A16-1099

State of Minnesota
In Court of Appeals

Lowel Trom, et al,

Appellants,

vs.

County of Dodge, et al,

Respondents,

And

Masching Swine Farms, LLC

Respondent.

BRIEF OF AMICI CURIAE DR. JILLIAN P. FRY, Ph.D., M.P.H., DR. ROBERT S. LAWRENCE, M.D., MS. CLAIRE M. FITCH, M.S.P.H., AND MS. CAROLYN R. HRICKO, M.P.H.

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INTEREST OF AMICI CURIAE[1]

Jillian P. Fry, Ph.D., MPH, Robert S. Lawrence, MD, Claire M. Fitch, MSPH, and Carolyn R. Hricko, MPH are faculty and/or researchers World Health Organization study the food system and public health. They are all affiliated with the Johns Hopkins Center for a Livable Future ("CLF").[2] Within this brief, these amici will refer to themselves as the "Public Health Amici."

CLF is an interdisciplinary academic center based within the Johns Hopkins Bloomberg School of Public Health, which applies scientific, policy, and regulatory expertise to issues surrounding food systems and public health. http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/. CLF engages in research, policy analysis, education, and other activities guided by an ecological perspective that diet, food production, the environment, and public health are interwoven elements of a complex system. The Public Health Amici recognize the prominent role that food animal production plays with regard to a wide range of public-health concerns within and associated with that system.

Dr. Jillian P. Fry, Ph.D., MPH, directs the CLF's Public Health & Sustainable Aquaculture Project, and is an Assistant Scientist in the Departments of Environmental Health Sciences and Health, Behavior, and Society at the Johns Hopkins Bloomberg

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[1] No counsel for any party authored this brief in whole or in part. No person or entity other than Amici, or its counsel, made any monetary contribution to the preparation or submission of this brief.

[2] The views of these amici do not necessarily reflect the views of Johns Hopkins University.

School of Public Health. Dr. Fry's research focuses on the effects of industrial food animal production (including aquaculture) on environmental public health, especially regarding resource use, effectiveness of regulations, and understanding policy processes relevant to food-animal production at the local, state, and federal levels. She has published 5 peer-reviewed journal articles on issues related to the environmental and public-health impacts of industrial food animal production. Dr. Fry also coordinates CLF's response to requests for technical assistance from community members, non-governmental organizations, and other stakeholders who are seeking a public health professional to interpret the scientific evidence on industrial food-animal production. (7/25/16 Palmer Aff., Exhibit 4, Curriculum Vitae of Jillian P. Fry).

Dr. Robert S. Lawrence, MD, is a Professor Emeritus of Environmental Health Science and International Health at the Johns Hopkins Bloomberg School of Public Health. He is also a Professor of Medicine at the Johns Hopkins School of Medicine. Dr. Lawrence is a graduate of Harvard College and Harvard Medical School, and trained in internal medicine at the Massachusetts General Hospital in Boston, Massachusetts. Dr. Lawrence founded the Center for a Livable Future in 1996, served as director until 2015, and has published 8 peer-reviewed articles directly related to the environmental and health impacts of industrial food-animal production. Before joining the Johns Hopkins Bloomberg School of Public Health and starting the CLF, Dr. Lawrence spent many years advancing the field of public health via leadership positions at multiple organizations, including the U.S. Centers for Disease Control and Prevention, the University of North Carolina Chapel Hill, Harvard Medical School, Cambridge Hospital,

the U.S. Preventive Services Task Force, and the Rockefeller Foundation. (*See* July 25, 2016 Affidavit of Kris Palmer in Support of Amicus Petition, Exhibit 1, Biographical Sketch of Robert S. Lawrence).

Ms. Claire M. Fitch, MSPH, is a Program Officer in the Food System Policy Program at the Johns Hopkins Bloomberg School of Public Health. In this position, Ms. Fitch has conducted literature reviews, and provided public comment and testimony on the public health impacts of industrial hog, turkey, and broiler-chicken production in the U.S. Prior to joining the CLF, Ms. Fitch was a U.S. Borlaug Fellow in Global Food Security with the USAID Nutrition Innovation Lab. (7/25/16 Palmer Aff., Exhibit 5, Curriculum Vitae of Claire M. Fitch).

Ms. Carolyn R. Hricko, MPH, is a Research Assistant in the Food System Policy Program at the Johns Hopkins Bloomberg School of Public Health. Ms. Hricko has a background in global health and sustainability, and has conducted literature reviews on air pollution and other environmental and public health impacts of industrial hog, turkey, and broiler-chicken production and processing in the U.S. (7/25/16 Palmer Aff., Exhibit 6, Curriculum Vitae of Carolyn R. Hricko).

The Public Health Amici assert a public interest. The Dodge County Ordinances at issue in this case required compliance with U.S. and state environmental laws, and the permit at issue in this appeal has broad implications for Dodge County, other counties in Minnesota, and rural areas across the U.S. Through this brief, the Public Health Amici provide interpretation of relevant scientific evidence regarding the public-health and community impacts of industrial-scale hog production.

RECORD FACTS THAT DEMONSTRATED THE LIKELIHOOD OF NEGATIVE PUBLIC HEALTH EFFECTS

The administrative record contained substantial evidence that demonstrated a high likelihood of negative public-health effects caused by industrial-scale hog production such as the one at issue in this case.

Masching Hog Farm (hereinafter, "Masching") proposed to build a facility that would house 2,400 hogs. Each hog generates as much waste as three people. So the Masching proposal amounted to the equivalent of a housing project that would house 7,200 people for 24 hours a day, seven days a week, 365 days a year.

Per the Masching proposal, all of those 7,200 people's feces and urine would remain onsite, in a concrete pit underneath their living space, with open-air slats to allow for ventilation of the excrements' gases. (*Id.* at AR-780-82). This hypothetical housing project's waste would remain in that pit for up to a year at a time. (*Id.* at 782). By the end of each year, this "housing project's" occupants would have produced an estimated *1.14 million gallons* of liquid waste composed of excrement and urine. (*Id.* at AR-812).

Such waste breaks down, and as it does, it releases toxic gases, including ammonia, hydrogen sulfide, and methane. (AR-647). All of these gases are potentially explosive, which poses an obvious risk to public health. And the evidence presented to the County specifically described how two of these gases --- ammonia and hydrogen sulfide --- directly affect human health with repeated exposure, even at low doses. (*Id.* at AR-646-48).

The evidence presented to the County showed that ammonia is an irritant that causes chemical burns to the respiratory tract, skin, and eyes. (*Id.* at 646). At high concentrations, it generates a severe cough, and chronic exposures to levels as low as 0.5 mg/m3 can result in decreased lung function and respiratory system.

Those at highest risk are children and the elderly. The evidence presented to the County showed that children who are regularly proximate to operations like the Masching's are more likely to develop asthma (a chronic lung disease that can affect said children for the rest of their lives), and bronchitis. Chronic lung disease can, and often does, kill the elderly. (AR-647).

The evidence presented to the County also showed that hydrogen sulfide causes inflammation of the moist membranes of the eyes and respiratory tract, and olfactory neuron loss. (*Id.*). It has an extremely noxious "rotten egg" odor. Studies presented to the County showed that this odor is so noxious that repeated exposure (merely due to the odor) can pose risks to mental health. And data submitted to the County showed that the odors from industrial hog operations such as the Masching's can be detected from as far away as six miles.

The County received evidence demonstrating that 1.1 million gallons of hog waste would be expected to generate significant amounts of ammonia and hydrogen sulfide. Such gases are so concentrated in facilities such as the Masching's, that the latters' designs *must* incorporate powerful ventilation systems, lest the hogs die due to exposure to the gases produced by their own decomposing bodily waste.

These necessary ventilation systems pump the bodily waste materials into the air around the facility, and until these gases disperse, nearby properties experience continuously elevated exposure to them, thereby increasing the properties' inhabitants' risk of chronic respiratory illnesses, changes to mental health, and even death.

As one would expect with a 7,200-occupant human housing project, the occupants of such high-density hog facilities are at increased risk of disease from various pathogens, including bacteria and viruses. One of the most commonly found bacteria is *Staphylococcus aureus*. *Staphylococcus aureus* is a pathogen responsible for a significant burden of skin infections and respiratory disorders.

In order to protect the animals (as well as enhance their growth), it is commonplace to feed them antibiotics. The evidence presented to the County included data showing that such feeding practices increase the risk of antibiotic resistance, and that therefore such facilities result in increased local risk of exposure to various antibiotic-resistant bacterial infections, including infections with Methicillin-Resistant *Staphylococcus aureus*, or "MRSA."

MRSA is a resistant strain of an otherwise-common bacterium. It can be life-threatening. In the elderly, it can cause life-threatening antibiotic-resistant pneumonia. In both elderly and younger people, it can cause severe skin infections, including necrotizing fasciitis, a severe type of skin infection that spreads quickly, and kills the body's soft tissues. MRSA is one of the so-called "flesh-eating bacteria."

In addition, pigs are one of the world's greatest sources of zoonotic diseases (i.e., viral or bacterial diseases that may be spread between animals and humans). Zoonotic

diseases may be spread via contaminated water sources, air, and insect vectors. And the evidence presented to the County showed that large, concentrated hog facilities, such as the Masching's, are breeding grounds for these zoonotic diseases.

To be fair, the County ultimately required some preventatives to avoid public health insult. But the County did not require (and therefore, the record does not include) any data from which the County (or a reviewing court) could reasonably assess whether the Masching's proposal would affect water or air quality, or whether the presence of this facility would pose a health risk to nearby residents.

ARGUMENT

The Dodge County Zoning Ordinance criteria for granting a Conditional Use Permit includes determinations that the project will not be detrimental to or endanger public health and that groundwater, surface water, and air quality will be protected. (*Id.* at AR-355).

In the Planning Commission Meeting and Dodge County Board Meeting minutes (*Id.* at AR-29 and AR-77), it is apparent that public-health issues were not discussed. The offset determination by the County Feedlot Officer that the site was "98% odor annoyance free" is not a robust analysis and fails to consider air emissions during manure removal and spreading, the compounded odor effects of the animal density in that area, the public-health impacts of gases and particulate matter associated with odor, and the offset under various weather conditions. In short, this data cannot be deemed a sufficient amount of evidence for a local authority to determine that a project will not be detrimental to public health.

The district court properly described a court's standard of review of a county's decision. That standard of review includes appropriate deference to the County. Such deference is necessary to preserve separation of powers. *See, e.g., Big Lake Association v. Saint Louis County Planning Commission*, 761 N.W.2d 487, 490-91 (Minn. 2009).

But in this case, the County undertook to protect public health. The state regulatory agencies assumed that the County would honor that undertaking. Where, as here, local governments like the County fail to give a hard look at proposals that endanger public health, court intervention is appropriate.

I. Air quality is a public-health issue, not a "nuisance."

The Masching's proposal is a medium-to-large scale hog feedlot. Such facilities are often described as Concentrated Animal Feeding Operations, or "CAFOs."

Gaseous emissions from hog feedlots primarily come from decomposing manure. When underground storage is used, gases are released by ventilation systems, manure removal, and during spreading. Such feedlot buildings also disseminate gases and particulate matter (*Id.* at AR-652). Major air pollutants from hog feedlots and the resulting public health risks are summarized in the NALBOH review (*Id.* at AR-652-654) and GRACE Communications Materials (*Id.* at AR-632-634). Main air emissions include hydrogen sulfide, ammonia, particulate matter, endotoxins, and methane.

One study, submitted below, identified 331 fixed gases and volatile organic compounds (VOCs) in air samples near North Carolina farms. A North Carolina State University study found that when human subjects were exposed to simulated feedlot emissions in a field laboratory for one hour, subjects were 4.1 times more likely to

develop headaches, 6.1 times more likely to report eye irritation, and 7.8 times more likely to report nausea than those in a control group (breathing clean air). (*Id.* at AR-633). Some of the health conditions associated with exposure to feedlot emissions include asthma symptoms, bronchitis, nasal irritation, diarrhea, hoarseness, sore throat, cough, chest tightness, nasal congestion, palpitations, shortness of breath, stress, drowsiness, and alteration in mood. (*Id.*).

Decomposing hog manure emits hydrogen sulfide, a colorless gas that limits cells' ability to use oxygen. This gas is particularly dangerous because the intensity of its odor only slightly increases at levels above 6 parts per million (ppm), and can reduce individuals' sense of smell at concentrations of 150 ppm or higher. Exposure to 500 ppm or higher is likely to be lethal. Exposure at low levels is associated with chronic cough, throat irritation, eye symptoms, nasal symptoms, headache, low blood pressure, and psychological disorders. Exposure is also linked to nausea, stomach distress, and blistering of the lips. Exposure to high levels can cause skin, eye, and respiratory irritation, neurologic and cardiac disorders, loss of consciousness, shock, pulmonary edema, seizures, comas, and death. Minnesota's Pollution Control Agency has documented hydrogen sulfide concentrations in excess of World Health Organization maximum exposure standards on properties near hog feedlots (*Id.* at AR-634).

Ammonia, emitted via manure decomposition, is absorbed in the upper airways and exposure can cause wheezing, shortness of breath, chronic lung disease, and irritation of the eyes, throat, respiratory system, sinuses and skin. Exposure to moderate concentrations of ammonia (50-150 ppm) can cause severe cough and mucous production

and exposure to concentrations higher than 150 ppm can cause scarring of the upper and lower airways, reactive airways dysfunction syndrome (RADS), persistent airway hypersensitiveness, lower lung inflammation, and pulmonary edema. Exposure to extremely high concentrations of ammonia can be fatal.

Detection of odor from hog feedlots indicates exposure to one or more of the gases described above, and may also mean that particulate matter and endotoxins are present. Regular exposure to particulate matter — which may include fecal matter, feed materials, skin cells, and pathogens — is linked to bronchitis, asthma, chronic respiratory symptoms, organic toxic dust syndrome, and cardiac disorders (including arrhythmia and heart attacks). Endotoxins may also be present in particulate matter and can cause respiratory problems even in extremely low concentrations.

II. The county also failed to consider evidence of substantial public-health impacts from pathogens.

After the Plaintiffs' Motion for Summary Judgment was granted and the Maschings' Conditional Use Permit vacated (*Id.* at AR-330), Nick Masching reapplied for a CUP with additional information (*Id.*at AR-128), including a geotechnical evaluation and a manure management plan. No additional information was provided to satisfy the zoning ordinance criteria that the project would not be detrimental to or endanger public health or air quality. The Planning Commission granted a CUP, citing the additional information contained in the second application, despite the continued lack of materials related to public health and/or air quality.

Based on the NALBOH report and information from the GRACE Communications Foundation submitted below, there is ample evidence contained in the record showing that large-scale animal operations are a serious threat to public health, especially when geographically clustered. This information is widely available, from these sources and many others, and should have been considered by Dodge County when making a decision about granting the CUP. For Dodge County to approve numerous hog feedlots and be in compliance with their zoning ordinance that claims to protect public health, air, and water, robust monitoring and action plans should be in place to track levels of common contaminants from feedlots and to respond if/when air and/or water are contaminated by the large-scale hog operations in Dodge County. Under current regulations, once the CUP is granted there are very minimal air regulations due to a significant exemption for feedlots (*Id.* at AR-578) and oversight of manure management relies heavily on record keeping and voluntary compliance (*Id.* at AR-574-578).

The evidence presented to the County showed that over 150 disease-causing bacteria, viruses, and other pathogens can be found in animal manure and can be transferred to people through fecal-oral transmission and exposure to contaminated air, drinking water, and recreational water. (*Id.* at AR-655-657). The crowded conditions in confined animal feeding operations like the Masching's proposal present frequent opportunities for the transmission of pathogens among animals, and between animals and humans.

While exposure to these pathogens poses a risk to healthy people, those with compromised immune systems, such as pregnant women, infants and young children, the

elderly and those who are HIV positive or have had chemotherapy, are at even greater risk of severe illness or death. Widespread disease outbreaks, such as salmonellosis, cryptosporidiosis and giardiasis, can result from exposure to water contaminated by pathogens.

These diseases cause symptoms ranging from nausea, vomiting and diarrhea, to dehydration, fever, and muscle pain and may result in death. Industrial hog operations also present opportunities for the replication, mutation, and recombination of viruses that can result in the development of novel viruses, some of which may lead to more efficient human-to-human transmission. (*Id.* at AR-657).

Antibiotics are routinely administered through animal feed, sometimes at non-therapeutic doses to promote growth and/or prevent disease. The evidence presented to the County showed that approximately 70% of all antibiotics and related drugs in the U.S. each year are sold for use in food animals, and more than half of those antibiotics are considered important in human medicine. There is strong evidence that the use of antibiotics in food animal production contributes to antibiotic resistance in bacteria and decreases the effectiveness of antibiotics in human medicine. This threatens human health because fewer options exist to help people overcome disease when infected with antibiotic-resistant pathogens. Moreover, antibiotics are often not fully metabolized by animals and can be present in manure. If manure pollutes a water supply, antibiotics can also leech into groundwater or surface water. Because of this concern for human health, there is a growing movement to eliminate the routine use of antibiotics in food animal production.

The NALBOH report, presented to the County, mentions opposition to the use of non-therapeutic antibiotics in animal agriculture by the American Medical Association and World Health Organization. (*Id.* at AR-657). In the fall of 2013, a research study titled "High-Density Livestock Operations, Crop Field Application of Manure, and Risk of Community-Associated Methicillin-Resistant Staphylococcus Aureus Infection in Pennsylvania" was published in JAMA Internal Medicine (a leading journal published by the American Medical Association).

The study focused on rates of MRSA infection, a type of bacteria resistant to some medically-important antibiotics, among residents living various distances from industrial hog operations and spray fields. The study had the following conclusion: "Proximity to hog manure application to crop fields and livestock operations each was associated with MRSA and skin and soft-tissue infection. These findings contribute to the growing concern about the potential public health impacts of high-density livestock production."

In addition, the World Health Organization identified antimicrobial resistance (a term used widely in recent years that includes antibiotic resistance) as "one of the biggest threats to global health" in the fall of 2016. The World Health Organization recognizes misuse of antimicrobials in animal agriculture for the purpose of growth promotion as a major cause of global antimicrobial resistance.

CONCLUSION

The Public Health Amici urge this court to examine the record before the County, below. That record included ample scientific evidence to support an inference that the proposed facility would endanger public health. The evidence submitted to the County

demonstrated a significant risk of injury due to lowered air quality. It also demonstrated a significant risk of antimicrobial resistance and increasingly dangerous pathogens.

Where, as here, local officials are charged with protecting public health, such evidence *must* be given serious consideration. At a minimum, courts must require that local officials carefully review the submitted evidence, as well as any contrary evidence submitted by the applicant. Local authorities must be required to articulate the bases for their conclusions, so that courts may reasonably review their decisions. Any other process risks endangering the lives of the public living near these facilities.

Respectfully Submitted

Dated: October 11, 2016

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CERTIFICATION OF BRIEF LENGTH

I hereby certify that this brief conforms to the requirements of Minn. R. Civ. App. P. 132.01, subds. 1 and 3, for a brief produced with a proportional font. The length of this brief is 3,851 words. This brief was prepared using Microsoft Office Word 2010.

Dated: October 11, 2016

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