



The aim of the animal welfare science update is to keep you informed of developments in animal welfare science relating to the work of the RSPCA. The update provides summaries of the most relevant scientific papers and reports received by the RSPCA Australia office in the past quarter. Email science@rspca.org.au to subscribe.

A big **'thank you'** to Dr Aung Si

There are many brains involved in the creation of the Science Update, from selecting the articles to the final design and layout, but for the past six years the Update's main writer has been Dr Aung Si, whose background in biological science and linguistics has served him so well in summarising animal welfare science. Aung Si is Burmese, but grew up in India, speaks multiple languages (and writes English better than most Australians) and has recently completed his second PhD in linguistics, studying the ethnobiology and traditional medicine of the Solega people of southern India. This will be Aung Si's last Science Update as he takes up a fulltime post-doctoral post in Melbourne in February. He will be greatly missed.

COMPANION ANIMALS

Attitudes towards shelter dogs in Australia

Finding new homes for shelter dogs can be challenging despite the fact that there is strong demand for pet dogs among the general public. Understanding community attitudes towards shelter dogs and beliefs about shelter practices such as behavioural assessments may help to shed more light on this issue. Although many dogs are relinquished to animal shelters for human-related problems (such as moving house or not having enough time), potential pet owners may focus on the fact that some shelter dogs are relinquished because of behavioural or health problems.



The authors of this study conducted an internet survey to gain an understanding of the Australian public's attitude towards shelter dogs and to find ways in which the adoption of shelter dogs may be enhanced. They found that most of the over 1,600 respondents held generally positive views about animal shelters and that while most participants were aware of routine shelter health and behavioural checks, one-third believed that adult shelter dogs had behavioural problems. This suggests that shelters may need to more effectively communicate that behavioural assessments should reduce the likelihood of behavioural problems in adopted dogs. This may also suggest that some potential owners may doubt the effectiveness of such behavioural assessments and the authors stress the importance of scientifically validated assessment protocols for animal shelters. They also recommend that shelters should try to involve more members of the public as volunteers as experience within a shelter environment tends to be associated with more positive views about shelter dogs.

Mournement, K., Coleman, G., Toukhsati, S. & Bennett, P. (2012) What do current and potential Australian dog owners believe about shelter practices and shelter dogs? *Anthrozoos*, 25(4): 457–473.

Public perceptions of feral cat management

In the United States large numbers of feral domestic cats (defined as abandoned, stray, unowned cats in this study) and free-roaming owned cats exist in many urban centres, and the control of these populations is often a matter of heated public debate. Historically, management of feral cats involved capture and euthanasia, but in recent years, other population control techniques have been developed such as trap-neuter-release (TNR). Recently, Athens-Clark County in the United States approved legislation making TNR the only possible population control option for its feral cats. Still, this legislation remains controversial, as many stakeholders prefer the creation of feral cat sanctuaries whereby cats could be trapped, neutered, and then released only within the boundaries of a fenced sanctuary, in order to safeguard the welfare of these cats, as well as to protect local wildlife populations.

The authors of this paper report the results of a survey designed to gauge the attitudes of Athens-Clark County residents towards feral cat control. They found that County residents had more positive experiences with feral cats than negative. The majority of respondents (56%) found feral cat sanctuaries to be an acceptable management option, while fewer agreed that TNR (49%) or euthanasia (44%) was an acceptable option. The authors state that cat sanctuaries may provide a solution for managing smaller cat colonies, and this option should be explored by more cities and non-profit organisations and they recommend scientific evaluation of the feasibility of creating and maintaining sanctuaries.

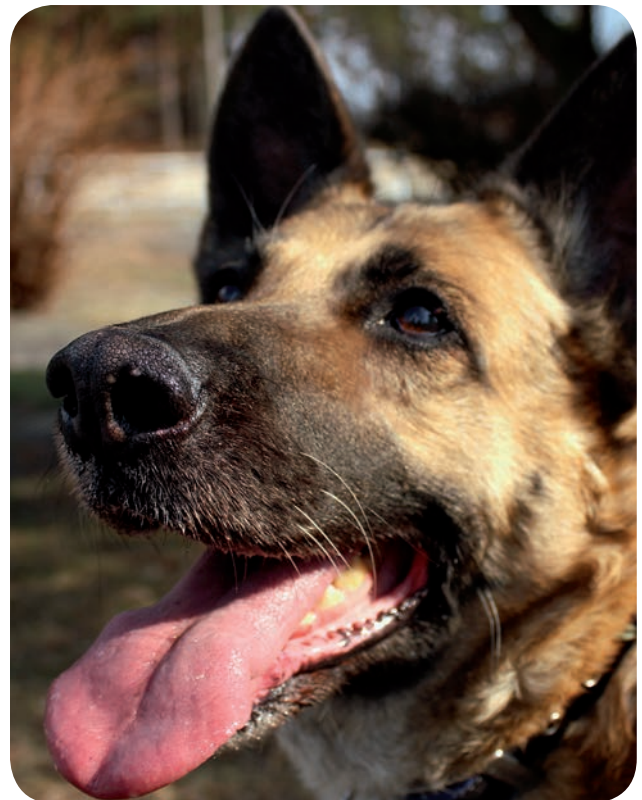


Loyd, K. & Hernandez, S. (2012) Public perceptions of domestic cats and preferences for feral cat management in the southeastern United States, *Anthrozoos*, 25(3): 337–351.

Human perceptions of dog breed traits

Both the print and electronic media are important sources of popular information regarding the behaviour of different dog breeds. However, many studies have shown that certain breeds, such as Rottweilers or Pitbulls tend to be singled out in media reports on vicious dog attacks. This creates a false impression in the public awareness that some breeds are intrinsically more dangerous than others, whereas in reality, any dog is capable of causing harm to humans, given the appropriate circumstances.

In this experimental study, one group of human subjects was shown either positive (looking friendly) or negative (snarling) images of German Shepherd dogs, while another group was asked to read positive (a life-saving story) or negative (an attack on a child) news articles on the topic of the same breed of dog. All subjects were then asked to rate six different breeds of dog, including German Shepherds on a number of personality traits. Participants exposed to the negative stimuli perceived this breed as significantly less approachable, and more dangerous and aggressive, than those exposed to the positive stimuli. The authors warn that biased media reporting can lead to widespread misinformation regarding the behaviour of dog breeds, and can also instil a false sense of security around those breeds generally regarded as being 'friendly' or 'safe'.



Wells, D.L., Morrison D.J. & Hepper P.G. (2012) The effect of priming on perceptions of dog breed traits, *Anthrozoos*, 25(3): 369–377.

Human perceptions of cat coat colour and personality

Associations between mammalian coat colour and behaviour have been investigated in a number of species. The domestic cat has been investigated in the past to determine if coat colour and personality are related, but these studies have produced mixed results. Nevertheless, cat owners may have strong opinions regarding the personality traits of differently coloured cats, and this may have a bearing on which cats are adopted from shelters, and which cats are relinquished to shelters.

The authors of this study carried out an internet survey of around 190 people from the United States, asking respondents to associate a selection of 10 behavioural traits with differently coloured cats. The results showed that orange and bi-coloured cats were more likely to be regarded as 'friendly', and that tri-coloured and white cats were more likely to be labelled as 'aloof'. There was no such bias for black cats. The authors speculate that a range of factors, such as representations of cats



in the popular media and perceptions of gender-related behavioural differences in cats may be responsible for these results.

Delgado, M.M., Munera J.D. & Reevy G.M. (2012) Human perceptions of coat colour as an indicator of domestic cat personality, *Anthrozoos*, 25(4): 427–440.

FARM ANIMALS

Animal husbandry regained: The place of farm animals in sustainable agriculture

by John Webster, Professor Emeritus at the University of Bristol, UK.

From the back cover: "The farming of animals for meat and milk confronts a stark dilemma. While world demand from a growing and more affluent human population is increasing rapidly, there are strong counter-arguments that we should eat less meat and pay more attention to environmental protection, animal welfare and human health and well-being.

The aim of this book is to identify and explain the causes and contributors to current problems in animal husbandry, especially those related to 'factory farming', and advance arguments that may contribute to its successful re-orientation. Husbandry is considered in its broadest sense, namely the productive and sustainable use of the land for the good of all (plants, humans and other animals).

The first part of the book outlines principles and arguments necessary to engage with current problems: depletion of natural resources and destruction of environment, animal welfare, food and health, fair trade and sharing resources. These arguments are illustrated by examples and sufficient evidence to justify the argument without obscuring the message. The second part presents a series of constructive proposals for change and development in animal husbandry, both in the developed world and subsistence agriculture. These include more integrated crop and livestock farming systems, the ethics of animal welfare and environmental management, and the evolution of a new social contract whereby the rights of the people to a fair share of good, safe food and a green and pleasant land are matched by a shared responsibility to preserve these things."

Pain after ring castration of calves

Male calves are routinely castrated in the beef industry, to make them easier to handle and manage as adults. A number of methods are used for this painful procedure, including the use of rubber rings that constrict the blood supply to the scrotum and testicles, causing this tissue to die and drop off. However, the use of rubber rings can also cause prolonged and intense pain. In this experimental study, four different rubber ring methods were tested to assess the amount of pain they cause to 4–6 week-old calves. They included: (i) a conventional single rubber ring, (ii) a stack of three rubber rings, (iii) a single rubber ring followed by the application of a Burdizzo clamp to the neck of the scrotum (to further damage the blood vessels) and (iv) a single rubber ring, followed by removal of dead scrotal tissue with a knife after 9 days.

The researchers found that the three ring method caused the greatest amount of swelling and pain to the calves. Their discomfort was so great that the rings had to be removed before the end of the study. Calves of group (iv) showed not only the least signs of pain in the days following the application of the ring, but also the fastest rate of wound healing. The authors recommend this treatment as it significantly reduces the risk of infection and improves the welfare of the calves.



Becker, J., Doherr, M.G., Bruckmaier, R.M. *et al.* (2012) Acute and chronic pain in calves after different methods of rubber-ring castration, *The Veterinary Journal*, **194**: 380–385.

Aerial perches for free-range hens

Animal welfare legislation in the European Union requires that each laying hen in a non-cage system be provided with at least 15 cm of perch space. This is because hens in such systems can develop problem behaviours such as feather-pecking and cannibalism. In this experimental study, the researchers provided aerial perches to half the laying hen population (the other half was used as a control) of five large commercial free-range houses, and monitored several welfare and production variables between 17 and 70 weeks of age.



Hens provided with perches appeared less fearful of humans when approached and put up significantly less resistance when handled. Aggressive behaviour was also reduced by the provision of the perches; as was the proportion of birds engaging in feather pecking behaviour. Furthermore, birds with access to perches were heavier, and had a better body condition score than the control birds. Birds without perches were observed trying to perch above the feeder and drinking lines, which quickly became crowded, and could result in injury. The authors suggest that the aerial perches allow birds to become accustomed to humans and their routines, avoid aggression from other birds and also lead less stressful lives.

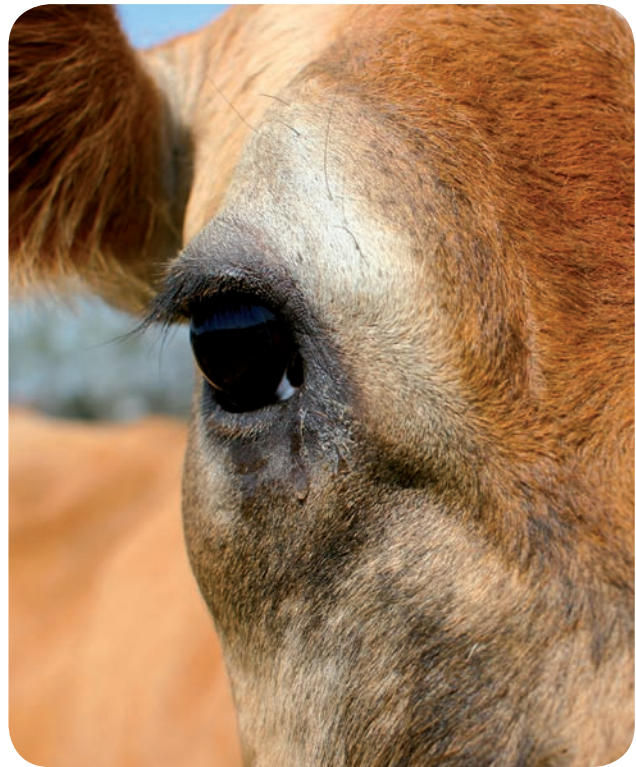
Donaldson, C.J. & O'Connell, N.E. (2012) The influence of access to aerial perches on fearfulness, social behaviour and production parameters in free-range laying hens, *Applied Animal Behaviour Science*, **142**: 51–60.

Relation between pre-slaughter cattle behaviour and meat quality

Cattle face a number of stresses on the way to the abattoir, such as feed and water deprivation, crowding, transport and contact with humans. Such stress can cause physiological changes that can adversely affect meat quality. Stress reduces glycogen levels in the muscle. After slaughter, glycogen in the muscle is converted to lactic acid and this reduces pH (an indicator of acidity levels). Low glycogen levels means less lactic acid and therefore a high ultimate pH. Meat with a pH value of greater than 5.7 is labelled a 'dark cutter' in the cattle industry and is considered to be of low quality. It is estimated that around 8% of Australian cattle were labelled as 'dark cutters' in 2007.

In this experimental study, the researchers tried to determine if visual observation of cattle behaviour on the way to slaughter could be used to reliably predict meat quality. Using a technique called 'Qualitative Behavioural Analysis' (QBA), the researchers asked a random selection of 28 human observers to watch video footage of 81 Angus cattle as they travelled through an undercover funnel chute to the abattoir killing box. The observers were asked to describe the behavioural responses of the cattle in any way they saw fit.

Statistical analysis of the results, followed by subsequent testing of meat quality, showed that the cattle whose behaviour was described as 'nervous' or 'anxious' also had higher blood lactate levels. Only one animal in the study was labelled a 'dark cutter', and it had been



characterised during QBA as one of the most 'annoyed'/'frightened' animals. The authors conclude that QBA can be reliably used to monitor cattle welfare, as well as to predict meat quality.

Stockman, C.A., McGilchrist, P., Collins, T. *et al.* (2012) Qualitative Behavioural Assessment of Angus steers during pre-slaughter handling and relationship with temperament and physiological responses, *Applied Animal Behaviour Science*, 142: 125–133.

Willingness to pay for improved fish welfare

Numerous studies have shown that public awareness of the welfare of farmed animals is growing and that consumers consider welfare to be a responsibility of producers and the government. However, few studies have documented what the public are willing to pay for farmed animal products that have been produced with high welfare standards. In Norway, Atlantic salmon are bred to maximise growth and productivity, and welfare traits such as disease resistance are only considered in terms of their economic value.

This paper presents the results of an internet survey completed by around 770 Norwegian respondents. Users were asked to choose between various hypothetical breeding programs that implemented combinations of four welfare attributes: (i) fewer deformities, (ii) less aggressive fish resulting in fewer injured fish, (iii) improved resistance to Salmon Lice, and (iv) improved resistance to infectious diseases. The survey also presented the costs of the various programs, along with photographs of salmon in various conditions. On average, respondents who bought farmed salmon were willing to pay, as an earmarked tax, an extra 256 Norwegian Kroner (NOK) per year for preventing injuries, 282 NOK/yr for preventing deformities, 749 NOK/yr for disease resistance, and 1034 NOK/yr to combat lice. (In January 2013, 1NOK = 0.17AUD)

Grimsrud, K.M., Nielsen, H.M., Navrud, S. *et al.* (2013) Households' willingness-to-pay for improved fish welfare in breeding programs for farmed Atlantic salmon, *Aquaculture*, 372–375: 19–27.

Effect of dark brooders on feather pecking

Very young chicks are unable to keep themselves warm and therefore have to be provided with artificial heating in farm situations. Although it has been shown that periods of darkness are beneficial to the growth and welfare of chicks, farmers often provide 24 hour lighting in the first seven days to ensure chicks can find feed and water. Modified 'dark brooders' (where the heating element is placed within a darkened enclosure which the chicks can enter to rest) have also been trialled, but some farmers worry that this may prevent the chicks from finding feed and water.

Dark brooding is thought to be advantageous because it allows all chicks in a given area to be resting at any given time, thereby preventing resting chicks from being disturbed by active ones. This setup also prevents active chicks from mistakenly pecking at the feathers of resting chicks. In this experimental study, dark brooders were trialled in a farm situation on a flock of birds, and observations were made over a period of 35 weeks. It was found that at all ages, dark brooder flocks performed significantly less severe feather pecking than

control flocks, and had a significantly lower percentage of birds with missing feathers. Dark brooder birds also appeared calmer around humans, and ended up slightly heavier than the control birds.



Gilani, A.-M., Knowles, T.G. & Nicol, C.J. (2012) The effect of dark brooders on feather pecking on commercial farms, *Applied Animal Behaviour Science*, **142**: 42–50.

Prevalence of risk factors for tail-biting in pigs

Tail-biting can be a serious and widespread problem in intensive pig farming systems, resulting in not only reduced welfare, but also economic losses through disease and death. The authors of this paper devised a Husbandry Advisory Tool (HAT), based on workshops and consultation sessions conducted with 65 commercial pig farms in England between May 2007 and July 2009. Following this, the HAT was compiled, comprising 83 known risk factors for tail-biting, ranked in order of importance. Forty-six farms were visited and advised about tail-biting using HAT, and around half of these farms also received financial incentives with which to implement the researchers' recommendations.

It was found that the most prevalent risk factors concerning tail-biting were related to the environment in which the pigs were housed, the presence of enrichment (such as straw flooring) access to feed and drink, and the pigs' medical history. Over the period of the study, the majority of farms showed an improvement in risk scores, but the greatest benefits were seen in the farms receiving financial support. However, the fact that improvements were seen even in control farms (where tail-biting was discussed but no specific advice was given) leads the authors to suggest that while financial incentive and advice are ideal, simply raising awareness of the issue of tail-biting with farmers can also have a positive effect.

Taylor, N.R., Parker, R.M.A., Mendl, M. *et al.* (2012) Prevalence of risk factors for tail biting on commercial farms and intervention strategies, *The Veterinary Journal*, **194**: 77–83.



Impact of spaying on cattle welfare

Female cattle reared on extensively managed properties in Australia are routinely spayed in order to control herd populations, reduce female breeder mortality, and reduce land degradation. Traditionally, spaying is carried out by first restraining a cow or heifer, rendering it immobile by means of an electric current, cutting an incision in its flank without anaesthesia, and surgically removing the ovaries, before suturing the incision. An alternative technique, called the dropped-ovary technique, was introduced in 1996, and is widely believed to be a more humane method of spaying. This requires the insertion of a spaying instrument into the vagina, manipulation of the ovaries through the wall of the rectum and the severing of the connective tissue around each ovary.

This experimental study compared the effects of these two techniques on the welfare of cows and heifers. It was found that both methods caused short-term pain to the animals, as evidenced by changes in behaviour (e.g. standing head down, not eating) and stress hormones in the blood. However, the flank technique had more potential to cause long-term distress, and lead to prolonged wound healing and death. Cows were often more severely affected than heifers. Moreover, the researchers found that the practice of electrical immobilisation can in itself be harmful to cattle, by causing pain and muscle or nerve damage.



Petherick, J.C., McCosker, K., Mayer, D.G. *et al.* (2012) Evaluation of the impacts of spaying by either the dropped ovary technique or ovariectomy via flank laparotomy on the welfare of *Bos indicus* beef heifers and cows, *Journal of Animal Science*, published online October 9, 2012.

Behaviour of boars and gilts in unmixed groups

Male pigs are castrated when young to prevent them from developing 'boar taint' as adults, a condition in which the meat takes on an unpleasant odour and flavour. In the European Union, there are plans to stop the practice of physical castration without anaesthesia in the near future, and to completely abandon physical castration by 2018. This means that beyond this date, pig farmers will have to manage boars that are not only sexually active, but also more aggressive towards other pigs.

In this experimental study, groups of gilts (young female pigs) and boars (male pigs) were housed in unmixed groups, and studied to compare their behaviour and meat quality. It was found that boars were more active than gilts and displayed more aggression and mounting behaviour. Housing boars next to a gilt pen increased explorative and drinking behaviour. Gilts housed next to a boar pen seemed more agitated, possibly due to the boars' activity. Boars tended to have a higher growth rate during the final phase, but had a greater prevalence of high skin lesion scores for the middle of the body and the ham. The authors conclude that some of these adverse effects can be managed by means of proper housing – in particular, keeping boars and gilts in separate enclosures and, preferably, in separate sheds.

Vanheukelom, V., Van Beirendonck, S, Van Thielen, J. *et al.* (2012) Behavior, production results and meat quality of intact boars and gilts housed in unmixed groups: A comparative study, *Applied Animal Behaviour Science*, **142**: 154–159.



MISCELLANEOUS

Using mortality to gauge animal welfare

Many human studies have shown clear and strong links between affective state (i.e. positive or negative emotion) on the one hand and death or disease on the other. Detecting a causal relationship between affective state and death or disease is easier in the case of human subjects, because unlike animals, they are able to tell the researcher how they feel. The authors of this review article propose that it may also be possible to gauge the affective state of animals (and hence their level of welfare) using mortality and disease prevalence as proxy indicators.

Animals and humans share many physiological mechanisms, especially in the context of dealing with stress. In both humans and animals, chronic stress (caused by conflict, loneliness, traumatic events, injury, etc.) can lead to disease by three prominent mechanisms: suppressing the body's immune system, putting strain on the heart and circulatory system, and facilitating the development and spread of cancers. The occurrence of such problems in animals, or death at an early age, can be then used as an indicator that the remaining animals in the group may also be experiencing poor welfare. The authors caution that such effects accumulate in small increments over time, and so death and disease may not be very sensitive indicators of welfare in animals that are not allowed to live out their natural lives (e.g. laboratory animals). These indicators are best suited to zoo and companion animals, which are expected to have long and healthy lives.

Walker, M.D., Duggan, G., Roulston, N. *et al.* (2012) Negative affective states and their effects on morbidity, mortality and longevity, *Animal Welfare*, 21: 497-509.

Publication bias in animal welfare scientific literature

Even though the practice and publication of scientific research is supposed to be an objective process, numerous biases may, at times, creep into the public dissemination of research findings. Authors, journal editors and reviewers may favour those pieces of scientific research that have positive or ground-breaking findings over those that present negative results. Such a positive result bias not only gives other researchers, policy makers and the public an incomplete picture of current scientific knowledge, but may also lead scientists to duplicate experimental studies, due to a lack of knowledge that such studies have already been carried out.

In this review article, the authors randomly selected around 90 scientific journal articles that presented experimental research on putative welfare-enhancing treatments for animals. A positive result bias was evident in these papers, as a large majority presented enhanced welfare outcomes. The source of funding declared by the researchers seemed to be a good predictor of the positiveness of the research outcomes: experiments funded by charities reported the largest welfare enhancements, while those funded by industry reported the lowest. The authors of this review suggest that such biases reflect the differing vested interests of the funding bodies, and recommend that scientists assess welfare treatments more candidly, and that peer-review of research articles be made more rigorous.

Van der Schott, A. and Phillips, C. (2012) Publication bias in animal welfare scientific literature. *Journal of Agricultural and Environmental Ethics*, DOI 10.1007/s10806-012-9433-8.

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ARTICLES OF INTEREST

COMPANION ANIMALS

Brown, W.P., Davidson, J.P. & Zuefle, M.E. (2013) Effects of phenotypic characteristics on the length of stay of dogs at two no kill animal shelters, *Journal of Applied Animal Welfare Science*, **16**(1): 2–18.

Jakovcevic, A., Elgier, A.M., Mustaca, A.E. *et al.* (2013) Frustration behaviors in domestic dogs, *Journal of Applied Animal Welfare Science*, **16**(1): 19–34.

McMillan, F.D. (In press) Stress-induced and emotional eating in animals: A review of the experimental evidence and implications for companion animal obesity, *Journal of Veterinary Behavior: Clinical Applications and Research*, published online 26 December 2012.

Pullen, A.J., Merrill, R.J.N. & Bradshaw, J.W.S. (2013) The effect of familiarity on behavior of kennelled dogs during interactions with conspecifics, *Journal of Applied Animal Welfare Science*, **16**(1): 64–76.

FARM ANIMALS

Aquaculture

Grimsrud, K.M., Nielsen, H.M., Navrud, S. *et al.* (2012) Households' willingness-to-pay for improved fish welfare in breeding programs for farmed Atlantic salmon, *Aquaculture*, **372**–**375**: 19–27.

Cattle

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Babcock, A.H., Cernicchiaro, N., White, B.J. *et al.* (2013) A multivariable assessment quantifying effects of cohort-level factors associated with combined mortality and culling risk in cohorts of U.S. commercial feedlot cattle, *Preventive Veterinary Medicine*, **108**(1): 38–46.

Barrier, A.C., Haskell, M.J., Birch, S. *et al.* (2013) The impact of dystocia on dairy calf health, welfare, performance and survival, *The Veterinary Journal*, **195**(1): 86–90.

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Pigs

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Poultry

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Bahal, P. (2012) The importance of reducing stocking density to improve broiler welfare, Essay selected for The Veterinarian magazine Prize for Written Communication for Sydney University third-year veterinary science students, *The Veterinarian*, July 2012, p. 22.

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