No. 21-468

IN THE

Supreme Court of the United States

NATIONAL PORK PRODUCERS COUNCIL, ET AL.,
Petitioners,

v.

KAREN ROSS, IN HER OFFICIAL CAPACITY AS SECRETARY OF THE CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE, ET AL.
Respondents.

On Writ of Certiorari to the United States Court of Appeals for the Ninth Circuit

BRIEF OF JIM KEEN, DVM, PH.D AND THOMAS POOL, MPH, DVM AS AMICI CURIAE IN SUPPORT OF RESPONDENTS

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August 15, 2022

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INTERESTS OF *AMICI CURIAE*[1]

The parties filing this *amici curiae* brief are two veterinarians who have devoted a combined 63 years to agriculture research and policy and who have extensive professional experience in farm animal husbandry and care.

Dr. Jim Keen, DVM, PhD, is a veterinarian and infectious disease epidemiologist with 34 years of experience with agricultural animals as a large animal clinician. He earned his veterinary medicine and epidemiology doctorate degrees from the University of Illinois at Urbana-Champaign.

For 17 years, Dr. Keen was a senior veterinary researcher focused on livestock and zoonotic infections and diseases of livestock production with the USDA Meat Animal Research Center in Nebraska, the largest livestock research center in the world with more than 30,000 beef cattle, swine, and sheep. He later served on the faculty at the University of Nebraska Lincoln School of Veterinary Medicine for 15 years and was a visiting fellow in the Animal Law and Policy Program at Harvard Law School.

Dr. Keen's specific expertise is emerging and zoonotic infectious diseases of farmed animals. He has broad field experience in outbreak investigation and animal disease control, including enteric zoonotic bacteria from livestock in the United States, foot and

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[1] All parties have consented to this filing. No counsel for a party authored this brief either in whole or in part. No person other than *amici* and their counsel made a monetary contribution to the preparation and submission of this brief.

mouth disease in the United Kingdom, and African swine fever in the Caucasus.

Dr. Keen has published more than 80 scientific publications and given more than 100 invited lectures in veterinary public health, the 'One Health' concept, livestock health, production, alternative animal agriculture, emerging zoonoses, food safety, animal welfare, and disease ecology. He currently lives on his family's 140-year-old grain and livestock farm in South Dakota where he has owned horses and raised poultry, heritage swine, and ruminants over many years in extensive pastured settings.

Dr. Thomas Pool, MPH, DVM, earned his Master's in Public Health, specializing in tropical medicine, from Harvard University, and his doctor of veterinary medicine from Oklahoma State University. He is a 30-year diplomate of the American College of Veterinary Preventive Medicine.

Dr. Pool served 26 years in the United States Army, and was commanding officer of the U.S. Army Veterinary Command, a worldwide, tri-service command. He also graduated from the U.S. Army War College. Earlier, he worked in the U.S. Army Medical Research and Development Command with peer-reviewed publications on leptospirosis and dengue hemorrhagic fever. Upon retirement as a full colonel from the Army, Dr. Pool served as the Territorial Veterinarian for Guam for 17 years. He continues to serve as adjunct professor for the University of Guam and the University of Wyoming School of Pharmacy.

SUMMARY OF ARGUMENT

Petitioners and their *amici* urge this Court to strike down California's Proposition 12, submitting multiple arguments why they believe the state law adopted by a landslide vote after a robust debate between competing viewpoints presents an unduly and allegedly insurmountable burden on the out-of-state pork industry.

Amici first provide the Court with a more accurate assessment of the impact that Proposition 12 will have on animal husbandry and on farmers' ability to make adjustments in their production systems. Contrary to the claim of the American Association of Swine Veterinarians (AASV), Proposition 12 does not mandate that farmers raise pigs in group housing settings. Further, major pork producers and consumers alike have made clear that they will readily be able to meet the demands of Proposition 12, in large part because the necessary shifts in sow housing and management have been in progress for years. California voters banned the use of gestation crates a decade earlier when voters approved Proposition 2, and the state was the third one to do so.

Next, we substantiate the public health importance of moving away from extreme confinement methods like gestation crate housing. The recent emergence of SARS-CoV-2 and monkeypox demonstrates why checking the spread of zoonotic epidemics and pandemics is a societal imperative. We explain, using evidence-based veterinary and public health science, why Californians' concerns are

founded in fact. We further link the cruel form of confinement that is the gestation crate system to heightened risks for public health and consumer safety.

ARGUMENT

I. Proposition 12 Will Have Minimal Economic Impact on the Raising of Pigs in California and in Other States.

A. Contrary to the Claims of Industry Veterinarians and Others, Proposition 12 Does Not Require Farmers to Raise Pigs in Group Housing.

> *"Everyone is entitled to his own opinion, but not his own facts.*
>
> *-- Senator Daniel P. Moynihan, January 18, 1983, The Washington Post,* More Than Social Security Was At Stake*, Page A17, Column 5.*

A group of pork-industry veterinarians, acting on behalf of the AASV, has filed an *amicus* brief urging the Court to overturn the decisions below upholding Proposition 12. These veterinarians spend almost the opening three-quarters of their brief arguing against a straw-man version of the California law – one that "mandates group pens in circumstances when the science supports flexibility to use stalls." AASV Br. 17.

Contrary to the AASV's assertion, nowhere does Proposition 12 "mandate group pens" or force pig farmers to place all their pigs in group housing settings. Instead, Proposition 12 simply requires that each pig must be supplied with twenty-four square feet of useable floorspace, which will provide these large animals the barest standard of humane treatment to lie down, stand up, and turn around during their truncated lifespans. Prop. 12, §2; codified at Cal. Health & Safety Code § 25990 *et seq*.

Significantly, AASV makes no reference to the actual language of Proposition 12 until near the end of its brief. The actual language of the law undermines AASV's assertions about the impact of Proposition 12 on America's pig farmers:

> "……a well-established body of scientific literature assessing biological metrics of sow welfare in individual stalls and group pens shows that both housing methods can be important tools in managing a healthy herd. **Categorically banning one of them, as Proposition 12 does**, will likely harm rather than improve animal well-being." AASV Br. 2 (emphasis added).

> "Proposition 12 Will Deprive Farmers Of Important Tools For Maintaining A Healthy Herd**."** AASV Br. 4.

> "By contrast, '[u]niform housing directives' that impose a one-size-fits-all solution 'could . . . result in reduced sow welfare and herd reproductive performance.'" AASV Br. 17.
>
> "Proposition 12 legally mandates a one-size-fits-all solution and is therefore scientifically ill advised [*sic*]." AASV Br. 17.

Those farmers who voluntarily choose to sell into the California market – which absorbs less than 10% of all United States pork production – may *either* provide individual stalls for sows *or* move them into group settings. In some cases, those individual stalls will need to be made slightly larger to meet the twenty-four-square-feet standard required under Proposition 12.

Farmers who choose to continue to rely on immobilizing crates for breeding sows have access to markets in forty-eight other states (Massachusetts has sales restrictions very similar to California's). They can also sell their pork to China, South Korea, Japan, Mexico, and other nations that collectively account for purchases of more than 25 percent of all domestically produced pork. These other states and nations have no prescriptive humane or food safety standards.

What's more, Tyson Foods, Smithfield, Hormel, Clements Group, Niman Ranch, and other major producers have said they have capacity to handle the

California market *right now with their existing production capacity*. Smithfield Foods, for instance – the largest pig producer in the United States, with more than one million sows in production – has halted all use of gestation crates, after confirmed pregnancy, for company-owned facilities. *Animal Care,* Smithfield Foods, https://www.smithfieldfoods.com/animal-care (last visited Aug. 8, 2022).

The average gestation crate now used on farms to confine sows measures approximately two feet by seven feet and affords only fourteen square feet of useable floorspace. Complying with Proposition 12's floorspace requirements simply requires widening crates by a mere *eighteen inches*. That minor accommodation will provide just enough space for the sow to turn around, stretch her body, and see other sows – sows that under the previous regulatory regime she can only hear. Thus, not only does the AAVS base its argument on a nonexistent group housing mandate – the burden of introducing more space to meet the new standard for gestation crates is minimal.

B. Much of the Domestic and International Hog Industry Has Already Rejected the Use of Gestation Crates In Favor Of Group Housing.

At any given time, there are about sixty-five million pigs reared for production in the United States; more than sixty million are raised in group

housing or pastures. In short, group housing is the most common, widely accepted form of housing when one aggregates pigs raised for meat or for breeding. There is no apparent reason why an association speaking for the industry would have such a harsh view of a housing system that dominates its husbandry strategies.[2]

Hormel, Tyson's, Clements, and other major providers have already asserted that they will have no problem meeting California's demand with existing crate-free capacity. "Hormel Foods has confirmed that it faces no risk of material losses from compliance with Proposition 12" *Hormel Foods Company Information About California Proposition 12*, Hormel Foods (Oct. 6, 2020), https://www.hormelfoods.com/newsroom/news/hormel-foods-company-information-about-california-proposition-12/. Likewise, in its earnings report, Tyson recently stated: "Tyson is currently aligning incentivizing suppliers where appropriate. We can do multiple programs simultaneously, including Prop 12 . . . we can certainly provide the raw material to

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[2] It is worth noting that the California Veterinary Medical Association endorsed Proposition 2 in California in 2008. That ballot measure, also passed in a landslide vote, banned gestation-crate confinement in California and created a performance standard. The animals had to be able to "lie down stand up, turn around, and freely extend their limbs." Proposition 12 built on that standard by creating an engineering standard, providing them with more square footage than a conventional gestational crate would.

service our customers in that way." *Tyson Foods Third Quarter 2021 Earnings August 9, 2021 at 9:00 a.m. Eastern*, https://s22.q4cdn.com/104708849/files/doc_financials/2021/q3/08-11-21_Tyson-Foods-080921.pdf (last visited Aug. 8, 2022).

Moreover, if "the customer is always right," then the pork industry has a larger problem than California law on its hands. McDonald's, Costco, Walmart, Safeway, Kroger's, Burger King, Cracker Barrel, and more than fifty other large corporate buyers have publicly opposed the use of gestation crates. Most of these companies have set timelines for fulfilling those pledges.

Barbaric gestation crates are not required for economic success or the sow's welfare. They are banned throughout the European Union, which has a population fifty percent larger than the United States. Group housing, or larger pre-birthing crates, not only provide the standard in these countries; they are the only production systems that can be legally used. Paradoxically, the petitioners' own stubbornness is keeping them out of major markets.

II. Proposition 12 Is Supported By Californians' Legitimate Concerns For Human And Animal Well-Being.

A. Californians Have Good Cause to Be Concerned About the Public Health Impacts of Intensive Confinement Practices in the Hog Industry.

> *"How did it come to this? What was missing from Kinlaw Farms—and from Murphy-Brown—was the recognition that treating animals better will benefit humans. What was neglected is that animal welfare and human welfare, far from advancing at cross-purposes, are actually integrally connected. The decades-long transition to concentrated animal feeding operations ("CAFOs") lays bare this connection, and the consequences of its breach, with startling clarity."* McKiver v. Murphy-Brown, LLC*, 980 F.3d 937, 978 (4th Cir. 2020) (Wilkinson, J., concurring).*

Standard Commerce Clause analysis affords a presumption of legitimacy to state health and safety interests. "[Laws that are] safety measures carry a strong presumption of validity when challenged in court. . . . Policy decisions are for the state legislature, absent federal entry into the field." *Bibb v. Navajo Freight Lines, Inc.*, 359 U.S. 520, 524 (1959)

Californians have well-founded and legitimate concerns that adverse health effects for humans and

animals alike will flow from poor sow welfare caused by the continued use of gestation crates:

- Sows maintained in gestation crates experience extreme and chronic behavioral and physiological distress;
- Chronic stress is highly immuno-suppressive and conducive to infections; and
- Restricting movement of the animals reduces muscle mass and bone density, weakening the animals.

Intensive swine farms raise breeding stock and market hogs in indoor confinement at high densities. Without heavy reliance on antimicrobial drugs, these farms cannot function in such an unhealthy living environment. Intensive confinement of large numbers of stressed swine increases risk of disease occurrence and transmission among animals and favors mutations and genetic recombination among zoonotic viruses and bacteria.

The major zoonotic risks from producing and consuming industrial pork are zoonotic foodborne bacteria, especially *Salmonella* pork contamination; antibiotic-resistant bacteria and antibiotic-resistant genes in live pigs; and contaminants in pathogenic and commensal bacteria driven by swine industry antimicrobial usage. These environments also foster emerging, epidemic or pandemic zoonotic swine pathogens, especially swine influenza virus.

These zoonotic risks cause millions of human illnesses, costing billions of dollars annually in health

care costs and recalls of pork. While California has limited production of pigs, it has long conducted substantial slaughtering of live pigs, and the transportation of live pigs may deliver pathogens to California and then pass them on to consumers in the marketplace.

1. Zoonotic food-borne bacteria

Most food-borne zoonotic pathogens in pork or pork products start with an infected sow who then transmits the bacteria to her piglets. The bacteria of most concern to pork safety (*Salmonella, Campylobacter, Listeria*, *Escherichia coli* O1517, and *Yersinia enterocolitica*) have their primary ecological niche in the intestinal tracts of clinically unaffected pigs. J. Fosse et al., *Prevalence and risk factors for bacterial food borne zoonotic hazards in slaughter pigs: a review*, 56 Zoonoses Public Health 429 (2009). As veterinarians, we focus on *Salmonella* as the most important industrial swine food-borne pathogen.

All life stages of swine are subclinical carriers of *Salmonella* which are ubiquitous in the industrial swine environment. In the United States in 2006, reported prevalence of *Salmonella*-positive production sites was 52.6% and the positive pig prevalence was 7.2%. A 2012 survey found 12/864 samples of retail ground pork contaminated with *Salmonella*. P.R. Broadway et al., *Prevalence and antimicrobial susceptibility of Salmonella Serovars isolated from U.S. Retail Ground Pork*, 18 Foodborne Pathogens and Disease 219 (2021). The emergence of

antibiotic resistant *Salmonella* associated with antimicrobial use in pig production is of special public health concern. Joana Campos et al., *Non-typhoidal Salmonella in the Pig Production Chain: A Comprehensive Analysis of Its Impact on Human Health*, 8 Pathogens 19 (2019).

Salmonella is the second leading cause of foodborne illness in the United States and the leading cause of hospitalizations and deaths from such illness. Pork consumption causes 525,000 infections, 2,900 hospitalizations and 82 deaths each year in the country. Between 9 to 15% of all national food-borne *Salmonella* infections arise from consuming pork or pork products. From 1998 to 2015, 288 domestic outbreaks were attributed to pork, resulting in 6,372 illnesses, 443 hospitalizations and four deaths. J.L. Self et al., *Outbreaks attributed to pork in the United States*, 1998-2015, 145 Epidemiology & Infection 2980 (2017).) Salmonellosis from pork costs $775 million to $1,905 million per year in medical care, lost productivity, loss of life, and pain and suffering. R.L. Scharff, *Food attribution and economic cost estimates for meat- and poultry-related illnesses*, 83 J. of Food Protection 959 (2020).

Breeding pigs are a major source of *Salmonella* dissemination along the pig production chain leading to pork product contamination and to human infections (Arica A. Baer, Michael J. Miller & Anna C. Dilger, *Pathogens of interest to the pork industry: a review of research on interventions to assure food safety*, 12 Comprehensive Reviews in Food Science & Food Safety 183 (2013) and Campos et al., *supra*). Cull

sows are commonly *Salmonella*-colonized. Isolation of *Salmonella* from mesenteric lymph nodes (MLNs) demonstrates swine asymptomatic infection. A nationwide survey of MLN prevalence showed 42 out of 205 (21%) of cull sows and 26/302 (9%) of market hogs were *Salmonella* colonized. B.C. Bessire et al., *National survey of* Salmonella *prevalence in lymph nodes of sows and market hogs*, 2 Translational Animal Science 336 (2018).

Of 1143 pigs on ten Canadian swine farms operated in similar ways to swine farms in the United States, 51 percent of sows, 32 percent of nursery pigs and 38 percent of market swine were found to be fecal *Salmonella*-positive. Sows were 2.3 times more likely to shed *Salmonella* than market pigs, and 4.0 times more likely to shed than nursery pigs, suggesting the breeding herd is an important source of *Salmonella* persistence. W. Wilkins et al., *Distribution of* Salmonella *serovars in breeding, nursery, and grow-to-finish pig, and risk factors for shedding in ten farrow-to-finish swine farms in Alberta and Saskatchewan*, 74 Canadian J. of Veterinary Research 81 (2010). In the United States in 2015, fecal *Salmonella* prevalence was 50% in sows and 35% in market swine. Campos et al., *supra*.

2. Antibiotic resistant bacteria

Antibiotics have been used routinely in swine production since the 1950s to keep animals healthy and to increase productivity. Veterinary antimicrobials are the same as, or belong to the same

classes as, antimicrobials for human use; they exert constant evolutionary pressure on animal microflora, selecting for drug resistance. Intensively-reared swine receive antibiotics at the pen or individual animal level to treat or prevent infectious diseases, especially respiratory and enteric infections. Antimicrobial administration to sows is common around parturition. This practice puts survival pressure on all bacteria in and on a pig, pathogen or commensal, which results in even non-pathogenic commensal bacteria on farms and in pork products possessing antimicrobial genes resistant to the effect of antimicrobial medications. D.F. Mollenkopf et al., Salmonella enterica *and* Escherichia coli *harboring* bla*CMY in retail beef and pork products*, 8 Foodborne Pathogens and Disease 333 (2011). Retail pork products from these infected animals expose consumers to antibiotic-resistant bacteria.

While data is unavailable on differential usage of antimicrobial agents in gestation crate-confined versus unconfined pregnant sows, higher levels of immunosuppressive stress leading to infections and the higher injury rates make it likely that gestation-crated sows are treated with antibiotics more frequently than unconfined swine. Restrictive, barren housing and many widely used management practices that cause pain and stress predispose high-performance pigs reared in intensive systems to disease. In this context, antibiotics are used as part of the infrastructure that sustains health and high levels of production in pig farms.

In spite of a recent FDA ban on antibiotic use for growth promotion, large amounts of antimicrobial agents are still used in United States swine production. In 2018, 2.37 million kilograms of active ingredient of "medically important antimicrobial and antibiotics" (i.e., also used in human medicine) were sold for use in pig production. Sales of non-medically important antimicrobials (i.e., not used in human medicine) totaled 414,000 kilograms. *See* U.S. Food & Drug Admin. Center for Veterinary Medicine, 2018 Summary Report On Antimicrobials Sold or Distributed for Use in Food-Producing Animals Table 19, 39 (Dec. 2019), https://www.fda.gov/media/133411/download. By comparison, sale of all human antimicrobials in the United States in 2017 totaled 3.64 million kilograms of active ingredient.

In the stressful and often unhygienic industrial swine production setting, antimicrobial agents that increase pig production efficiency also allow farmers to partially combat adverse effects introduced by industrialization itself. Thus, antimicrobials are being used to treat diseased animal production systems as much as they are treating swine diseases.

Sows play a large role in antimicrobial resistance in their offspring, from piglets to market hogs. Significant positive correlation exists between levels of antimicrobial resistance genes in feces of market pigs and the sows on the farms where the pigs were born for multiple resistance genes. Anna Camilla Birkegård et al., *Persistence of antimicrobial resistance genes from sows to finisher pigs*, 149

Preventive Veterinary Medicine 10 (2018). Antimicrobial resistance and antimicrobial use in sows are risk factors for antimicrobial resistance in commensal fecal *E coli* in their nursing piglet offspring; i.e., sows are an antibiotic resistance reservoir. Bénédicte Callens et al., *Presence of antimicrobial resistance and antimicrobial use in sows are risk factors for antimicrobial resistance in their offspring*, 21 Microbial Drug Resistance 50 (2015). Furthermore, sows treated with antibiotics before giving birth pass on high drug resistance to fecal *E. coli* bacteria in their nursing piglets. A. G. Mathew et al., *Effects of antibiotic use in sows on resistance of E. coli and Salmonella enterica Typhimurium in their offspring*, 2 Foodborne Pathogens and Disease 212 (2005).

Staphylococcus aureus are ubiquitous opportunistic commensal bacterial pathogens of humans and livestock of increasing human clinical and veterinary importance due to their capacity to rapidly develop antimicrobial resistance. Injudicious antibiotic use has given rise to the emergence of antibiotic-resistant *S. aureus* strains, the most significant of which is methicillin-resistant *Staphylococcus aureus* (MRSA). MRSA is resistant to beta lactam antibiotics (penicillins and cephalosporins), which are the first line of treatment against *S. aureus* infections. Human infections caused by *S. aureus* and MRSA range from superficial skin lesions to lethal deep-seated infections such as osteomyelitis, septic arthritis, pneumonia and septicemia.

Livestock-associated MRSA (LA-MRSA) emerged in pigs in Denmark in 2005 and spread worldwide in industrial swine. It possesses a high capacity to establish and transmit within livestock herds and spread to people. LA-MRSA rarely causes illness in pigs. However, LA-MRSA constitutes an occupational health hazard for farm workers, veterinarians and their families and, most importantly, presents a risk of further dissemination into society. Birgit Lassok & Bernd-Alois Tenhagen, *From pig to pork: methicillin-resistant* Staphylococcus aureus *in the pork production chain*, 76 J. of Food Protection 1095 (2013).

The most widespread LA-MRSA in Europe and North America belongs to the clonal complex (CC) 398, and commonly spills over from livestock to people, carrying with it high levels of resistance to antibiotics commonly used in farming. Food of animal origin, particularly pork, intended for human consumption is often contaminated with LA-MRSA CC398. It is causing increasing numbers of human infections, including people who have not had direct contact with livestock. Sarah Rhodes et al., *Getting ahead of antibiotic-resistant* Staphylococcus aureus *in U.S. hogs*, 196 Environmental Research 110954 (2021). A recent study of MRSA in retail pork from thirty-six stores in the Midwest and Eastern United States isolated *S. aureus* from 256 samples (64.8%) of 395 pork samples and MRSA from 26 (7%) of pork samples. Ashley M. O'Brien et al., *MRSA in conventional and alternative retail pork products*, 7 PLoS One e30092 (2012).

3. Emerging, epidemic, or pandemic zoonotic swine pathogens

Intensive livestock farming also increases zoonotic pandemic risks because of long-distance animal movements, high livestock densities, poor animal health and welfare, low disease resistance, and low commercial pig genetic diversity. Two industrial swine pathogens that readily infect and are endemic in breeding sows are of particular concern.

Swine influenza virus (SIV), a pig respiratory disease caused by influenza A viruses, is one of the most important and costly diseases affecting the pig industry. The virus is endemic in United States industrial swine with various SIV subtypes co-circulating and diversifying in the field. Widespread morbidity in swine herds negatively impacts animal welfare and economic performance. Human zoonotic SIV pandemics have emerged from pigs on multiple occasions. Spread and mutation of influenza viruses are facilitated by the close crowding of swine in industrial settings, including sow breeding facilities. Yin Li & Ian Robertson, *The epidemiology of swine influenza*, 1 Animal Diseases 21 (2021).

Zoonotic SIV strains can lead to spillover epidemics or pandemics in human populations. Zoonotic SIV risk must not be underestimated: the original 1918 H1:N1 influenza pandemic that killed 100 million people may have originated in swine. An SIV human pandemic is the most significant public health threat from industrialized swine operations.

The best-known recent example is the 2009 H1:N1 pandemic influenza A virus involving reassortment of three different influenza strains circulating in pigs, birds, and humans. This swine flu pandemic infected 700 million to 1.4 billion people (11 to 21% of the global population of 6.8 billion at the time) and killed 284,000 people worldwide.

Streptococcus suis is a major porcine pathogen worldwide and an emerging multi-drug resistant zoonotic pathogen. Claudio Palmieri, Pietro E. Varaldo & Bruna Facinelli, Streptococcus suis*, an emerging drug-resistant animal and human pathogen*, 2 Frontiers in Microbiology 235 (2011). It is endemic in all countries with intensive pig farming. Almost 100% of pig farms worldwide harbor carrier animals. The natural habitat of *S. suis* is the pig upper respiratory tract. In humans, *S. suis* causes severe systemic infections including meningitis, deafness, endocarditis, arthritis and many other serious conditions. The number of human cases due to *S. suis* has recently dramatically increased. Most human cases are due to either close occupational contact with pigs or pork products, e.g., farmers, veterinarians, butchers, and food processing workers, or, due to consumption of uncooked or undercooked pork products. Antimicrobial resistance to multiple drug classes in zoonotic *S. suis* is likely driven from industrial swine antimicrobial usage.

Extreme and unnecessary swine production methods such as sow gestation crates correlate with adverse human health concerns. Breeding sows act as major incubators, amplifiers, and transmission ports

of zoonotic pathogens and antimicrobial resistance. An industrial sow produces approximately twenty-five piglets per year. After fattening over six months, each of the piglets will weigh 280 pounds and yield 200 pounds of pork product at slaughter. Thus, a sow colonizing her offspring with *Salmonella* or an antimicrobial resistant MRSA has tremendous potential to damage human health at the end of the pork food chain, with 5,000 pounds of potentially contaminated pork per sow entering the national market each year.

Californians clearly have legitimate concerns about the food safety of pork derived from pig offspring of gestation crate-confined sows and from cull sows sold for meat. The failure of the California Department of Food and Agriculture to identify this range of threats in its rulemaking reflects deficient scientific analysis by that agency, not overreach by California voters. The limits imposed by Proposition 12 are grounded on concerns about the humane treatment of animals, the ready availability of alternative production systems, and the scientific evidence showing the food safety threats that are caused by the most extreme form of confinement in all of animal agriculture.

B. The Inhumane Impacts of Cruel Confinement of Pigs in The Current Gestation Crate Industry Are Well-Documented and Also Implicate Food Safety and Public Health.

> *"So our animals can't turn around for the 2.5 years that they are in the stalls producing piglets.* I don't know who asked the sow if she wanted to turn around.*"*
>
> *- Dave Warner, spokesperson for the National Pork Producers Council. July 25, 2012 (emphasis added). Matthew Prescott,* Your pig almost certainly came from a factory farm, no matter what anyone tells you*, The Washington Post (July 15, 2014).*

Dave Warner's statements evince a callous and cavalier disregard for animal welfare. Pigs are highly social animals that require, even crave, close physical contact with other pigs. They prefer group living with well-established social structures and dominance hierarchies. Pigs are hard-wired from millions of years of adaptive evolution to be part of a herd. They are strongly stressed when they are isolated and these social structures are disrupted.

Good farm animal welfare practice can be informed by observing (and mimicking) wild counterparts. Domestic pigs descended from the highly gregarious wild boar, while feral and free-ranging swine always live in groups. Mature sow

sociality is particularly strong in wild boar and feral hogs. It is interesting that, in the swine species *that normally exists in stable social groupings of mature females*, one of the most common commercial swine practices is to individually pen gestating sows. Gonyou HW, 2001. The social behavior of pigs. In: *Social Behaviour in Farm Animals*. L.J. Keeling and H.W. Gonyou (eds). CABI Publishing, New York; Ch 6; pp. 147-176.

"A pig by itself is not a pig" reflects the fundamental reality that swine behavior becomes abnormal in social isolation. This is a prime reason why individually confining 500-pound pregnant sows in 14 square foot gestation crates for 75 percent of their adult lives in industrial swine settings is so abusive, harmful, and disrespectful to the pigs' essential nature. For the highly intelligent, active, curious, and gregarious sow, social isolation in a small cage is traumatic, analogous to humans in solitary confinement who suffer severe duration-dependent psychological damage and physical health problems.

While Mr. Warner and the pork industry may not have asked the sows in their care if they would like to turn around, scientists have: in carefully designed animal behavior research they found that when penned in a wide enough enclosure, sows will turn around nearly 200 times a day**.** Clearly the behavior is important to the sow. K.E. Bøe, G. M. Cronin & I. Andersen, *Turning around by pregnant sows*, 133 Applied Animal Behaviour Science 164 (2011). Sows have told us in numerable ways, as noted

below, that their abject lives in cramped confinement is painful and miserable.

Contrary to AASV's assertion, Proposition 12 does not mandate group housing; farmers are free to continue to cage their sows in solitary confinement stalls and still provide compliant pork to California. However, those who care about the wellbeing of these highly intelligent animals understand that the continued use of gestation crates of any size in place of group settings and access to social interaction takes a tremendous physical and mental toll. "Group housing" is a catch-all phrase for varied indoor or even outdoor housing, husbandry, technology and management systems that can be profitable and meet the needs of both pregnant sow and producers. They offer sows the opportunity to exercise, display exploratory behaviors, and develop social relationships.

There is an extensive scientific literature and practical experience in group housing of sows developed over the past three decades. For example, using the search term "gestating sow housing" on the AASV's online "Swine Information Library" returned 503 results (https://www.aasv.org/search.php?q=gestating%20sow%20group%20housing); the search term "group sow housing" returned 1320 results. Swine veterinary practitioners are well-aware of this viable and practical sow management option and its benefits.

Many concerns related to sow group housing (e.g. aggression and injury over feed access) can be resolved with a good system design and

stockmanship. For example, the Electronic Sow Feeder (ESF) is a feeding system for pregnant group housed sows that minimizes aggression over feed access. Sows enter the ESF feeding stall through a gate which closes behind them, preventing access by any other sow. A computer scans the sow's ear tag and delivers the appropriate feed ration for each sow, providing a non-competitive environment at feeding that allows individual feeding curves for each sow. Gonyou H, Rioja-Lang F, 2018. Non Competitive Feeding Systems: Electronic Sow Feeders, *Science of Ethology, 1(4):114-17.* https://www.prairieswine.com/wp-content/uploads/2018/11/PSC-Group-Sow-Housing.pdf

Reproducing females are the most valuable animals on a swine operation, as they are the source of the final farm product: market hogs. After reaching puberty at eight months of age, the impregnated sow is individually immobilized inside a gestation crate for four months of pregnancy. One week before birth, she is transferred to a similarly restrictive farrowing (birthing) cage. After three weeks of nursing, ten to twelve piglets are weaned. Within a week, the sow is re-impregnated and put back into a gestation crate. This five-month pregnancy-lactation-breeding cycle repeats continuously for up to four years, after which the sow is culled and sent to slaughter as her reproductive capacity is exhausted.

Gestation crates or sow stalls are an intensive indoor housing system adopted by the pork industry in the early 1970s to confine pregnant breeding sows.

The crates are tubular metal bar cages, typically seven feet long, two feet wide, and three feet tall, the same size and shape as the sow herself and roughly the size of a standard refrigerator. Sows that may weigh more than 500 pounds have six inches or less of space above and to their sides from crate bars. The floor is often concrete that is slatted at the rear to allow urine and feces to pass through into a slurry pit below. There are about six million breeding sows in the United States. These sows produce about 130 million market pigs per year. About 70 percent of United States sows (approximately 4.2 million) are currently kept in gestation crates. Post-puberty, a sow spends 75 percent of her life in a gestation crate, 20 percent of her life in a farrowing crate, and just 5 percent of her life "uncaged." Humane Society Veterinary Medical Association, *Veterinary Report on Gestation Crates*, April 2013. 15 pp.

The crated sow cannot turn around or even comfortably lie down. This severe confinement precludes manifesting natural behaviors such as rooting, nesting, and socializing with other pigs. For years, the sows' daily activity is reduced to approximately ten minutes: the time it takes sows to eat their concentrated corn-soybean diet. Simple movements such as standing up or lying down may be difficult and painful. Large sows cannot lie flat but must remain lying on their sternums. Stalls are usually situated in long rows within fully enclosed, climate-controlled buildings with no bedding or sunlight, often more than 100 crates per building, like cars in a packed parking lot. This degree of movement

restriction is the most severe of any animal farmed for food globally.

The industry's and the AASV's argument that sow stalls are good for welfare rests on the untenable premise that it is acceptable to prevent an undesirable pattern of behavior – namely, aggression between animals free to attack one another – by restricting *all forms of behavio*r. This is analogous to claiming that prisons would be much more manageable if all inmates were kept permanently in solitary confinement.

A generally accepted definition of animal welfare is "how well an animal is coping with the conditions in which it lives." Attempts to improve farm animal welfare have commonly centered around three broad objectives:

- *Basic health and functioning*: ensure good physical health and biological functioning ("productivity") e.g. rates of disease, injury, mortality, and reproductive success.
- *Affective (emotional) state*: minimize unpleasant "affective states" (pain, fear, suffering, etc.) and allow animals normal pleasures, e.g., on indicators of pain, fear, distress.
- *Natural living*: allow animals to develop and live in ways that are natural for the species, including expressing natural innate behaviors.

For the following reasons, we vehemently disagree with the swine veterinarians that sow gestation crates are the best option for sow welfare for the following reasons.

First, sows kept in gestation crates, while having generally high reproductive performance for a limited duration of three to four years, often suffer from poor health. Annual United States industrial sow herd mortality is about 12 percent. A further 47 percent are culled each year. This represents an incredibly high 60 percent annual sow replacement rate. Voluntary culling reasons include farrowing difficulty (difficulty giving birth), small litter size, poor lactation and rearing, poor maternal behavior, and reproduction performance below herd average. Involuntary culling reasons include anestrus (the sow does not come into 'heat'), failure to conceive, abortion, lameness, and other disease or injury.

Research by Broom et al. found that 33% of crated sows required removal from production as a result of health problems, compared with less than 4% of group-housed sows. D.M. Broom, M. T. Mendl & A. J. Zanella, *A comparison of the welfare of sows in different housing conditions*, 61 Animal Science 369 (1995). While gestation-crated sows are removed from production at a much higher rate than group-housed sows, many studies demonstrate little or no difference in reproductive performance of sows kept in gestation crates compared to that of group housed sows. *E.g.*, Yuzo Koketsu & Ryosuke Ida, *Sow housing associated with reproductive performance in breeding herds*, 84 Molecular Reproduction and Development 979 (2016);

Yolande Seddon & Jennifer Brown, *Groups or Stalls: What Does the Science Say?*, 1 Science of Ethology 26 (2018).

Production diseases are pathological conditions (infectious, metabolic, genetic, behavioral, nutritional, injury, or wounds) induced or exacerbated by industrial management practices. They are human-made problems associated with a break-down of homeostatic mechanisms in high-producing animals that *increase in incidence as the level of production increases*.

Crated sow production diseases are a manifestation of the animal's inability to cope with the demands of high production. They include several endemic infectious bacterial and viral diseases of the gastrointestinal, respiratory and reproductive systems, such as Porcine Reproductive and Respiratory Syndrome virus, lameness, decubital ulcers (bedsores) of the shoulders from weight pressure against the cage bars, uterine prolapse, gastric ulcers, and gastric torsion. Crated sows are also under chronic stress, which is highly immunosuppressive.

The lack of movement resulting from long-term sow-cage confinement has several health consequences itself. It can lead to poor cardiovascular function and bone and muscle weakness. In heavy pigs, it predisposes them to lameness. Lameness, in turn, predisposes sows to urinary tract infections. Sows become heavier as pregnancy progresses and may have difficulty moving because of the pain, which inclines them to remain in the 'sitting dog position' for

long periods and reduce water consumption. This leads to infrequent urination, which, together with fecal contamination of the perineal region, predisposes sows to bacterial urinary tract infections, which is the main cause of prophylactic antimicrobial usage (AMU) in pregnant sows. As discussed above, sow AMU is a driver of antimicrobial resistance to drugs used in both human and veterinary medicine.

Pigs are intelligent, curious, social, inquisitive, and active animals. Immobilization in gestation crates without environmental enrichment or mental stimulation takes a severe psychological toll. Crated sows are frustrated, bored, and, essentially, clinically depressed.

Stereotypies – repetitive movements or sounds – in caged sows are abnormal, repetitive behaviors with no evident function or goal. They are attributed to boredom and frustration resulting from an impoverished environment, confinement, restraint, and unfulfilled needs. They are indicators of poor welfare.

Stereotypies are extremely common in gestation-crated sows. They include repetitive bar-biting, head-weaving, pressing their drinkers without drinking, and making chewing motions with an empty mouth ('sham-chewing'). Stereotypies can lead to physical injury, e.g., sores from excessive rubbing against bars, or broken teeth from bar-biting. In contrast, group-housed sows show more exploratory behavior, less sham-chewing, less sitting behavior, and lower stress hormone levels throughout pregnancy than those in sow stalls. And the piglets of

group-housed sows show better resistance to disease challenge. Xin Liu et al., *Comparison of the behavior, physiology, and offspring resilience of gestating sows when raised in a group housing system and individual stalls*, 11 Animals 2076 (2021).

Unresponsiveness in sows is another behavioral disorder indicative of poor welfare. Over time, crated sows respond less to external stimuli, including water poured on their backs, sow grunts, an electronic buzzer, and even piglet squeals. Humane Society Veterinary Medical Association, *Veterinary Report on Gestation Crates*, April 2013. 15 pp.

In their natural environment, pigs are social animals which explore their environment in search of food. Domesticated pigs have retained most of their ancestors' natural behavior, despite domestication. Gestation crates prevent sows from engaging in most, if not virtually all, of their natural social and individual behaviors including rooting, foraging, nest-building, grazing, and wallowing.

Crate-confined pregnant sows are in perpetual chronic stress and poor welfare. Sow crates, which are essentially extremely narrow solitary confinement prison cells, are the most egregious practice in the swine industry and perhaps in all of animal agriculture, given the high intelligence and social nature of pigs. They generate serious but unnecessary physical, psychological, and ethical welfare consequences given the readily viable alternatives to gestation crates, namely, a variety of group housing options.

Unsurprisingly, gestation crates are deemed unacceptable by most Americans. California voters passed Proposition 12 with 63% of the vote, but Massachusetts voters two years earlier passed a nearly identical measure with close to four-fifths of the vote. Eight other states have gestation crate bans, including, Arizona, Florida, Michigan, and Ohio. A poll of 2,064 American adults found that 66% of Americans find sow gestation crates unacceptable, and 65% were willing to pay more for pork products from companies that eliminate gestation crates. *Majority of Pork Buyers Show Concern for Pig Welfare, Survey Shows*, Harris Insights and Analytics LLC (Oct. 7, 2020), https://dkt6rvnu67rqj.cloudfront.net/cdn/ff/rIbaD52kRlqtpTd6PGqxUBjvFHB1Y2CONyULgYNpuGc/1607544936/public/media/World_Animal_Protection_Report_revised_v2.pdf.

Aa national survey conducted by academics at Michigan State University in 2008 found that about 70% of respondents indicated that they would vote for a referendum banning gestation crates in their state of residence. Dr. Glynn Tonsor, *U.S. Resident Support for Gestation Crate Bans*, 13 MSU Pork Quarterly 3 (2008).

In sum, the petitioners, along with the AASV, are out of step with their consumers and the judgment of most veterinary professionals. The American swine industry, comprised of 60,000 pork producers, is known as the most adaptable and flexible in our animal agriculture sector. Systems of pork production changed from free-range forest-based to fenced

pasture to small-scale dirt lots and finally into industrial-scale indoor confinement over the past century alone. Proposition 12 and the additional, minor shifts it requires ask far less of producers than any of the other prior shifts in production in an ever-evolving sector. Most important, the changes that will follow from adopting the requirements imposed by Proposition 12 benefit not only the animals, but the health of humans. In short, everybody is better off.

CONCLUSION

The judgment of the Ninth Circuit should be upheld.

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