B. S. (2016). Association Between Unconventional Natural Gas Development in the Marcellus Shale and Asthma Exacerbations. *JAMA Internal Medicine*, 176(9), 1334. <https://doi.org/10.1001/jamainternmed.2016.2436>
- Willis, M. D., Jusko, T. A., Halterman, J. S., & Hill, E. L. (2018b). Unconventional natural gas development and pediatric asthma hospitalizations in Pennsylvania. *Environmental Research*, 166, 402–408. <https://doi.org/10.1016/j.envres.2018.06.022>