

School Boards Can Protect Children from CAFO Odors and Pollution

A concentrated animal feeding operation (CAFO) is an industrial-scale operation where animals are confined in a building. The manure is captured in a holding facility, such as a pit under the building or a stand-alone tank, where it is retained until it can be spread on agriculture fields after harvest or just before planting. The fields where the manure is spread are called manure application fields. Because of the large number of animals confined in one area – several thousand pigs and hundreds of thousand chickens or turkeys, the amount of manure generated creates horrendous stench and toxic levels of pollution. That stench and pollution affects school children.

The stench and pollution can be detected for several miles from the CAFO and the fields where the manure is spread. “Odors from waste are carried away from farm areas on dust and other air particles. Depending on things like weather conditions and farming techniques, CAFO odors can be smelled from as much as 5 or 6 miles away, although 3 miles is a more common distance”.¹ The odor emanating from liquid manure applied to farm fields persists for weeks.



Odor is a symptom of the presence of harmful pollutants.

The issue of CAFO manure is more than its horrendous stench. The manure is loaded with toxic pollutants such as methane, hydrogen sulfide, ammonia, particulate matter (PM_{2.5} and PM₁₀), fungi, bacteria, and endotoxins that become airborne.

The physical reaction to the toxic chemicals in CAFO manure results in nausea, running noses, sore eyes, respiratory distress, and asthma attacks. Exposure to odors can cause changes in mood.

Because of the heavy use of antimicrobials within a CAFO, the bacteria have become antibiotic-resistant. That can result in harmful life-threatening illnesses, including methicillin-resistant *Staphylococcus aureus* (MRSA) and drug-resistant *E. coli*.²

¹ Carrie Hribar, “Understanding Concentrated Animal Feeding Operations and Their Impact on Communities”, National Association of Local Boards of Health, 2010, page 7

² Ellen K. Silbergeld, Chickenizing Farms & Food – How Industrial Meat Production Endangers Workers, Animals, and Consumers, Johns Hopkins University Press, Baltimore, 2016

So what can the school board do?

One of the responsibilities of the school board is to ensure that the students are given a safe and secure environment.³ Part of being safe is being protected from unhealthy pollution.

Parents have an expectation that when they send their children to school, their health is protected.

School boards should take action to protect children from the odors and toxic chemicals emanating from CAFOS and their manure application fields. If a CAFO or its manure application fields are close to a school, the school board can require the following measures:

- Requiring children to stay inside on bad odor days instead of having recess or gym class outdoors.
- Requiring the windows to be closed on bad odor days.
- Installing and running air purifiers and air filters.
- Requiring the principal to keep a log on air quality – from an odor perspective. The log should be updated right before recess and lunch hour times. The log should be available for review by parents and members of the public.
- The school board should develop policies that cancel or move outdoor sports team practices or games, marching band practices, and other activities due to poor outdoor air quality and odor.
- The school board should close schools that have difficulty with high odor levels.

Children’s lungs are more susceptible to air pollution.

Children face a special risk to air pollution because generally they are more active than adults when they are outdoors. This means that they breathe more air. When that air is polluted, children can face health effects. Further, children’s lungs are developing. “Growth and development of the human respiratory system is not complete until approximately 18-20 years of age.”⁴ That affects the ability of the lungs to fight off infections and to deal with pollutants.

“Among children, indicators of asthma have been related to measures of residential and school exposure to pollution from hog operations.”⁵



Even the odors are damaging to public health.

Children spend a significant amount of time in school. Being exposed to CAFO odors while they are at school can have adverse impacts on their ability to learn.

³ Iowa Association of School Boards, “The Standards for Effective School boards”, www.ia-sb.org/Main/Toolbox/Standards_for_Effective_School_Boards/Main/Toolbox/Standards_for_Effective_School_Boards/Board_Standards.aspx?hkey=20e2efd0-7ed9-4cdf-bd15-5a950c3658d1

⁴ Rodney R. Dietert, Ruth A. Etzel, David Chen, Marilyn Halonen, Steven D. Holladay, Annie M. Jarabek, Kenneth Landreth, David B. Peden, Kent Pinkerton, Ralph J. Smialowicz, Tracey Zoetis, D, “Workshop to Identify Critical Windows of Exposure for Children's Health: Immune and Respiratory Systems Work Group Summary”, *Environmental Health Perspectives*, June, 2000; Volume 108, Supplement 3, pages 483-490

⁵ S. Wing, R. A. Horton, S. W. Marshall, K. Thu, M. Tajik, L. Schinasi, S. S. Schiffman, “Air Pollution, Lung Function, and Physical Symptoms in Communities Near Concentrated Swine Feeding Operations”, *Epidemiology*, February 6, 2018

Studies working with adults living near CAFOs have found CAFO odors to have negative effects on mood. Children at school are exposed to the same odors and pollution as adults in their homes.

“Mental health deterioration and an increased sensitization to smells can also result from living in close proximity to odors from CAFOs. Odor can cause negative mood states, such as tension, depression, or anger, and possibly neuropsychiatric abnormalities, such as impaired balance or memory. People who live close to factory farms can develop CAFO-related post-traumatic stress disorder, including anxiety about declining quality of life.”⁶

A study led by Dr. Rachel Horton⁷ concluded “Hog odor, hydrogen sulfide, and semivolatile PM₁₀ are related to stress and negative mood in disproportionately low-income communities near industrial hog operations in eastern North Carolina.” The Horton study found, “In a community-based, longitudinal study of neighbors of industrial hog operations, we observed associations among malodor, several airborne emissions, stress, and negative mood. Specifically, we observed increased reporting of stress and negative mood in response to increasing malodor. Additionally, increases in H₂S and semivolatile PM₁₀, both odorous in nature, were associated with reported stress and 1 or more mood variables. Our findings complement a large literature on malodor as an environmental stressor. Malodor and concomitant airborne emissions do appear to trigger stress and negative mood in nearby residents unwillingly exposed at home.”



Dr. Horton wrote, “Odor, noise, heat, and crowding are environmental stressors that may affect physical and mental health. Malodor is reported in neighborhoods near hazardous waste facilities, petroleum refineries, certain industrial facilities, and confined animal feeding operations; people in these areas may report sensations of irritation, respiratory problems and other physical health symptoms, interference with activities of daily living, and concerns about chronic diseases and property values.”

In discussing the study results, Dr. Horton’s team stated, “We found that ratings of feeling stressed or annoyed, nervous or anxious, gloomy or unhappy, angry or grouchy, and confused or unable to concentrate increased with ratings of malodor. Of the 5 outcome variables, odor was most strongly related to feeling stressed or annoyed.” Other findings by Dr. Horton’s team include, “Hydrogen sulfide appeared to be associated with feeling stressed or annoyed and nervous or anxious but not with the other 3 mood variables. We found that PM₁₀ was not associated with the outcome variables, with the exception of a marginal association with feeling confused or unable to concentrate. Semivolatile PM₁₀ however, appeared to be associated with feeling stressed or annoyed and nervous or anxious and only marginally associated with the remaining 3 mood variables.”

The results of these studies indicate that humans can be adversely affected by exposure to CAFO odors.

Current laws and regulations are not protective of human health from exposure to CAFO odors and toxic pollution.

⁶ Carrie Hribar, “Understanding Concentrated Animal Feeding Operations and Their Impact on Communities”, National Association of Local Boards of Health, 2010, page 8

⁷ Rachel Avery Horton, Steve Wing, Stephen W. Marshall, Kimberly a. Brownley, “Malodor as a Trigger of Stress and Negative Mood in Neighbors of Industrial Hog Operations”, *American Journal of Public Health*, November, 2009, Volume 99, Supplement 3

You may think that Iowa regulations would be written to protect children from exposure to CAFOs. However, that is not the case.

Iowa Code Section 459.207 authorizes the Iowa department of Natural Resources to conduct a study of airborne pollutants and to develop plans to control and prevent airborne pollutants originating from animal feeding operations.⁸ The Department of Natural Resources has never followed through.

Iowa Code does establish separation distances. However those distances are inadequate in keeping CAFO odors and pollution away from the community and schools. Bear in mind, CAFO odors can be detected 3 miles and up to 6 miles away from the CAFO.



The smallest confinement operations have no separation distances. For the largest operations, the largest separation is 3000 feet, slightly over half a mile. The separation distances for confinements, liquid manure application, and stockpiling manure are:

	Distance requirement	Code section
Type of manure-retention facility <ul style="list-style-type: none"> • confinement building • anaerobic lagoon • uncovered earthen manure storage basin • uncovered formed manure storage structure • covered earthen manure storage basin • covered formed manure storage structure • egg washwater storage structure 	The smallest confinements have no separation distances from a school. For the largest operations, the largest separation is 3000 feet from a school, slightly over half a mile. Separation distances for confinement buildings and manure-retention facilities vary by: <ul style="list-style-type: none"> • number of animals generating manure that will be held in the facility • the type of animal (feeder cattle dairy cattle, hogs, sheep, turkeys, chickens, fish) • the size range of the animals • the dates when the CAFO was constructed • the type of manure-retention facility • distance from city limits. 	459.201, 459.202, 459.205
Liquid manure application	A person shall not apply liquid manure from a confinement feeding operation on land located within 750	459.204, 459.205

⁸ Iowa Code Section 459.207(2) The department shall conduct a comprehensive field study to monitor the level of airborne pollutants emitted from animal feeding operations in this state, including but not limited to each type of confinement feeding operation structure.

Iowa Code Section 459.207(3)(a) After the completion of the field study, the department may develop comprehensive plans and programs for the abatement, control, and prevention of airborne pollutants originating from animal feeding operations in accordance with this section. The comprehensive plans and programs may be developed if the baseline data from the field study demonstrates to a reasonable degree of scientific certainty that airborne pollutants emitted by an animal feeding operation are present at a separated location at levels commonly known to cause a material and verifiable adverse health effect. The department may adopt any comprehensive plans or programs in accordance with chapter 17A prior to implementation or enforcement of an air quality standard but in no event shall the plans and programs provide for the enforcement of an air quality standard prior to December 1, 2004.

	Distance requirement	Code section
	feet from an educational institution. However it does not apply for Liquid manure where <ul style="list-style-type: none"> • The liquid manure is injected into the soil or incorporated within the soil not later than twenty-four hours from the original application • The liquid manure originates from a small animal feeding operation. 	
Liquid manure applied by spray irrigation equipment	250 feet from an educational institution	459.205
Stockpiling dry manure	1250 feet from an educational institution	459.204B

The Master Matrix does not protect children's health.

The Master Matrix is a scoring tool that is used to determine if a large CAFO can be built at a particular site. The Matrix gives extra points if the CAFO exceeds the minimum setbacks from a school by at least 250 feet. The Matrix also gives extra points if the manure application fields exceed the minimum setbacks from a school by at least 200 feet.

However only the largest CAFOs have to follow the matrix. Smaller CAFOs do not have to follow those separation distances. Furthermore, several separate CAFOs can be clustered in an area, with a combined number of animals in excess of the Matrix requirement; and that fact is not take into consideration for required separation distances from schools.

Conclusion

Children are vulnerable to health problems from inhaling the pollutants created by CAFOs. The odors from CAFOs can causes changes in moods, which can lead to problems in learning. School Boards can protect students from those pollutants by:

- Requiring children to stay inside on bad odor days instead of having recess or gym class outdoors.
- Requiring the windows to be closed on bad odor days.
- Installing and running air purifiers and air filters.
- Requiring the principle to keep a log on air quality – from an odor perspective. The log should be updated right before recess and lunch hour times. The log should be available for review by parents and members of the public.
- The school board should develop policies that cancel or move outdoor sports team practices or games, marching band practices, and other activities due to poor outdoor air quality and odor.
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Sources

American Lung Association, "Children and Air Pollution", www.lung.org/our-initiatives/healthy-air/outdoor/air-pollution/children-and-air-pollution.html

Julia R. Barrett, “Hogging the Air: CAFO Emissions Reach into Schools”, *Environmental Health Perspectives*, April, 2006, Volume 114(4): A241

Rodney R. Dietert, Ruth A. Etzel, David Chen, Marilyn Halonen, Steven D. Holladay, Annie M. Jarabek, Kenneth Landreth, David B. Peden, Kent Pinkerton, Ralph J. Smialowicz, Tracey Zoetis, D, “Workshop to Identify Critical Windows of Exposure for Children's Health: Immune and Respiratory Systems Work Group Summary”, *Environmental Health Perspectives*, June, 2000; Volume 108, Supplement 3, pages 483-490

Virginia T. Guidry, Christine L. Gray, Amy Lowman, Devon Hall, Steve Wing, “Data quality from a longitudinal study of adolescent health at schools near industrial livestock facilities”, *Annals of Epidemiology*, July, 2015, Volume 7: 532-8.e1.

Rachel Avery Horton, Steve Wing, Stephen W. Marshall, Kimberly a. Brownley, “Malodor as a Trigger of Stress and Negative Mood in Neighbors of Industrial Hog Operations ”, *American Journal of Public Health*, November, 2009, Volume 99, Supplement 3

Carrie Hribar, “Understanding Concentrated Animal Feeding Operations and Their Impact on Communities”, National Association of Local Boards of Health, 2010

Iowa Association of School Boards, “The Standards for Effective School boards”, www.ia-sb.org/Main/Toolbox/Standards_for_Effective_School_Boards/Main/Toolbox/Standards_for_Effective_School_Boards/Board_Standards.aspx?hkey=20e2efd0-7ed9-4cdf-bd15-5a950c3658d1

Iowa Code Sections 459.201, 459.202, 459.203, 459.204, 459.204B, 459.205, 459.207

Master Matrix, available at www.iowadnr.gov/Environmental-Protection/Land-Quality/Animal-Feeding-Operations/Confinements/Construction-Requirements/Permitted/Master-Matrix

Joseph Rudek, “Adverse Health Effects of Hog Production – A Literature Review”, Environmental Defense Fund, March, 2008

Ellen K. Silbergeld, *Chickenizing Farms & Food – How Industrial Meat Production Endangers Workers, Animals, and Consumers*, Johns Hopkins University Press, Baltimore, 2016

S. Wing, R. A. Horton, S. W. Marshall, K. Thu, M. Tajik, L. Schinasi, S. S, Schiffman, “Air Pollution, Lung Function, and Physical Symptoms in Communities Near Concentrated Swine Feeding Operations”, *Epidemiology*, February 6, 2018

Resources

For a map of the public school districts in Iowa
<https://educateiowa.gov/resources/school-district-maps>

For a list of the public school buildings in Iowa
<https://educateiowa.gov/documents/directories/2019/04/2018-2019-iowa-public-school-building-directory>