

---

## **Sponsors**

---

### **University of Minnesota**

College of Veterinary Medicine

College of Agricultural, Food and Environmental Sciences

Extension Service

Swine Center

### **Editors**

W. Christopher Scruton

Stephen Claas

### **Layout**

David Brown

### **Logo Design**

Ruth Cronje, and Jan Swanson;

based on the original design by Dr. Robert Dunlop

### **Cover Design**

Sarah Summerbell

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, or sexual orientation.

# Measurable outcomes for swine welfare

Suzanne T. Millman

Department of Population Medicine, Ontario Veterinary College, University of Guelph, Guelph, ON, N1G 2W1, Canada. Tel: (519) 824-4120 ext.3677, Email: smillman@ovc.uoguelph.ca

## The need for objective measures for swine welfare

At the present time, animal welfare is one of several issues that are generating public scrutiny of the swine industry. Surveys taken during the past ten years indicate strong public concern about animal suffering. For example, 93% of people surveyed agreed that “animal pain and suffering should be reduced as much as possible, even though the animals are going to be slaughtered” (Caravan Opinion Research, 1995). Specifically, 70% of Americans said that pigs should be treated more humanely, and that they would pay more for meat from pigs that had been raised more humanely (Penn, Schoen, & Berland Associates, 2001). The emergence of “welfare-friendly” product labels, such as Free-Farmed, Niman Ranch, and others, indicates that concern for animal welfare is an important issue to citizens who consume animal products and who see animal agriculture as an integral part of our culture. Consequently, increased regulation of farming practices through welfare standards developed by retailers and through legislation will likely continue. For those working in the swine industry, questions arise whether animal welfare concerns are justified and whether pigs truly fare better in these “welfare-friendly” management schemes. Note that I am restricting the debate about animal welfare to impacts on the pigs themselves, rather than intentions of people handling, managing, or marketing them. Although there have been instances of willful cruelty or abuse towards animals within the farming community,<sup>1</sup> such occurrences are unusual and pose different sets of questions.

Debate continues about whether animal welfare is best defined by what an animal feels or its biological function. Since public concern focuses on animals that are sentient, with the greatest levels of concern directed towards animals of high cognitive abilities, it is reasonable to assume that the “feelings” definition of animal welfare comes closest to reflecting public sentiment. For example, few people express concern about impaired reproductive fitness of mollusks or fruit flies. Furthermore, while some people also express concern about the survival of plants or about the preservation of architectural wonders, such as cathedrals, they grant animals unique status because of their abilities to experience suffering and pleasure. For

example, the Amsterdam Treaty classifies animals as “sentient beings” and provides them with special consideration under European law.

Even where there is agreement that welfare relates to how animals feel, there continues to be disagreement about which feelings are most important and about levels of suffering that are considered acceptable. Do we know if pigs feel boredom, and, if so, how do we weigh boredom relative to fear or pain? Such judgements are based on personal values, and, hence, consensus is unlikely to occur. Animal welfare science plays a useful role by providing objective information from which such judgements can be made—namely to what extent pigs experience boredom, fear, and pain. Presumably if differing decisions are made using the same template of scientific information, they may be more constructively debated on ethical grounds.

## What is measurable in swine welfare?

Some of the disagreement about what defines animal welfare may have less to do with definition and more to do with which methodology provides the most useful information. The challenge of animal welfare science is to determine what an animal is feeling, using sound scientific methodology and reasonable sets of assumptions. We have come a long way from glancing casually at a pig to determine its responses to a procedure or the quality of its environment. Techniques that are quantifiable and repeatable continue to be developed and shed light on an animal’s perception of its quality of life; these techniques involve neurology, physiology, behavior, health, and productivity. I will briefly illustrate some of these indirect measures which, when taken together in an interdisciplinary approach, can yield robust information about what pigs experience or feel.

### Do we know when pigs are in pain or distress?

- Pitch and frequency of calls by piglets may reflect distress due to pain, since piglets give more high-frequency calls during castration than sham-castrated piglets do (Weary et al., 1998).
- Neuromas, suggestive of chronic pain, have been found to persist in tail stumps of pigs at 18 weeks

docked with scissors and clippers. (Glatz & Lunam, 1998).

- By scoring for number, severity, and location of skin lesions, it is possible to make assumptions about pain experienced. It was found that group-housed gilts received significantly more skin lesions ( $P < 0.05$ ) than gilts housed in stalls (Harris et al., 2002). Similar scoring systems are being developed to assess lameness.

#### Do pigs feel fear?

- Hemsworth has worked extensively on stockpersonship, particularly in relation to fearfulness of pigs that results from rough handling (for review see Hemsworth & Barnett, 2000). By measuring flight distance, latency to approach, as well as changes in plasma cortisol levels, heart rate, and growth parameters, it has been shown that pigs experience fear in the presence of humans, and that familiarization and gentle handling can reduce the fear response.

#### Are pigs experiencing frustration?

- Stereotypic behavior has been associated with frustrated feeding behavior. In feed-restricted sows, some stereotypic behavior, such as bar-biting, occurs during the feeding period itself, while others, such as drinking combined with rooting (Rushen, 1985), occur over longer durations following feeding. Von Borell and Hurnik (1991) found that individual pigs showing the greatest amount of stereotypic behavior also have the greatest corticosteroid responses to ACTH.
- One behavioral indicator of frustration has been shown to be increased aggression. Frustration was experimentally induced in pigs by feeding group-housed pigs at variable intervals, with either a reliable or unreliable signal (a bell) that food was about to be delivered performed. Pigs receiving an unreliable signal performed significantly more aggression towards pen-mates immediately following the false signal (Carlstead, 1986).
- Using operant conditioning techniques, it is possible to quantify preferences and levels of motivation of pigs. Prior to farrowing, sows perform more locomotory behavior when given the opportunity, whereas crated sows show an increase in postural changes suggestive of restlessness or frustration during this time (Phillips et al., 1991). When sows were trained to lift a lever to gain access to increased pen space for locomotion, they worked significantly harder to gain access to this extra space ( $P < 0.01$ ), and showed increased locomotory behavior ( $P < 0.05$ ) during the day previous to farrowing than during preceding days (Haskell et al., 1997).

In summary, current techniques are adequate for rudimentary understanding of factors that cause pigs to experience suffering and pleasure. No measurement in isolation is adequate for determining animal welfare, but by taking a variety of measurements in thoughtfully designed experiments, it is possible to tease apart causal factors so that improvements could be made.

### Measurable outcomes: Farm assurance and farm assessment

If we are able to determine what animals experience and what causes suffering, the following question arises: What could—and should—be done to improve their lives? Such a question runs into ethical, political, and economic debates. Increasingly citizens look for assurance that all animals are being treated humanely, particularly those raised for food, research, or entertainment, with such assurance resting on transparency of management procedures and verification by independent monitoring. Consumer choice has focused on sliding scales of minimum standards developed by animal protection organizations, by retailers, and by the animal industries. However, there is currently a shift to move beyond farm assurance schemes that simply demand environments that are expected to result in acceptable levels of animal welfare and to move towards farm assessment schemes that examine the observable welfare status of animals within production units. For example, we might expect aggression to be reduced if group-housed sows are provided with a certain ratio of electronic feeders or with feeders of a particular design, but do we know aggression and injury are actually reduced when these changes are instituted on individual farms? Where rigid requirements exist, they run risks of stifling creative solutions by producers that might be tailored for particular situations, and, in so doing, better address welfare concerns. If the objectives of providing straw for sows are to ensure comfortable lying spaces and to satisfy the motivation to root and forage, could the objectives not equally or perhaps better be met by providing substrates or by other means? Some farm assurance schemes, such as Freedom Foods developed by the Royal Society for the Prevention of Cruelty to Animals, accommodate flexibility by emphasizing satisfaction of the animal's biological needs according to the Five Freedoms (Table 1).

Veterinarians should be interested in this move towards farm assessment, since their expertise in diagnosis, prevention, and treatment of health problems provides particular skills for working within such a framework. Inclusion of animal welfare assessments in herd health programs could provide mechanisms to help producers identify where improvements to welfare could be made, identify achievable goals, and evaluate progress made over time. If welfare assessments are to be meaningful, col-

Table 1: The five freedoms for animal welfare (FAWC 1993).

1	Freedom from thirst, hunger and malnutrition	By ready access to fresh water and a diet to maintain full health and vigor
2	Freedom from discomfort	By provision of a suitable environment including shelter and a comfortable resting area
3	Freedom from pain, injury and disease	By prevention or rapid diagnosis and treatment
4	Freedom to express normal behaviour	By providing sufficient space, proper facilities and company of the animal's own kind
5	Freedom from fear and distress	By ensuring conditions which avoid mental suffering

laboration with scientists working in the animal welfare discipline will be necessary for the critical steps of developing and interpreting criteria that reflect what animals experience rather than simply basing assessment on parameters that are easily obtained.

Animal welfare assessment programs would benefit from discussions with citizens who are concerned with animal welfare. On a cautionary note, it is important to recognize that, for many citizens, concern for animal welfare arises not in isolation, but rather from an integrated vision of animal agriculture together with issues such as environmental impacts, impacts on rural communities, public health, and working conditions. Although citizens may initially scrutinize industrial animal production because of concern about one issue, such as pollution from manure waste lagoons, their increased awareness about current farming practices may give rise to additional concerns, such as animal welfare and public health. There is emerging evidence that, even though consumers may not directly cite animal welfare as an issue of concern, they use welfare when making purchases as an indicator for other concerns about animal production, such as food safety and environmental stewardship (Harper & Henson, 2000). Similarly, increases in sales of organic foods and community supported agriculture projects suggest that consumers approach food in a multidisciplinary, integrated way that includes concern for animal welfare. Hence, it would be prudent for the swine industry to address citizen concerns by including impact assessments for animal welfare together with other public interest issues when planning changes to management or design of swine facilities.

### **Conclusion: The role of swine practitioners in addressing swine welfare**

In summary, it is possible to take objective measurements of animal welfare. However, since animal welfare science is in its infancy, there is a strong need for research funding for the following:

- Expanding our understanding of the needs of swine
- Developing and validating meaningful animal welfare scoring systems
- Developing equipment and management options to correct problems with existing systems

At the present time few scoring systems exist relative to the multidimensional nature of animal welfare; more comprehensive and repeatable scoring systems are urgently needed for assessment at the farm level. Because of their unique role as trusted and knowledgeable consultants, veterinarians have the opportunity to play a pivotal role by keeping abreast of the rapidly evolving discipline of animal welfare science and by assisting clients in diagnosis, prevention, and treatment of welfare problems.

### **Notes**

1. In a high profile prosecution, a former manager for Seaboard Farms Inc, Oklahoma was charged with felony animal cruelty in August, 2001 following an undercover investigation by People for the Ethical Treatment of Animals that revealed shockingly brutal fatal beatings of pigs.

### **References**

- Caravan 1995. *Attitudes toward protecting farm animals from cruelty*. Opinion Research Corporation, Princeton, NJ, USA, ORC Study #70433, August 17, 1995.
- Carlstead, K., 1986. Predictability of feeding: its effect on agonistic behaviour and growth in grower pigs. *Applied Animal Behaviour Science*, 16: 25-38.
- FAWC, 1993. *Second report on priorities for research and development in farm animal welfare*. Farm Animal Welfare Council, Ministry of Agriculture, Fisheries and Food, UK.
- Glatz, P. and Lunam, C., 1998. S.A. *Pig and Poultry Fair 1998*, Pig and Poultry Production Institute Research Summaries, p.22.
- Harris, M.J., Sorrells, A.D., Eicher, S.D., Richert, B.T. and Pajor, E.A., 2002. Effects on production, health and behavior of two types of housing for gestating gilts. *Journal of Animal Science*, 80(Suppl): 26-27.
- Harper, G., and Henson, S., 2000. Animal welfare and consumer concerns. *Eurogroup's Annual Plenary Session*, 1-2 December, 2000, Brussels.

- Haskell, M.J., Hutson, G.D., Dickenson, L.G. and Palmer, S., 1997. The pre-farrowing behaviour of sows with operant access to space for locomotion. *Applied Animal Behaviour Science*, 51: 51-58.
- Hemsworth, P.H. and Barnett, J.L., 2000. Human-animal interactions and animal stress. In: *The Biology of Animal Stress*, G.P. Moberg and J.A. Mench (Editors), CAB International, Oxon, UK, p.309-335..
- Penn, Schoen & Berland Associates, 2001. *The Humane Society of the U.S. Poll of Consumer Knowledge and Opinions on the Issue of Factory Hog Farming*. Penn, Schoen & Berland Associates, Inc., Washington, DC.
- Phillips, P.A., Fraser, D. and Thompson, B.K., 1991. Preference by sows for a partially enclosed farrowing crate. *Applied Animal Behaviour Science*, 32: 35-43.
- Rushen, J., 1985. Stereotyped behaviour, adjunct drinking and the feeding period of tethered sows. *Animal Behaviour*, 32: 1059-1067.
- Von Borell, E. and Hurnik, J.F., 1991. Stereotypic behaviour, adreno-cortico function and open field behaviour of individually-confined gestating sows. *Physiology & Behavior* 49: 709-714.
- Weary, D.M., Braithwaite, L.A. and Fraser, D., 1998. Vocal response to pain in piglets. *Applied Animal Behaviour Science*, 56: 161-172.

