

AMERICAN MEDICAL ASSOCIATION HOUSE OF DELEGATES

Resolution: 439
(A-22)

Introduced by: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island,
Vermont

Subject: Informing Physicians, Health Care Providers, and the Public That Cooking
with a Gas Stove Increases Household Air Pollution and the Risk of
Childhood Asthma

Referred to: Reference Committee D

1 Whereas, In the United States, more than 11.5 million people with asthma, including nearly 3
2 million children, report having had one or more asthma attacks in 2015¹; and
3
4 Whereas, Household air pollution is a major health problem. Worldwide, it is responsible for
5 more than three million deaths a year,² and indoor air pollution is strongly linked to asthma;³
6 and
7
8 Whereas, Household and outdoor air pollution are social determinants of health and associated
9 with an increased risk of asthma;^{4,5} and air pollution contributes to health disparities in asthma;⁶
10 and
11
12 Whereas, According to the United States Environmental Protection Agency (EPA), a growing
13 body of scientific evidence indicates that, even in large cities, indoor air can be more polluted
14 than the outdoor air;⁷ and
15
16 Whereas, Burning natural gas creates nitrogen dioxide (NO₂), particulate matter (PM_{2.5}), carbon
17 monoxide (CO), and other byproducts that contribute to air pollution;⁸ and
18
19 Whereas, Nitrogen dioxide levels are significantly higher in homes with gas stoves than homes
20 with electric stoves;^{9,10} and

¹ Zahran HS, Bailey CM, Damon SA, Garbe PL, Breyse PN. Vital Signs: Asthma in Children – United States, 2001-2016. *MMWR Morb Mortal Wkly Rep* 2018;67:149-155.DOI: <http://dx.doi.org/10.15585/mmwr.mm6705e1>

² The World Health Organization. Household air pollution and health. <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>. Published May 8, 2018. Accessed October 5, 2019.

³ Breyse PN, Diette GB, Matsui EC, Butz AM, Hansel NN, McCormack MC. Indoor air pollution and asthma in children. *Proc Am Thorac Soc*. 2010;7(2):102–106. doi:10.1513/pats.200908-083RM.

⁴ Sharma H, Hansel N, Matsui E, Diette G, Eggleston P, Breyse P. Indoor environmental influences on children's asthma. *Pediatr Clin North Am*. 2007;54:103–120. <https://doi.org/10.1016/j.pcl.2006.11.007>.

⁵ Guarnieri M, Balmes JR. Outdoor air pollution and asthma. *Lancet*. 2014;383(9928):1581-92.

⁶ Forno E, Celedón JC. Health disparities in asthma. *Am J Respir Crit Care Med*. 2012;185(10):1033–1035. doi:10.1164/rccm.201202-0350ED.

⁷ Environmental Protection Agency. The inside story: A guide to indoor air quality <https://www.epa.gov/indoor-air-quality-iaq/inside-story-guide-indoor-air-quality>. Accessed April 8, 2019.

⁸ Environmental Protection Agency. Natural gas combustion. www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf. Accessed February 14, 2019.

⁹ Belanger K, Gent JF, Triche EW, Bracken MB, Leaderer BP. Association of indoor nitrogen dioxide exposure with respiratory symptoms in children with asthma. *Am J Respir Crit Care Med*. 2006;173(3):297–303. doi:10.1164/rccm.200408-1123OC.

¹⁰ Mullen NA, Li J, Russell, ML, Spears, M, Less, BD, Singer BC. Results of the California Health Homes Indoor Air Quality Study of 2011–2013: impact of natural gas appliances on air pollutant concentrations. *Indoor Air*. 2016;26: 231–245. <https://doi.org/10.1111/ina.12190>.

1 Whereas, In a simulation of homes where gas cooking stoves are used without exhaust
2 ventilation hoods, indoor NO₂ levels exceed outdoor air quality standards in 41%–70% of
3 homes;¹¹ and
4

5 Whereas, The burning of natural gas in stoves releases nitrogen oxides (NO_x) into indoor air
6 and is an important source of household air pollution in the United States;¹² and
7

8 Whereas, According to the EPA, “Breathing air with a high concentration of NO₂ can irritate
9 airways in the human respiratory system. Such exposures over short periods can aggravate
10 respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing,
11 wheezing or difficulty breathing), hospital admissions and visits to emergency rooms. Longer
12 exposures to elevated concentrations of NO₂ may contribute to the development of asthma and
13 potentially increase susceptibility to respiratory infections. People with asthma, as well as
14 children and the elderly are generally at greater risk for the health effects of NO₂”;¹³ and
15

16 Whereas, The World Health Organization recognized the associations between cooking with
17 gas stoves, indoor NO₂ levels, and asthma in their 2010 guidelines for indoor air quality;¹⁴ and
18

19 Whereas, Children living in a home with a gas cooking stove have a 42% increased risk of
20 current asthma and a 24% increased lifetime risk of asthma according to a meta-analysis;¹⁵ and
21

22 Whereas, A year-long, prospective study of NO₂ exposure in 1,342 children with active asthma
23 in Massachusetts and Connecticut found a dose-response relationship between the amount of
24 NO₂ exposure and risk of asthma severity. Every five-fold increase in NO₂ exposure above 6
25 parts per billion (ppb) was associated with a dose-dependent increase in the risk of asthma
26 severity, wheeze, and rescue medication use;¹⁶ and
27

28 Whereas, About one-third of households in the United States cook with gas stoves;¹⁷ and
29

30 Whereas, In homes with gas cooking stoves, children whose parents reported never using
31 exhaust fans, or who did not have them available had lower lung function and higher adjusted
32 odds of asthma 1.56 (1.03, 2.32), wheeze, 1.66 (1.16, 2.38), and bronchitis 1.66 (1.05–2.70)
33 compared to children in homes where parents reported using exhaust fans;¹⁸ and
34

35 Whereas, In a randomized study comparing replacing gas stoves with electric stoves, using a
36 free-standing high efficiency particulate air (HEPA) filters and installing above-stove hoods with
exhaust fans were effective in reducing NO₂ levels;¹⁹ and

¹¹ Logue JM, Klepeis NE, Lobscheid AB, Singer BC. Pollutant exposures from natural gas cooking burners: A simulation-based assessment for Southern California. *Environ Health Perspect*. 2014;122:43–50. <https://dx.doi.org/10.1289/ehp.1306673>.

¹² Environmental Protection Agency. Nitrogen dioxide's impact on indoor air quality. <https://www.epa.gov/indoor-air-quality-iaq/nitrogen-dioxides-impact-indoor-air-quality>. Accessed October 12, 2019.

¹³ Environmental Protection Agency. Nitrogen dioxide (NO₂) pollution. <https://www.epa.gov/no2-pollution/basic-information-about-no2>. Accessed April 8, 2019.

¹⁴ Jarvis DJ, Adamkiewicz G, Heroux ME, et al. Nitrogen dioxide. WHO Guidelines for Indoor Air Quality: Selected Pollutants. Geneva: World Health Organization; 2010. <https://www.ncbi.nlm.nih.gov/books/NBK138707/>.

¹⁵ Lin W, Brunekreef B, Gehring U. Meta-analysis of the effects of indoor nitrogen dioxide and gas cooking on asthma and wheeze in children. *Int J Epidemiol*. 2013;42:1724–1737. doi:10.1093/ije/dyt150.

¹⁶ Belanger K, Holford TR, Gent JF, Hill ME, Kezik JM, Leaderer BP. Household levels of nitrogen dioxide and pediatric asthma severity. *Epidemiology*. 2013;24(2):320–330. doi:10.1097/EDE.0b013e318280e2ac.

¹⁷ US Department of Housing and Urban Development and US Census Bureau, American Housing Survey for the United States. www.census.gov/prod/2011pubs/h150-09.pdf. Published 2009. Accessed February 13, 2019.

¹⁸ Kile ML, Coker ES, Smit E, Sudakin D, Molitor J, Harding AK. A cross-sectional study of the association between ventilation of gas stoves and chronic respiratory illness in U.S. children enrolled in NHANESIII. *Environ Health*. 2014;13:71. doi:10.1186/1476-069X-13-71.

¹⁹ Paulin LM, Diette GB, Scott M, McCormack MC, Matsui EC, Curtin-Brosnan J, Williams DL, Kidd-Taylor A, Shea M, Breyse P, Hanse NN. Home interventions are effective at decreasing indoor nitrogen dioxide concentrations. *Indoor Air*. 2014;24:416–424. doi:10.1111/ina.12085

1 Whereas, Informal questioning found that many parents, health professionals, local health
2 departments, local boards of health, and others did not know about the association between
3 cooking with gas stoves and increased risk of asthma;²⁰ and
4

5 Whereas, Parents, public health staff, building inspectors, teachers, and many others should
6 know about this association so that they can help protect children from household air pollution
7 produced by gas stoves and reduce the risk of asthma; therefore, be it
8

9 RESOLVED, That our American Medical Association recognize the association between the
10 use of gas stoves, indoor nitrogen dioxide levels and asthma (New HOD Policy); and be it
11 further
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13 RESOLVED, That our AMA inform its members and, to the extent possible, health care
14 providers, the public, and relevant organizations that use of a gas stove increases household
15 air pollution and the risk of childhood asthma and asthma severity; which can be mitigated by
16 reducing the use of the gas cooking stove, using adequate ventilation, and/or using an
17 appropriate air filter (Directive to Take Action); and be it further
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19 RESOLVED, That our AMA advocate for innovative programs to assist with mitigation of cost
20 to encourage the transition from gas stoves to electric stoves in an equitable manner.
21 (Directive to Take Action)

Fiscal Note: Not yet determined

Received: 05/18/22

²⁰ Personal communication from T. Stephen Jones and Andee Krasner April 4, 2019.