



An HSUS Report: Welfare Issues with Gestation Crates for Pregnant Sows

Abstract

Throughout nearly the entirety of their 112-115 day pregnancies, an estimated 60-70% of breeding sows in the United States are confined in gestation crates (also known as sow stalls)—individual metal enclosures so restrictive that the pigs cannot turn around. Crated sows suffer a number of significant welfare problems, including elevated risk of urinary tract infections, weakened bones, overgrown hooves, lameness, behavioral restriction, and stereotypies. Due to concerns for the welfare of intensively confined sows, legislative, industry, and corporate policies are increasingly phasing out the use of gestation crates.

Introduction

More than 5.8 million pigs are used for breeding in the U.S. pork industry.¹ The majority (an estimated 60-70%) of breeding sows are confined in gestation crates² for nearly the entirety of their approximately four-month (112-115 day)³ pregnancies. Gestation crates are individual, concrete-floored metal stalls measuring 0.6-0.7 m (2.0-2.3 ft) by 2.0-2.1 m (6.6-6.9 ft), only slightly larger than the animal and so severely restrictive that the sows are unable to turn around.⁴ In typical pig production facilities, gestation crates are placed side by side in rows, often with more than 20 sows per row and 100 or more sows per shed.^{5,6} The crate floors are customarily constructed with slats to allow manure to fall into a lower pit to separate the sow from her excrement.⁷



Economic pressure, rather than science or animal welfare, is the driving force behind the use of gestation crate housing in the U.S. pork industry according to John J. McGlone, professor of Animal and Food Science and Cell Biology and Anatomy at Texas Tech University and a director of the Pork Industry Institute: “[I]t is the economic forces that drive pork producers to do things that hurt or stress their pigs.”⁸ Although gestation crates are already banned in Sweden and the United Kingdom and, for welfare reasons, are being phased out in the European Union (with a total ban on use after the fourth week of pregnancy effective in 2013),⁹ Tasmania,¹⁰ and New Zealand,¹¹ they remain at present a common animal agribusiness practice in the United States.

Recent policy changes in the United States have indicated a clear move away from gestation crate practices, however. In 2002, Florida voters legislated against the use of gestation crates, with the ban going into effect in November 2008.¹² In 2006, Arizonans passed the Humane Treatment of Farm Animals Act, a voter proposition that disallows both gestation crates for pregnant sows and crates for calves raised for veal beginning January 1, 2013.¹³ In 2007, Oregon became the first state to ban the use of gestation crates through the state legislature, a ban effective on January 1, 2012.¹⁴ Colorado followed suit in 2008, banning crates for both calves raised for veal and pregnant pigs with a ten year phase-out period.^{15,16} A November 2008 ballot measure in California, which passed with 63.5% of the vote, bans gestation crates, veal crates, and battery cages for egg-laying hens, effective January 1, 2015.^{17,18,19} In May 2009, the Maine legislature passed a law banning gestation stalls for sows and veal crates for calves throughout the state, effective January 1, 2011.²⁰ Michigan followed in October 2009, with passage of state legislation that will phase out veal crates and gestation crates within ten years.²¹ In 2010, an

agreement in Ohio led to a comprehensive set of rules banning the use of gestation crates for pregnant sows after 2025, among other animal welfare improvements.^{22,23}

Industry shifts within North America have also pronounced movement away from the use of gestation crates. In 2007, Smithfield Foods, the world's and United States' largest pig producer,^{24,25} and Maple Leaf, Canada's largest pig producer,²⁶ made corporate commitments to phase-out their use of gestation crates,^{27,28} and the Colorado Pork Producers Council announced a ten-year phase-out for the state's pig producers.²⁹ Said Smithfield Foods CEO Larry Pope, "Our own research has demonstrated that group pens are as good as individual gestation stalls in caring for pregnant sows."³⁰ Celebrity chef Wolfgang Puck has committed to purchasing pork from crate-free sources for all of his restaurants,³¹ and Burger King has begun purchasing crate-free pork in increasing quantities as supply becomes more consistent.³² McDonald's 2008 Corporate Responsibility Report states it "has long supported suppliers that choose to move away from sow gestation crates and tethers,"³³ but has not yet made concrete purchasing policies mandating specific quantities of pork from crate-free operations.

Crating Pregnant Sows

Within U.S. animal agriculture, breeding sows produce an average of 2.1-2.5 litters each year³⁴ and are typically first impregnated around seven months of age,³⁵ often through artificial insemination.^{36,37} A week before birthing, sows are customarily moved into farrowing crates to nurse their piglets. The piglets are weaned at 17-21 days old,³⁸ and the sows are re-impregnated a few days later.³⁹ Breeding sows are typically culled after an average of 3.5 parities.⁴⁰ Although in decreasing percentages given legislative and industry shifts away from individually confining pregnant sows, at present, the majority spend nearly their entire approximately four-month pregnancies in gestation crates, which prevent the animals from satisfying basic psychological needs and engaging in most of their social and natural behavior,⁴¹ including rooting, foraging, nest-building, grazing, and wallowing.^{42,43}

As a result of the intensive confinement, crated sows suffer a number of welfare problems, including poor hygiene, risk of urinary infections, weakened bones, overgrown hooves, poor social interaction, lameness, behavioral restriction, and stereotypies. The European Union Scientific Veterinary Committee (SVC) criticized gestation crates in its 1997 report, "The Welfare of Intensively Kept Pigs," and concluded: "No individual pen should be used which does not allow the sow to turn around easily."⁴⁴

Crated gestating sows have difficulty moving due to the spatial restriction, lack of exercise, and flooring type,⁴⁵ whereas group-housed sows have a greater range of movement and show fewer abnormalities of bone and muscle development.⁴⁶ As well, several factors relating to the construction of gestation crates and the unsanitary conditions prevalent in pig production facilities may predispose crated sows to disease and/or injury, including: confinement, slatted floors with sharp corners, rough concrete flooring, lack of bedding, and endemic infections.^{47,48}

Physical Health Concerns

Virtually immobilized in barren, restrictive gestation crates, the welfare of breeding sows is severely compromised. Jeremy Marchant-Forde, now a research animal scientist with the U.S. Department of Agriculture (USDA), and Donald Broom, professor of Animal Welfare at the University of Cambridge, have posited that difficulty performing the simple movements of standing and lying is indicative of poor sow welfare.⁴⁹ They describe that commercial stalls were not designed with the understanding of these movements and note: "With these dynamic space requirements taken into account, the vast majority of gestation stalls and farrowing crates are too small in width and length, to allow standing and lying to be carried out without spatial restriction."⁵⁰ Other animal scientists have made similar determinations and also suggest that crated sows experience increasingly severe discomfort as pregnancy advances.⁵¹

Indeed, welfare concerns were not the primary consideration in the design of many current housing systems.⁵² A survey of manufacturers revealed that engineers never used sow measurements during the design of the first gestation crates.⁵³

Discomfort can be compounded by problems associated with barren crates. Without any bedding materials, sows have no thermal protection, which can cause systemic and local cold stress, and may contribute to or exacerbate injuries to skin and limbs.⁵⁴ Since gestation crates are barely larger than the sow's body, the animals must urinate and defecate where they stand. As such, the concrete floors of the crates are often partially or fully slatted to allow waste to fall into a pit below. Housing the sows directly above their own excrement has been shown to expose the animals to aversively high levels of ammonia,⁵⁵ and respiratory disease has been found to be a significant health issue for pigs kept in confinement.⁵⁶ Foot and leg disorders, urinary tract infections, and cardiovascular problems are also of concern for crated sows, who additionally suffer traumatic injuries and body sores often caused by being forced to stand and lie on unnatural flooring or in residual feces and urine. Research led by Broom found 33% of crated sows required removal from production as a result of health problems, compared with less than 4% of group-housed sows.⁵⁷

Injury Due to Gestation Crate Design

Space restriction in gestation crates is a significant cause of injuries to pregnant sows. Intensively confined, crated sows experience soreness and injuries from rubbing against the bars of their enclosures and from standing or lying on barren flooring.⁵⁸ As gestation crates are narrow and typically placed side by side within pig production facilities, when lying down, sows must extend their limbs into adjacent stalls where they may be stepped on.⁵⁹ The slatted floors often have sharp corners that can injure exposed limbs and sows who slip in the crates.⁶⁰ Food-deprived sows can also suffer head and snout injuries from attempting to access an adjacent stall's feeder.⁶¹ Research has shown that rates of injury increase with time spent in the gestation stall.⁶² Despite concerns regarding injuries and research showing that providing extra stall space can considerably reduce injuries and improve breeding sow welfare,⁶³ industry observers believe the trend may be towards even narrower stalls.⁶⁴ Though stalls have not yet become physically smaller, over time, they have become effectively smaller compared to the size of the sow. Industry journal *National Hog Farmer* reported that in 1989, the sow stall was of adequate size to hold the average gestating sow,⁶⁵ but research from 2004 found that more than 60% of sows could not fit in conventional stalls without being compressed against the crate's sides.⁶⁶

Foot and Leg Problems

In their natural habitat, pigs evolved to walk in woodlands and scrub. Putting sows in gestation crates with unnatural flooring changes the stresses on sows' feet⁶⁷ and is considered to significantly contribute to toe lesions,⁶⁸ with some reports finding up to 80% of stall-housed sows suffering from this condition.⁶⁹ Gestation-crate confinement has also been found to excessively⁷⁰ cause damage to joints⁷¹ and lameness.^{72,73} Erosion of the cement floor from water and feed may leave rocks and sharp edges that can contribute to foot, leg, and shoulder sores,⁷⁴ and bolts which fix the crates in place can also contribute to similar injuries.⁷⁵

Reduced Muscle Mass and Bone Strength

The health and welfare of breeding sows housed in gestation crates has been determined to be negatively affected by their inability to turn around or exercise.⁷⁶ The restriction of movement can lead to a "reduction of muscle weight and considerable reduction of bone strength,"⁷⁷ making the most basic movements difficult⁷⁸ and leading to a "greater chance of the sow slipping during lying and standing and incurring physical damage."⁷⁹ Successive pregnancies exacerbate the problems of diminished muscle mass and bone strength.⁸⁰

Urinary Tract Infections

Gestation-crated sows suffer from a higher rate of urinary tract infections (UTIs) than uncrated sows,⁸¹ due to their inactivity, decreased water consumption, infrequency of urination,⁸² and possible contact with their own

waste.⁸³ These infections can result in a high mortality rate, with one study estimating that half of breeding sow mortalities were caused by UTIs.⁸⁴ In comparison, group-housed sows suffer a lower incidence of UTIs associated with inactivity.⁸⁵ Increasing water intake at one commercial operation using group pens rather than gestation crates nearly eliminated UTIs.⁸⁶

Mortality

Sows confined in gestation crates have been found to suffer from dramatic weight loss after successive pregnancies and a high incidence of health problems requiring the animals to be “removed from the [production] system.”⁸⁷ Research on crate-free production has found that both outdoor,⁸⁸ and loose-housing⁸⁹ systems offer benefits to sow health and longevity. Compared with typical U.S. crate production methods, deep-bedded, loose housing systems studied in Sweden result in lower cull rates and greater sow longevity.⁹⁰ Commercial operations have also recorded better reproductive performance and lower mortality rates for sows housed in pens rather than confined in crates.⁹¹

Compared to group-housed sows, gestation-crated sows show increased resting heart rates, likely due to decreased muscle fitness from chronic lack of exercise,⁹² and are more likely to suffer decreased cardiovascular fitness.⁹³ The deaths of many pigs during transport can be traced to cardiovascular problems.⁹⁴

Mental Health and Behavioral Concerns

When pigs are not confined, they are active and curious animals. Pigs are intelligent, social, inquisitive, and capable of learning complex tasks,^{95,96,97} perceiving time, and anticipating future events.⁹⁸ Near-immobilization in gestation crates without environmental enrichment or mental stimulation impairs their welfare.

Inability to Express Natural Behavior

In natural environments, sows spend approximately 31% of their time grazing, 21% rooting, 14% walking, and 6% lying down.⁹⁹ Pigs also perform thermoregulatory behavior such as wallowing and shade-seeking.¹⁰⁰ When given space, sows elect separate areas for nesting, feeding, and eliminating.^{101,102}

Highly social animals, pigs learn to perform simple tasks for the reward of contact with familiar individuals.^{103,104} They develop behavioral and acoustic signals important to the organization of their social structure. Researchers have described more than 20 different sounds emitted by pigs while performing various social activities including feeding, play, maternal behavior, and sexual interactions.¹⁰⁵ For wild boars and feral pigs, their home range, for which they show a high degree of site fidelity, can vary from less than 1 km² (0.39 mi²) to more than 25 km² (9.65 mi²).¹⁰⁶ When released from confinement to semi-natural enclosures, sows quickly revert to natural behavior including rooting, nest-building, and traveling long distances, and spend considerable time performing such behavior when given the opportunity.¹⁰⁷

Intensive confinement, however, thwarts nearly all this behavior, reducing daily activity to approximately ten minutes—the time it takes sows to eat their concentrated diet. According to one veterinarian, confinement in gestation crates is “so foreign to what I perceive to be the natural habits of swine that it is unjustified by the economic benefits perceived to result.”¹⁰⁸ Compared to group-housed sows, crated sows have been found to be more often frustrated, indicated by the amount of time spent performing stereotypic behavior,¹⁰⁹ likely due to their inability to express natural behavior such as foraging. Confinement in gestation crates, according to Marchant-Forde and Broom, “has resulted in alteration or prevention of many of the sow’s normal behaviours, increases in abnormal behaviour and in various other indicators of poor welfare.”¹¹⁰

Stereotypies

Stereotypies are characterized as movement or behavior that is abnormal, repetitive, and seemingly with no function or goal.¹¹¹ Researchers attribute this behavior to boredom and frustration resulting from an

impoverished environment, confinement, restraint, and unfulfilled needs.^{112,113} Stereotypies are commonly described in animals in zoos and laboratories, indicating the animal has difficulty coping with the conditions or is in an environment deleterious to welfare.¹¹⁴

Stereotypic behavior is common among gestation-crated sows and includes repetitive bar-biting, head-weaving, pressing their drinkers without drinking, and making chewing motions with an empty mouth, called sham- or vacuum-chewing.^{115,116,117} Stereotypic behavior can lead to physical injury, such as sores from excessive rubbing against the crate's bars or damage in the mouth from bar-biting and sham-chewing.¹¹⁸

Confined sows are typically fed half the amount they would eat *ad libitum* to prevent excessive weight gain and fat deposition,¹¹⁹ which can result in poor reproductive performance. It is believed that this restrictive diet, combined with the inability to forage, contribute to the development of stereotypic behavior and stress.^{120,121}

Crated sows spend considerably more time performing oral stereotypic behavior than those housed in small groups. In one study by Broom *et al.*, sows in crates exhibited abnormal behavior approximately ten times more often than group-housed sows. One crated sow spent more than 40% of her time performing stereotypies. The authors commented: "Using a wide range of welfare indicators, it was clear that stall-housed sows had more problems than group-housed sows and that these problems were worse in the fourth than in the first pregnancy." The amount of time sows engaged in stereotypies in the study increased with the time spent in crates.¹²² By comparison, in situations where sows have greater freedom in more complex environments, the amount of stereotyped behavior is virtually zero.¹²³

"That stereotypies are an indication of welfare problems was a strong consensus among nearly all authors whose work was reviewed,"¹²⁴ concluded the American Veterinary Medical Association's (AVMA's) Task Force on the Housing of Pregnant Sows. The SVC agreed: "The extent of stereotypy gives an indication of how poor the welfare is."¹²⁵

Unresponsiveness

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 squeals from piglets^{126,127} The SVC commented that inactivity and unresponsiveness are abnormal and it is likely that crated sows become clinically depressed.¹²⁸

Aggression

Limiting aggression is often given as justification for confining sows in gestation crates, yet antagonistic interactions remain a problem in stall housing systems. Studies have shown that confinement in individual stalls may lead to "unsettled dominance relationships" and "high aggression levels."¹²⁹ These unresolved agonistic interactions are likely to cause stress and worsen with successive pregnancies.^{130,131} Crated sows have been found to experience agonistic interactions up to three times more often than group-housed sows and cannot readily practice avoidance.¹³² This same study found that stall-housed sows were more aggressive than group-housed sows by their fourth pregnancy.¹³³ Although aggression can be a welfare problem in group housing, it can be curtailed with responsible management and good practices.¹³⁴

Stress

Changes in hormone levels are often used as a gauge of stress in animals.¹³⁵ Cortisol levels in restricted sows have been found to be significantly increased compared to group-housed sows, indicating a chronic stress response to confinement.¹³⁶ The simple act of turning around—in special stalls designed to allow this freedom¹³⁷—measurably reduces stress hormone levels in sows¹³⁸ almost to the level of their group-housed counterparts.¹³⁹

Additionally, stress associated with confinement has been implicated in diminishing immune function. Recent research has shown a redistribution of white blood cells occurs in sows who are crated during gestation, “suggesting immune dysfunction perhaps as a consequence of increased stress.”¹⁴⁰

Alternative Housing Systems

Alternatives to gestation-crate production methods include “turn-around” stalls, free-range and pasture-based systems, and, most commonly, indoor group housing. Turn-around stalls can be slightly larger than customary gestation crates or have a moving wall that allows the sow to turn around inside the crate. In free-range systems, sows are afforded access to the outdoors and, optimally, given the freedom and materials to express natural behavior such as nest-building and rooting. Sows are raised outdoors in pasture-based production and typically provided portable housing or shelters to allow for sustainable rotational practice. With the main alternative to gestation-crate systems, groups of up to several dozen sows are housed together in indoor pens, sometimes with deep litter allowing for access to bedding materials, and given freedom to move and the opportunity to socialize.

Feeding practices in group-housing systems vary. Often, group-housed sows are fed through automated or manual on-ground distribution of enough food for the entire group. This practice can result in aggression among sows during feeding, due to competition. Various types of feeding stalls have been introduced to reduce this aggression. Free-access stalls allow sows to enter an individual stall to feed, but do not resolve all welfare issues, particularly when sows who eat at different speeds are housed together; those who finish eating quickly may exit their stalls and bite at slower-feeding sows in other stalls. Some free-access stalls are fitted with a back gate or an automated, controlled rate feeder, so faster-eating sows are forced to eat more slowly, to eliminate this aggression. The most effective alternative to date is likely the electronic sow feeder (ESF) system, which allows entry of one sow at a time, identifies her through an electronic tag or collar, and distributes the appropriate ration. When the sow finishes eating, she leaves through a separate exit. In the ESF system, feeding aggression is eliminated because sows do not have to compete for food. In several countries, ESF systems are being widely adopted and their welfare advantages are well-documented in scientific reviews.^{141,142}

Higher sow productivity is possible in group housing than in individual crates, resulting from reduced rates of confinement injuries and urinary tract infections,¹⁴³ earlier first estrus,^{144,145} larger litter size, and lower stillbirth incidence.¹⁴⁶ Commenting on the increased litter size in group versus crated housing systems, Iowa State University animal science professor Mark Honeyman was quoted as saying it is “a large difference....It’s significant from an economic value and productivity value viewpoint.”¹⁴⁷

In its review, the SVC reported that sows in groups “have more exercise, more control over their environment, more opportunity for normal social interactions and better potential for the provision of opportunities to root or manipulate materials....As a consequence, group-housed sows show less abnormality of bone and muscle development, much less abnormal behaviour, less likelihood of extreme physiological responses, less of the urinary tract infections associated with inactivity, and better cardiovascular fitness.”¹⁴⁸ Currently more than 4 million sows are raised in group housing in Europe.¹⁴⁹

Conclusion

Although the American Veterinary Medical Association’s Task Force on the Housing of Pregnant Sows concluded that “no one system is clearly better than others under all conditions,” the Task Force did identify a number of problems inherent to gestation crates: “Gestation stalls, particularly when used in conjunction with feed restriction, may adversely affect welfare by restricting behavior, including foraging, movement, and postural changes.”¹⁵⁰ Other contributing factors to poor welfare noted were “lack of exercise, lack of environmental complexity, lack of rooting/chewing materials, and an inability for the sow to exert control over her environment.”¹⁵¹

After a comprehensive two-year study, the independent Pew Commission on Industrial Farm Animal Production, a project of The Pew Charitable Trusts and the Johns Hopkins Bloomberg School of Public Health

chaired by former Kansas Governor John Carlin and including former U.S. Agriculture Secretary Dan Glickman, concluded that gestation crates should be phased out:

After reviewing the literature, visiting production facilities, and listening to producers themselves, the Commission believes that the most intensive confinement systems, such as restrictive veal crates, hog gestation pens, restrictive farrowing crates, and battery cages for poultry, all prevent the animal from a normal range of movement and constitute inhumane treatment.¹⁵²

Scientific evidence supports improved health and welfare for sows not confined in gestation crates. In “The Welfare of Intensively Kept Pigs,” the European Union’s Scientific Veterinary Committee concluded: “Since overall welfare appears to be better when the sows are not confined throughout gestation, sows should preferably be kept in groups.”¹⁵³

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