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Animal welfare

Bovine welfare

A review of bovine cases consigned under veterinary certification to emergency and casualty slaughter in Ireland during 2006 to 2008

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Irish Veterinary Journal 63, 568-577 (2010)

The emergency and casualty slaughter of cattle for human consumption (in cases where animals are likely to have suffered from acute or chronic pain, respectively) in Ireland requires that the animal is accompanied to the slaughterhouse by an official veterinary certificate (VC) completed on-farm by the owner's private veterinary practitioner (PVP). No published data is currently available in Ireland based on information provided in these VCs. In this paper, we present a review of bovine cases consigned under veterinary certification to emergency and casualty slaughter in Ireland during 2006 to 2008. All VCs during the years 2006 (where available), 2007 and 2008 were collected from four large Irish slaughterhouses. The data were computerized, and analysed using descriptive and spatial methods. In total, 1,255 VCs were enrolled into the study (1,255 study animals, 1,072 study herds), 798 (63.6%) and 457 (36.4%) animals were consigned to emergency and casualty slaughter, respectively. VCs were completed throughout the year, with consigned animals travelling a mean distance of 27.2 km from farm to slaughter. The time elapsed between veterinary certification and slaughter was greater than three days for 18.2% of all study animals. In 965 (76.9%) animals, the certified suspected disability related to the locomotory system, most commonly as a result of fractures. Among animals for which data were available, 11.9% were totally condemned at post-mortem. The transport of animals with fractured limbs and/or other painful conditions is a significant animal welfare concern.

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Veterinary certificates for emergency or casualty slaughter bovine animals in Ireland: are the welfare needs of certified animals adequately protected?

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All emergency and casualty bovines in the Republic of Ireland that are deemed to be fit for human consumption must be accompanied to the slaughterhouse by an official veterinary certificate (VC). In a previous study, Cullinane *et al.* (2010) conducted a review of bovine cases consigned under veterinary certification to emergency and casualty slaughter in Ireland during 2006 to 2008. The current study will further evaluate the original results, with emphasis on the period of validity, transport distance and transport conditions. It will also consider whether or not the current VC adequately protects the welfare needs of the certified bovine animal.

Identification of key performance indicators for on-farm animal welfare incidents: possible tools for early warning and prevention

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Irish Veterinary Journal 64, 13 (2011)

The objective of this study was to describe aspects of case study herds investigated by the Department of Agriculture, Food and the Marine (DAFM) in which animal welfare incidents occurred and to identify key performance indicators (KPIs) that can be monitored to enhance the Early Warning System (EWS). Despite an EWS being in place for a number of years, animal welfare incidents continue to occur. Questionnaires regarding welfare incidents were sent to Superintending Veterinary Inspectors (SVIs), resulting in 18 herds being chosen as case study herds, 12 of which had a clearly defined welfare incident date. For each study herd, data on six potential KPIs were extracted from DAFM databases. The KPIs for those herds with a clearly defined welfare incident date were studied for a consecutive four year window, with the fourth year being the 'incident year', when the welfare incident was disclosed. For study herds without a clearly defined welfare incident date, the KPIs were determined on a yearly basis between 2001 and 2009. We found that the late registration of calves, the use of on-farm burial as a method of carcase disposal, an increasing number of moves to knackeries over time and records of animals moved to 'herd unknown' were notable on the case farms. Four KPIs were prominent on the case study farms and warrant further investigation in control herds to determine their potential to provide a framework for refining current systems of early warning and prevention.

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On farm animal welfare: the utility of databases for early warning

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During the last four years, the Department of Agriculture, Food and the Marine (DAFM) has sponsored two studies to investigate on-farm animal welfare incidents that have occurred on Irish farms and that have been investigated by DAFM. The first study (unpublished) looked at incidents which occurred between September 2006 and March 2007. The more recent study on animal welfare incidents looked specifically at 18 case study herds and identified four potential key performance indicator (KPIs), the information on which was downloaded from DAFM databases, that could be used to enhance the Early Warning System (EWS), i.e. late registrations of calves, an increase in the use of on-farm burial as a method of carcase disposal, an increase in the number of carcasses sent to knackeries and animals missing from the herd profile that cannot be accounted for. That study recognised the need for these KPIs to be studied in control herds to see if they also occur in the national herd or if they are more notable in the case study herds and therefore of use in enhancing the EWS. In summary, the objective of this current study is to examine, in control herds, the four KPIs identified in the earlier DAFM study to see if their occurrence is irregular and potentially indicative of other problems occurring on the farm.

A sociological study investigating reasons for animal welfare incidents on-farm

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In 2004, the Department of Agriculture, Food and the Marine (DAFM) in conjunction with the Farm Animal Welfare Advisory Council (FAWAC), established an Early Warning System (EWS) aimed at preventing farm animal welfare incidents taking place on Irish farms. Despite its establishment, welfare problems on Irish farms still persist. A recent DAFM sponsored study on animal welfare incidents looked specifically at 18 case study herds and identified four potential key performance indicators (KPIs) that could be used to enhance the EWS, i.e. late registrations of calves, an increase in the use of on-farm burial as a method of carcase disposal, an increase in the number of carcasses sent to knackeries and animals missing from the herd profile that cannot be accounted for. Anecdotal evidence from that study and others suggest a linkage between social factors and welfare incidents. These comprise economic, health, psychological factors, examples including the death of a parent, ill health, depression, and problems related to alcohol use. This evidence suggests that such life-events can have a direct and indirect role on individual farm management. There is no evidence of research in Ireland on linkages between social factors and animal welfare incidents. It is therefore proposed that this study will investigate and aim to identify social factors that contribute to animal welfare incidents on Irish farms. This study will take a qualitative approach, using in-depth face-to-face interviews to explore and identify these factors, and consider how they contributed to animal welfare incidents in Ireland.

Use of farmer focus groups to evaluate a welfare scheme for suckler beef cattle

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Schemes to improve farm animal welfare have existed in Europe since the 1990s. Reform of the Common Agricultural Policy (CAP) in 2003 provided funds for animal welfare initiatives. In 2008, Ireland's Department of Agriculture, Food and the Marine (DAFM) launched the Animal Welfare, Recording and Breeding Scheme for Suckler Herds ('Suckler Scheme'). The main aims of the scheme include enhancing welfare standards and improving genetic quality of the national beef herd. This is a voluntary scheme based on economic incentives. Initial uptake was widespread with approximately 50,000 farmers joining (approximately 76% of registered beef suckler herds). Little research has focused on the attitudes of beef farmers' to animal welfare schemes. The objectives of this study were to seek farmers' opinions of the 'Suckler Scheme', to explore the underlying reasons for these opinions as well as perceptions of the scheme's relationship to welfare, and to elicit ideas for improving future schemes. In this study, four focus groups (each comprising 7+ suckler farmers) were conducted in November 2009 in four regions of Ireland. Participants were sourced through local veterinarians and invited to attend the focus groups. Ethical approval was obtained in advance and participants received a full explanation of how data would be managed before consenting to take part. Audio recordings were transcribed verbatim and then 'coded' for topics and views mentioned. Coding and thematic analysis were carried out using NVIVO 8, a software programme designed for qualitative data analysis. The majority of participants perceived all the scheme measures as being important and relevant to good farming practices while acknowledging that not all measures related to welfare but rather to data collection and breeding of beef cattle. There was strong consensus that the measures relating to the minimum age at first calving and to meal-feeding at weaning have a positive impact on animal welfare and health. Two measures were criticized for being impractical (i.e. the amount of paperwork for recording animal events and the conditions concerning the disbudding of calves). The conditions for the timing of weaning were also criticized for having a negative financial impact at sales. Participants also suggested additional measures that could further improve animal welfare. The inability to produce high-quality beef animals at a profit is of concern to farmers. The majority anticipated that the data being collected via the scheme would help inform decisions when trying to breed a 'quality' beef animal.

Use of farmer focus groups to explore compliance issues relating to a welfare scheme for suckler beef cattle

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On-farm animal welfare is primarily determined by farmer compliance with regulations (and quality assurance standards). The levels of compliance, however, may prove difficult to assess. Ireland's Animal Welfare, Recording and Breeding Scheme for Suckler Herds ('Suckler Scheme') was launched by the Department of Agriculture, Food and the Marine (DAFM) in 2008, providing financial incentives to suckler beef farmers for implementing a number of specified welfare practices. Initial uptake of the scheme was widespread with approximately 50,000 farmers joining (approximately 76% of eligible herds). Using the Scheme as a case study, our research has focused on exploring the factors that influence beef farmers' willingness or ability to comply with welfare guidelines. In this study, four focus groups (each comprising 7-9 farmers) were conducted in 2009. Participants were sourced through local veterinarians and invited to attend. Audio recordings of discussions were transcribed verbatim and then 'coded' for topics and views mentioned. Coding and thematic analysis were carried out using NVIVO 8. When asked to list times when welfare is most at risk, participants responded as follows: calving (88%), weaning (69%), nutrition / body condition during pregnancy (25%), handling (25%), housing (22%) and disbudding / dehorning (16%). All four groups commented that all existing scheme measures were relevant to good farming practices and therefore should continue. Participants suggested amendments to a number of measures as follows: change disbudding ages; simplify paperwork; change the training; increase scheme payments; and change weaning rules. Focus groups provide scope for deeper exploration into the attitudes and beliefs underlying participants' answers in a way that more conventional surveys may not. They also provide an opportunity for farmers to discuss compliance issues without the risk of incurring a farm inspection or financial penalty. Farmers seem motivated to comply when criteria result in financial benefit, are practical and workable, impact positively on welfare and health (e.g. minimum age at first calving and meal-feeding), or are such that failure to comply may trigger inspection and / or loss of payments (e.g. attendance at training). Farmers seem less motivated to comply when criteria seem impractical at farm level, may have a negligible or even negative effect on welfare (e.g. age for disbudding), are over-complicated (e.g. paperwork), lack consistency, or may cause financial loss (e.g. Weaning).

Equine health and welfare

Evaluation of current equine welfare issues in Ireland: causes, desirability, feasibility and means of raising standards

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Equine Veterinary Journal 42, 105-113 (2010)

Significant potential threats to the health and welfare of horses exist in Ireland when supply exceeds demand and the identification system for horses is not yet robust. The objective of this study was to secure engagement with stakeholder groups and determine their perception of equine welfare in Ireland and encourage the development of inclusive, rather than imposed, policy solutions. A 3 round, web-based Policy Delphi incorporating novel vignette methodology was conducted from November 2007–March 2008 to canvass opinion (in both quantitative and qualitative forms) on the perceived most significant equine welfare issues. Vignettes (narratives depicting potential compromise to equine welfare) were employed. Quantitative data were collected in the form of scoring on a 9 point Likert scale with labelled end-points, qualitative information as text subsequently analysed for themes. All 44 respondents completed all rounds. Major equine welfare issues were identified as welfare of horses during the disposal process and at unregulated gatherings. Assessed

quantitatively on a 9 point Likert scale (0 = minimal; 8 = maximal), respondents scored the desirability and feasibility of improving standards, median 8 and 6, respectively, for both issues identified. Basic themes identified in respondents' quotes as reasons to raise equine welfare standards were ideological, protection of animal welfare, safe-guarding the reputation of the equine industry and safety (of people, horses and environment). Themes for reasons for low standards were societal norms, fiscal pressures, indolence, indifference and ignorance. Themes underpinning potential means for achieving meaningful change (solutions) were legislation, enforcement, education/training, fiscal remedies, increasing awareness and a combination of these. Mechanisms aimed at raising standards must be based on an understanding of motivational drivers for currently low standards. The challenge is to translate the findings and this heightened awareness into meaningful change to the benefit of horses and those who care for them.

Reprinted from Equine Veterinary Journal, 42, Collins, J.A., Hanlon, A., More, S.J., Wall, P.G., Kennedy, J., Duggan, V., Evaluation of current equine welfare issues in Ireland: causes, desirability, feasibility and means of raising standards, 105-113, Copyright 2010, with permission from EVJ Ltd.

Case study of equine welfare on an Irish farm: 2007-2009

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Veterinary Record 167, 90-95 (2010)

This report describes the progression in welfare standards for horses on a horse farm in the Republic of Ireland between 2007 and 2009. Visits to the farm were undertaken and information, in the form of written notes and digital recording of observations and examinations, was gathered in consultation with officials from the Gardaí (the Irish police), the Department of Agriculture, Food and the Marine and the Irish Society for the Prevention of Cruelty to Animals. Further independent veterinary corroboration of clinical findings and laboratory support occurred following seizure of the horses. The complex reality of on-farm equine welfare problems and the difficulties in achieving a resolution are discussed compared with other species conventionally considered to be food-producing animals.

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Aspects of the owning/keeping and disposal of horses, and how these relate to equine health/welfare in Ireland

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Irish Veterinary Journal 64, 11 (2011)

Ireland has long been renowned as a major centre for the breeding, rearing and keeping of horses. Since 2007, however, there has been increasing concern for horse health and welfare standards, and links between these concerns and the structures, governance and funding of the Irish equine industries have been reported. This paper addresses two central issues: firstly, the local governance of, trade in and disposal of unwanted horses; and secondly, mechanisms employed to improve standards of care given to horses owned by certain communities. Primary information was gathered through visits to horse pounds run by, and on behalf of, Local Authorities, to social horse projects, to horse dealer yards, ferry ports, horse slaughter plants and knackerries. The approach adopted by members of a given group, e.g. ferry ports, is described and differences are highlighted, for example in how different Local Authorities implement the Control of Horses Act of 1986, and how the choice, for example, of disposal route affects the standard of animal welfare. There is a pressing need for a more centrally mandated and uniformly applied system of governance to safeguard the health and promote the keeping of horses to a higher welfare standard in Ireland. Fundamental to an understanding of why there is insufficient oversight of the keeping and proper disposal of horses is the lack of a comprehensive, integrated system for the registration, identification and tracing of equidae in Ireland.

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Use of qualitative methods to identify solutions to selected equine welfare problems in Ireland

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Veterinary Record (in press)

This paper explores the views of those in the Irish equine industry, organisations and government regarding necessary improvements to equine welfare in Ireland at unregulated gatherings and during the disposal process. Three qualitative research methods were employed, namely semistructured interviews, focus groups and a structured, facilitated workshop. Representatives from industry, welfare societies, socially disadvantaged groupings and government engaged with this process and shared their views regarding horse welfare and implementable solutions with merit to address welfare problems. A consensus was achieved that equine welfare in Ireland could be improved by the development of a comprehensive identification system, a Code of Practice for horse gatherings, a horse licensing scheme, ring-fenced funding to promote responsible, humane horse disposal and better means of raising awareness of the value of safeguarding horse welfare for the benefit of all parties.

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The development and application of a tool to assess the welfare of equidae at fairs and markets in Ireland

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Unregulated horse gatherings, such as fairs and markets, are considered to be of high value culturally, socially and economically to Ireland. However, a Delphi study completed in 2008 by Collins *et al.* identified welfare standards for horses at such events as one of the two most significant equine welfare concerns in Ireland. In this paper, we describe the development of an equine welfare assessment protocol, based on the Five Freedoms, which employs measurement of both welfare inputs and outputs, and early attempts to apply this protocol at fairs and markets in Ireland. Thirty parameters (based on a semi-qualitative 5 point Likert scale) were each measured on thirty occasions alongside details of weather, horse numbers and the presence of an organising committee. The dataset ($n=30$) was divided into three subsets (with some overlap) to enable the analyses of welfare scores for individual events ($n=14$), inter-observer variability in scores at events scored simultaneously but independently by the first two authors, JC and JJ ($n=5$), and change over time at any one event ($n=8$). By the criterion of importance adopted by the authors, the freedom of horses to access water, feed and shelter (resource input) and the ability of horses to drink and feed (current output) were deemed to be unduly compromised. The presence of an organising committee was not found to be protective of equine welfare. It is suggested by the authors that a combined approach (input and output-based measures) to the assessment of equine welfare at unregulated gatherings be adopted but that further work is required to refine the protocol to ensure that repeatability and reproducibility of scoring are achieved in its implementation.

Development of a bio-security assessment tool and its application at equine events in Ireland

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There is the potential for disease transmission wherever horses gather in groups. The inconsistent application of disease control measures across the horse industries in Ireland, the highly contagious nature of many of the equine infectious diseases, the potential for the spread of disease from sub-clinically infected horses and increased transport of horses to international events together mean that all horses are put at risk of disease transmission, particularly in the event of an outbreak of an exotic equine disease. The objectives of this study were to develop a bio-security assessment tool for use at equine events, to apply the tool in the investigation of the potential for contagious disease transmission at equine events in Ireland, and to determine the influence of the degree of regulation of event on risk of disease transmission. A scoring system was developed to identify bio-security risks at equine events. This was based on both direct and indirect risk factors which contribute to contagious disease transmission. Risk factors included categories such as contact between horses, contact with fomites, feeding facilities, degree of public access, control of wildlife, sanitation of stables and housing ventilation. The regulation status of each event was determined based on a combination of published governing rules and observation of their enforcement during on-site visits. Highly regulated events had significantly lower overall risk levels than partially regulated events ($p<0.003$); overall risk level of partially regulated events did not differ significantly from that of unregulated events ($p=0.051$).

A retrospective study of horses investigated for weight loss despite a good appetite (2002-2011)

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Weight loss despite a good appetite is a frequent diagnostic challenge for equine veterinarians; however, there are few objective reports and little descriptive information regarding risk factors and prognostic indicators. The aim of this study was evaluate the relationship between historical and clinicopathological findings and final outcome in order to identify risk factors and prognostic indicators. Medical records of horses referred for investigation of weight loss despite a good appetite were reviewed. Data collated included history, signalment, clinical and diagnostic findings, diagnoses and outcome (survival vs non-survival). Univariable associations were evaluated with a Mann-Whitney *U* test, Fisher's Exact test (categorical or binary data) or Pearson's rank correlation (continuous data), with $P \leq 0.05$ considered significant. Forty cases met the inclusion criteria. Albumin concentrations at admission were significantly ($P = 0.008$) higher in survivors (29.1 ± 6.5 g/L) than non-survivors (22.8 ± 5.4 g/L) and positively correlated with outcome ($r^2 = 0.23$; $P = 0.005$). Animals with low total protein ($P = 0.029$, OR = 7, 95 % CI = 1.22 – 40.1) and albumin ($P = 0.032$, OR = 6, 95% CI = 1.22 – 29.5) concentrations were at greater risk for non-survival. Body condition score was positively correlated with total protein ($r^2 = 0.17$; $P = 0.03$) and albumin ($r^2 = 0.53$; $P < 0.0001$) concentrations at admission and duration of clinical signs ($r^2 = 0.19$; $P = 0.03$). The severity of hypoproteinaemia and hypoalbuminaemia are related with a worsening prognosis. Since body condition score is positively associated with albumin concentration, it could potentially be used as a prognostic indicator for survival in conjunction with albumin concentration.

Porcine welfare

The use of meat inspection as a surveillance tool for improved pig welfare

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Food animal welfare is synonymous with food quality and linked to food safety. This link is evident at slaughter, when ante-mortem and post-mortem inspections are conducted to ensure that the animal is fit for human consumption, carcasses that are damaged as a result of bruising, lesions, disease and injury are trimmed or rejected, depending on the extent of disease and damage. Damage to carcasses is likely to be indicative of the housing, and management of the animal during the production period, and thus reflect the animals welfare. Disease and injury such as lesions and bruising are undeniably an indication of poor welfare. The main objectives of this research is to explore the use of carcass condemnation as a surveillance tool for farm animal welfare and to examine the process of carcass condemnation of swine in Ireland, including the reporting mechanisms and the economic losses to the farmer and the processor.

Emergency issues

A qualitative assessment of the risk of spread to and within the commercial poultry industry, following the introduction of H5N1 avian influenza into Ireland, and of potential risk mitigation measures

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¹ UCD CVERA, ² Birdwatch Ireland, ³ National Parks and Wildlife Service, ⁴ DAFM, ⁵ Private practitioner, ⁶ UCD School of Veterinary Medicine

This paper describes work conducted in 2008 to qualitatively assess the risk of spread to and within the commercial poultry industry, following the introduction of H5N1 avian influenza into Ireland, and of potential risk mitigation measures. Four transmission routes were considered, including spread among wild waterbirds, spread from wild waterbirds to non-commercial avian operations, spread from wild waterbirds to commercial poultry (directly or via non-commercial avian operations) and spread within the commercial poultry industry. There is considerable potential in Ireland for spread of H5N1 avian influenza among wild waterbirds, and from wild waterbirds to non-commercial avian operations. In contrast, the opportunity for spread to and within the commercial poultry sector is variable, depending on a broad range of factors including production system, water source and management. A number of important risk mitigation measures were identified, focusing on improved information and awareness, risk based surveillance and maintenance of up-to-date databases. Each of these issues has now been considered in detail, both by DAFM and industry.

An outbreak of piroplasmosis in horses in Ireland

Bailey, D.¹, Leadon, D.L.², Brangan, P.¹, de Waal, T.³, Lenihan, P.⁴, Larkin, J.¹, Ennett, F.¹, Gaynor, S.¹, More, S.J.^{3,5}

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An outbreak of piroplasmosis (caused by *Theileria equi*) occurred in horses in Ireland during 2009. The objective of this paper is to describe the outbreak, the transmission of *T. equi* within Ireland and aspects of outbreak management.

Outbreak of bovine brucellosis in County Clare, Ireland, during 2005

Hayes, M.¹, Kilroy, A.¹, Ashe, S.¹, Power, S.², Kenny, K.², Collins, D.M.³, More, S.J.^{3,4}

¹ DAFM, ² DAFM Veterinary Laboratory Service, ³ UCD CVERA, ⁴ UCD School of Veterinary Medicine

Veterinary Record 166, 107-111 (2010)

This paper describes an investigation of an outbreak of bovine brucellosis in County Clare, Ireland, during 2005. It is likely that infection on the index farm was linked to a previous outbreak of brucellosis in County Clare. During March to May 2005, transmission of brucellosis within the herd was rapid; this was facilitated by a range of factors, including close contact between cattle kept in winter housing, and the mixing of animals, both during grazing and at housing, throughout the year. Containment of the disease, including only limited spread to one contiguous herd, was facilitated by the recent construction of a shed for winter housing.

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Transmissible spongiform encephalopathy (TSE)

Factors contributing to sample quality for the BSE active surveillance programme in the Republic of Ireland

Cahill, A.¹, Collins, D.M.², Aznar, I.², More, S.J.^{2,3}, Griffin, J.¹, Sheridan, H.¹

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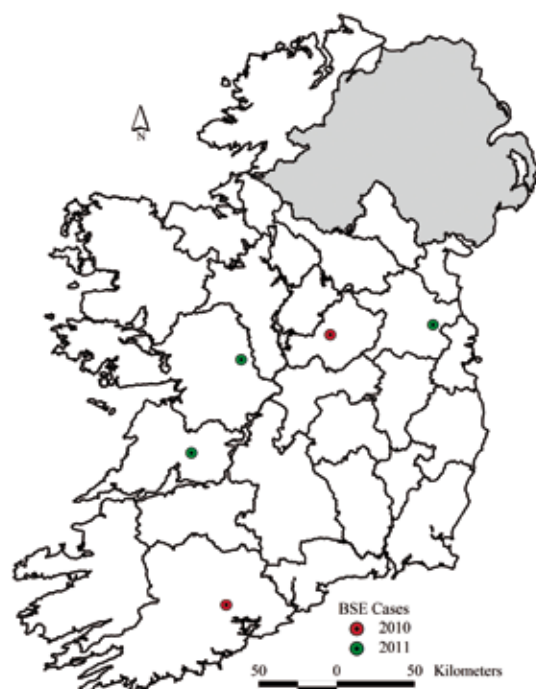
The Republic of Ireland's active surveillance programme for BSE involves the collection of brain stem tissue samples from certain categories of cattle, including cattle which die on farm (fallen cattle). Some of these samples are of poor quality due to autolysis and this has implications for accurate BSE diagnosis. The Republic of Ireland is obliged under EU law to take measures to minimise sample autolysis. Data on the degree of autolysis of all samples taken between 2007 and 2011 have been captured on the AHCS (Animal Health Computer System). The objective of this study is to identify risk factors for poor sample quality in fallen animals in the Republic of Ireland.

Bovine spongiform encephalopathy in the Republic of Ireland before and after the reinforced feed ban: epidemiology, spatial analysis and risk factors

Ryan, E.¹, McGrath, G.², Sheridan, H.³, More, S.J.^{2,4}, Aznar, I.²

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Bovine spongiform encephalopathy (BSE) is a prion disease of cattle, spread by contamination of cattle feed. In the Republic of Ireland, a reinforced feed ban on mammalian meat and bone meal (MBM) was introduced on 1st October 1996 to stop further infection of cattle. Between then and July 2010, 44 cases of BSE from 40 herds have been born, termed "born after the reinforced ban" or "BARB" BSE cases. The objectives of this project were to describe the epidemiology of these BARB cases, to determine area-level risk factors for BSE and how they related to the stage of the BSE epidemic, and to evaluate whether the spatial pattern of BSE cases was non-random and had changed over time.



Confirmed BSE cases in Ireland during 2010 & 2011.

Q fever

Q fever in humans and farmed animals in four European countries

Georgiev, M.¹, Afonso, A.¹, Neubauer, S.², Needham, H.³, Thiery, R.⁴, Rodolakis, A.⁵, Roest, H.J.⁶, Staerk, K.⁷, Stegeman, J.A.⁸, Vellema, P.⁹, van der Hoek, W.¹⁰, More, S.J.^{11, 12}

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Q fever, is a zoonotic bacterial disease in humans, caused by *C. burnetii*, and a large range of animals can be infected. This paper presents a review of Q fever and *C. burnetii* infection in humans and farmed animals, using case studies from four European countries. In all four countries, the serological prevalence of *C. burnetii* infection and reported incidence of Q fever varies broadly in both farmed animals and humans. Animal proximity and contact with infected animals or their birth products have been identified as the most important risk factors for human disease. Intrinsic farm factors, such as production system and management, influence the number of outbreaks in an area. Potential control options are common methods of disease control have included measures to increase diagnostic precision and general awareness, and to reduce human exposure and spill over. This study highlights important gaps in knowledge, and future research needs.

Seroprevalence of *Coxiella burnetii* antibodies in sheep and goats in the Republic of Ireland

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Veterinary Record 169, 280 (2011)

Q fever is a zoonotic disease caused by *Coxiella burnetii*, a bacteria whose main reservoirs are goats, sheep and cattle but which can also infect a wide range of mammals. The objective of this study was to estimate the prevalence of exposure to *C. burnetii* in sheep and goats in the Republic of Ireland. Serum from 2,197 sheep from 119 flocks and 590 goats from 66 herds, randomly sampled, were tested for the presence of *C. burnetii* antibodies using an indirect ELISA. In sheep, 15/2,197 (0.7 per cent) samples from 10/119 (8.4 per cent) flocks were positive. In goats, 2/590 (0.3 per cent) samples from 1/66 (1.5 per cent) herd were positive. The results confirm the exposure of sheep and goats to *C. burnetii* in the Republic of Ireland.

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Prevalence of *Coxiella burnetii* (Q fever) antibodies in bovine serum and bulk-milk samples

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Epidemiology and Infection 139, 1413-1417 (2011)

Q fever (*Coxiella burnetii*) is a zoonotic disease of increasing public health importance. The objective of this study was to estimate the prevalence of, and risk factors associated with, exposure to *C. burnetii* in cattle in the Republic of Ireland. Bulk-tank milk samples from 290 dairy herds and 1,659 sera from 332 dairy and beef herds, randomly sampled, were tested by indirect ELISA to detect antibodies to *C. burnetii*. In total, 37.9 % of bulk-milk sample herds and 1.8% of sera (from 6.9% of herds) were antibody positive. Of risk factors tested using logistic regression analysis, only large herd size (bulk-milk analysis) and dairy breed (serum analysis) significantly increased the odds of being positive for antibodies to *C. burnetii*. Herds with positive milk or serum samples were randomly distributed throughout the Republic of Ireland and no clustering was observed. The use of an ELISA to test bulk-milk samples collected by randomized stratified sampling is a cost-effective method by which national herd prevalence can be estimated by active surveillance.

Reprinted from Epidemiology and Infection, 139, Ryan, E.D., Kirby, M., Collins, D.M., Sayers, R., Mee, J.F., Clegg, T., Prevalence of Coxiella burnetii (Q fever) antibodies in bovine serum and bulk-milk samples, 1413-1417, Copyright 2011, with permission from Cambridge University Press.



Keem beach, Achill Island. Photograph by E. Gormley.

Companion animal epidemiology

The spatial distribution of pet dogs and pet cats on the island of Ireland

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BMC Veterinary Research 7, 28 (2011)

There is considerable international research regarding the link between human demographics and pet ownership. In several international studies, pet ownership was associated with household demographics including: the presence of children in the household, urban/rural location, level of education and age/family structure. What is lacking across all these studies, however, is an understanding of how these pets are spatially distributed throughout the regions under study. This paper describes the spatial distribution of pet dog and pet cat owning households on the island of Ireland. In 2006, there were an estimated 640,620 pet dog owning households and 215,542 pet cat owning households in Ireland. These estimates are derived from logistic regression modelling, based on household composition to determine pet dog ownership and the type of house to determine pet cat ownership. Results are presented using choropleth maps. There is a higher density of pet dog owning households in the east of Ireland and in the cities than the west of Ireland and rural areas. However, in urban districts there are a lower proportion of households owning pet dogs than in rural districts. There are more households with cats in the urban areas, but the proportion of households with cats is greater in rural areas. The difference in spatial distribution of dog ownership is a reflection of a generally higher density of households in the east of Ireland and in major cities. The higher proportion of ownership in the west is understandable given the higher proportion of farmers and rural dwellings in this area. Spatial representation allows us to visualise the impact of human household distribution on the density of both pet dogs and pet cats on the island of Ireland. This information can be used when analysing risk of disease spread, for market research and for instigating veterinary care.

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Companion animal ownership: understanding the attitudes, beliefs and behaviour of pet owners towards their pets

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Pet owners own pets for a variety of reasons including companionship, protection, and as working animals. Ownership is also a contributor to owners' physical and mental health. Some studies have been conducted on issues relating to ownership, including pet neutering and obesity. As yet, little data are available from qualitative research. In this study, we investigate pet owners' attitudes, beliefs and behaviours towards their pets, with specific emphasis on, diet, weight control and exercise. An interview-administered survey questionnaire and focus group discussions were conducted for the study. Data was coded and managed using Nvivo 8 qualitative data analysis software and StataSE Version 10[®]. Several themes for owning a pet emerged in the study, most commonly associated with companionship and child development. Owners tend to spoil their pet(s) with food despite being aware that this could lead to their pet becoming overweight. Owners believe that cats exercise themselves, whereas dogs need to be walked off the lead to exercise properly. Having a pet was considered the equivalent to having an extra person in the family. Our results help provide information on how owners and their pets may benefit from tailored counselling about pet exercise and neutering.

Neutering in Ireland: Investigating risk factors for neutering and examining owner attitudes and beliefs towards neutering

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Companion animal over-population is an old problem which causes significant costs to humans and governments every year (Olson *et al.* 1991). Over-population has been associated with owners being unconcerned about neutering their pets or allowing them to stray (Soto *et al.* 2005; Natoli *et al.* 2006; Weng *et al.* 2006). Cat owners are more likely to neuter than dog owners (Franti *et al.* 1980; Leslie *et al.* 1994; Poss and Bader 2007; Downes *et al.* 2009; Faver 2009; McKay *et al.* 2009). In this study, we investigate risk factors for neutering a pet and examine pet owners' attitudes, beliefs and behaviours towards their pets, with specific emphasis on neutering. Data from 3 sources were included in this study; a computer assisted telephone interview, one to one interviews and focus group discussions conducted specifically for the study. Data was coded and managed using Nvivo 8 qualitative data analysis software and StataSE Version 10[®]. Reasons for neutering included, preventing unwanted pregnancies, to limit wandering behaviour and prevent disease. Individual pet characteristics played a role in the decision of owners to neuter their pet(s). Some owners suggested that they would be reluctant to neuter again after past experience.

Factors associated with furry pet ownership among patients with asthma

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Journal of Asthma 47, 742-749 (2010)

Exposure to indoor allergens is an established risk factor for poor asthma control. Current guidelines recommend removing pets from the home of patients with asthma. This cross-sectional study was conducted to determine the prevalence of furry pet ownership in asthmatics compared to non-asthmatics and to identify factors associated with furry pet ownership among those with asthma. Secondary analysis assessed characteristics among asthmatics that might be associated with allowing a furry pet into the bedroom. Using data from The National Asthma Survey collected from 2003 to 2004, we carried out univariate and multiple regression analyses, in 2009, to identify independent predictors of furry pet ownership in asthma sufferers after controlling for potential confounders. Overall, asthmatics were more likely to own a furry pet than nonasthmatic individuals in the general population (49.9% versus 44.8%, $p < .001$). Multivariate analysis showed that female sex, older age, white race, and high income were independent predictors of furry pet ownership among asthmatics. Additionally, 68.7% of patients with asthma who own a furry pet allowed them into their bedroom. Higher income and carrying out ≤ 2 environmental control practices in the home were associated with increased likelihood of allowing a furry pet into the bedroom. Furry pet ownership is equally or more common among asthmatics compared to those without asthma. The majority of asthmatics with furry pets allow them into the bedroom. Recognizing and addressing these problems may help decrease asthma morbidity.

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Cadmium exposure in cattle

National survey of cadmium in bovine kidneys

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Of all the animal tissues, livers and kidney constitute a special dilemma in that they have a tendency to bioaccumulate toxic metals such as lead (Pb), cadmium (Cd), mercury (Hg) and arsenic (As). Maximum levels (ML) for Hg, Pb, Cd and tin (Sn) in foodstuffs are set by Commission Regulation No. 1881/2006 (amended by No. 629/2008), which includes bovine muscle, livers and kidneys. Cadmium, a widely distributed environmental industrial pollutant, has no beneficial biological role and may be highly toxic when introduced into the body by ingestion or inhalation to both animals and humans. Cadmium is not easily cleared by the cells and the poor efficiency of cellular export systems explains the long residence time of this element in storage tissues such as the intestine, the liver and the kidneys, resulting in older animals having higher liver and kidney Cd concentrations even if the levels in their diets and water are consistently low. Cadmium has no known biological function in either animals or humans but mimics the actions of other divalent metals that are essential to diverse biological functions. Cadmium bioavailability, retention and consequently toxicity are affected by several factors such as nutritional status (low body iron stores) and multiple pregnancies, pre-existing health conditions or diseases. The objective of this study is to determine cadmium concentrations in bovine kidneys randomly collected from cattle over five years of age from the 26 counties of Ireland.

Cadmium review

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No biological role has been described for cadmium (Cd) in animals and its presence in animal tissue is considered unnecessary. Cadmium is considered to be one of the most toxic substances in the environment due to its wide range of organ toxicity and long elimination half-life. Batteries are an important source of Cd pollution, additionally, combustion of coal, smelting, mining, alloy processing and industries that employ Cd as a dye are also potential sources of Cd pollution. Agricultural practices such as the application of sewage sludge and contaminated fertilizers are also sources of Cd contamination. Absorption of Cd occurs via the respiratory and digestive system. Approximately 10 to 50% of Cd fumes are absorbed by the respiratory system. While, Cd is poorly absorbed via the digestive tract, compared to similar divalent cations, Zn and Fe; approximately 5% of oral Cd is absorbed. Once absorbed, Cd circulates in red blood cells or bound to albumin in plasma. Cadmium interacts with the metabolism of essential minerals; calcium, zinc, iron, copper and selenium. The majority of newborn ruminants have a low Cd burden. Accumulation occurs slowly over time, primarily in liver and kidneys. In the liver it may induce and bind metallothionein, this complex is released slowly into circulation and then accumulates in kidneys. At high levels, dietary Cd can cause decreased feed intake, and lowered weight gain, anaemia, decreased bone absorption and abortions and Cd toxicity has been reported in many species including cattle.

International collaboration

Quantitative Rose Bengal test for diagnosis of bovine brucellosis

Cho, D.¹, Nam, H.¹, Kim, J.¹, Heo, E.¹, Cho, Y.¹, Hwang, I.¹, Kim, J.¹, Kim, J.¹, Jung, S.¹, More, S.^{2,3}

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Journal of Immunoassay and Immunochemistry 31, 120-130 (2010)

The Rose Bengal Test (RBT) is the most widely used screening test for brucellosis in both humans and animals. Owing to its apparent simplicity of reading, however, interpretations of the RBT results can be affected by personal experience. This study describes a simple way to improve the accuracy and uniformity of reading the RBT reaction by counting the number of agglutinated particles using transparent OHP film with Quantity One®, which was originally designed to count the bacterial colony numbers on agar plates. Using this system, the reactivities of three Rose Bengal antigens from different sources against international standard serum (1,000 units, VLA, UK) could be numerically measured: the intensity scale ranged from zero to around 1,600. This system enabled us to compare the antigenicity of Rose Bengal antigens from three different sources by using statistical analyses such as regression and mean intensity. Collectively, mathematical measuring of the reaction intensity used in this study may help interpret subtle test results by providing more reliable data and additional statistical information on the herd. In addition, the method would also be applicable to other agglutination test for other diseases.

Reprinted from Journal of Immunoassay and Immunochemistry, 31, Cho, D., Nam, H., Kim, J., Heo, E., Cho, Y., Hwang, I., Kim, J., Kim, J., Jung, S., More, S., Quantitative Rose Bengal test for diagnosis of bovine brucellosis, 120-130, Copyright 2010, with permission from Taylor and Francis Ltd.

Epidemiological characteristics of bovine brucellosis in Korea, 2001-2004

Nam, H.-M.¹, Kim, C.-H.¹, More, S.J.^{2,3}, Yoon, H.¹, Kim, S.J.¹, Lee, B.-Y.¹, Park, C.-K.¹, Jeon, J.-M.¹, Wee, S.-H.¹

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This paper describes the epidemiological characteristics of bovine brucellosis in Korea during January 2000-September 2004, which encompasses the period when the incidence of bovine brucellosis increased abruptly. Data from the National Animal Infectious Disease Data Management System were used for this study. A range of epidemiological measures were calculated including annual herd and animal incidence. During the study period, there were 1,183 outbreaks on 638 farms. In beef cattle, annual herd incidence increased from 0.15 (2000) to 11.5 (2004 to September) outbreaks per 10,000 and annual animal incidence varied between 3.4 (2000) and 105.8 (2004, to September) per 100,000, respectively. On 401 (62.9%) farms during this period, infection was eradicated without recurrence. Recurrence of infection was significantly higher on farms where abortion was reported (53.3%) compared to farms where it wasn't (30.0%). On beef cattle farms, infection was introduced most frequently through purchased cattle (46.2%). Based on the results of this study, the establishment and spread of brucellosis in the Korean beef cattle population was mainly due to incomplete or inappropriate treatment of aborted material and the movement of infected cattle.

Mycobacterium bovis in Korea: an update

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The Veterinary Journal 185, 347-350 (2010)

This paper reports changes in the cattle population and the incidence of bovine tuberculosis in the Republic of Korea between 1960 and 2007, and discusses potential factors contributing to the recently observed increase in disease incidence, particularly in beef cattle and deer. Although there have been ongoing refinements to the existing programme, further improvements in current strategies are needed, including surveillance of susceptible animal species, both domestic and wild, and ongoing surveillance of the human population.

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An outbreak of highly pathogenic avian influenza at a public animal exhibit in Seoul, Korea during 2008

Yoon, H.¹, Moon, O.K.¹, More, S.J.^{2, 3}, Park, C.K.⁴, Park, J.Y.¹, Lee, Y.J.¹, Lee, S.D.¹, Ha, J.K.¹, Jeong, S.K.¹, Jeong, J.W.¹, Lee, S.J.¹

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Zoonoses and Public Health 57, 142-145 (2010)

This study describes the first recorded outbreak of HPAI in the city of Seoul, in captive birds held in an exhibition for public viewing at a local district office. The index cases were two pheasants, which had been introduced into the exhibit on 24 April, 4 days prior to death, from a store in a local market in Gyeonggi-do. Ducks and chickens from an HPAI outbreak farm, subsequently confirmed on 4 May, had also been held in this store. This outbreak highlights the potential role of local markets in AIV transmission. This outbreak led to considerable public health concern in Korea, however, no human cases were reported. The non-commercial poultry sector needs to be considered in national plans for preparedness and response.

Reprinted from Zoonoses and Public Health, 57, Yoon, H., Moon, O.K., More, S.J., Park, C.K., Park, J.Y., Lee, Y.J., Lee, S.D., Ha, J.K., Jeong, S.K., Jeong, J.W., Lee, S.J., An outbreak of highly pathogenic avian influenza at a public animal exhibit in Seoul, Korea during 2008, 142-145, Copyright 2010, National Veterinary Research and Quarantine Service.

Miscellaneous

Endophyte review/opinion paper

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Animals grazing or consuming conserved forages can encounter problems if forages are infected with an endophyte, which produces toxins which are harmful to animals. Endophytes are fungi that live within a plant and the relationship between a grass and its endophyte is symbiotic. The grass provides the nutrients and the endophyte produces toxins that fend off insects, diseases and grazing animals. Endophytes are transmitted only through grass seed. Different species of endophyte fungus infect different species of grass. Principally we are concerned with the fungus *Neotyphodium coenophialum*, which produces over 32 toxic alkaloids including 17 ergot alkaloids that affect livestock. The principal toxin is ergovaline, which amongst other alkaloids, causes fescue toxicosis in livestock. These toxins are vasoconstrictors, they constrict blood vessels and reduce circulation to the body extremities, interfering with the animals ability to regulate body temperature and causing conditions called 'fescue foot' in cold weather and 'summer slump' in hot weather. The objective of this study is to determine the role of the endophyte ergovaline on a number of farms where poor animal performance had been reported.

Graduate Certificate in Dairy Herd Health

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Online learning is growing in popularity as a method to deliver lifelong learning to veterinary professionals, as many are unable to commit to full-time, on-campus educational programmes. The number of academic staff engaging in this method of educational delivery is low, however. There are challenges to the development and delivery of high-quality online learning programmes, recent reductions in university resources, both human and financial. The Dairy Herd Health group in the University College of Dublin, aimed to overcome these hurdles, and set out to develop and deliver an online graduate certificate in dairy herd health. Targeted at veterinarians out in practice, practitioners will be equipped with tools for herd data analysis, practical herd evaluation skills, and an ability to integrate the multiple facets of dairy herd health for the development of holistic herd level solutions that are set in context with regard to herd profitability and animal health and welfare. The Certificate was successfully delivered in 2011. This paper offers a framework for the development of online graduate programmes with limited resources and novice academic staff new to online delivery of programmes. We reflect on the challenges that academic staff members encountered in the design and delivery of their online teaching strategies. Finally we provide recommendations on how to overcome these teaching and learning challenges.

Preface. SVEPM 2010 – The role of veterinary epidemiology in animal health in the world today

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Preventive Veterinary Medicine 100, 89 (2011)

This preface provides an introduction to a special edition of Preventive Veterinary Medicine, based on research presented at the 2010 Society of Veterinary Epidemiology and Preventive Medicine conference. The papers range from classical approaches of observational epidemiology applied to current problems, to more novel techniques involving contact structure and social network analysis, and culminate with an introduction to advanced statistical methods of analysing Bayesian networks.

Adapted from Preventive Veterinary Medicine, 100, Martinez, T.A., Pfeiffer, D.U., More, S.J., Preface. SVEPM 2010 – The role of veterinary epidemiology in animal health in the world today, 89, Copyright 2011, with permission from Elsevier.

Evidence is at the core of scientific method: A challenge for clinicians

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The Veterinary Journal (in press)

Evidence is at the core of the scientific method, providing the basis for acquiring new and correcting and consolidating existing knowledge. Within the disciplines of veterinary medicine, evidence is generally gathered through experimentation and/or observation, with conclusions then being drawn using inductive and/or deductive reasoning. There are many issues relating to scientific evidence, although only two are considered in this paper. Firstly, scientific evidence needs to be presented to end-users, including clinicians, policy-makers and other scientific researchers, in a manner that facilitates critical evaluation, hence the importance of internationally reporting guidelines. Secondly, scientific evidence, combined with clinical judgement and expertise, forms the foundation for evidence-based veterinary medicine (EBVM). This guest editorial provides an introduction to a separate critique of EBVM, including strategies to increase its adoption in clinical practice.

Adapted from The Veterinary Journal, 191, More, S.J., Evidence is at the core of scientific method: A challenge for clinicians, 11-12, Copyright 2012, with permission from Elsevier.

Improving the quality of reporting in veterinary journals: how far do we need to go with reporting guidelines?

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The Veterinary Journal 184, 249-250 (2010)

Publication in the international peer-reviewed literature is one of the most important outputs of any research. Despite its importance, however, the quality of reporting is variable. Guidelines have been developed by international scientific

teams to promote the quality of reporting of research studies, thereby improving both the value and reliability of medical research literature. Increasingly, key medical journals, either require or recommend author compliance with reporting guidelines. As yet, however, a similar approach is not standard practice among veterinary journals. This would be partly resolved through efforts to raise awareness of these reporting guidelines among veterinary researchers. In addition, veterinary journals should require author compliance with relevant reporting guidelines, in the interest of high quality reporting of veterinary medical research.

Adapted from The Veterinary Journal, 184, More, S.J., Improving the quality of reporting in veterinary journals: how far do we need to go with reporting guidelines?, 249-250, Copyright 2010, with permission from Elsevier.

Markers of the uterine innate immune response of the mare

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Animal Reproduction Science 119, 31–39 (2010)

Reproductive efficiency in mares is low and persistent mating-induced endometritis (PMIE) is an important cause of subfertility. Mating-induced endometritis (MIE) an obligate precursor to PMIE, is a ubiquitous, transient inflammatory response to the presence of sperm, seminal components and pathogens. However, the specific inflammatory pathways that derive from MIE and that may also be precursors to PMIE are not clear. The ability to identify and measure robust, repeatable markers of inflammation integral to MIE may be key to understanding the progression to PMIE. The aim of the study was to (i) refine a protocol for inducing MIE and in doing so test a range of cellular and molecular parameters as valid markers of MIE to facilitate future studies of mares susceptible to PMIE (ii) concurrently identify those parameters with potential as inflammatory indicators during MIE to inform and enhance early treatment regimens in practice. Mating-induced endometritis was induced in pony mares using a stringent protocol; mares were treated intrauterine with frozen/thawed semen ($n = 5$; FTS) or frozen/thawed extender ($n = 6$; FTEx). The parameters tested were measured before treatment were compared to samples collected at strategic time points after treatment: uterine cytology using cytological (at 8, 16, 24, 48 and 72 h after treatment) or histological analysis (at 24 and 72 h); uterine bacteriology (at 24 and 72 h); secretion of prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$; at 8, 16, 24, 48 and 72 h); peripheral concentrations of serum amyloid A (SAA; at 24h); endometrial mRNA gene expression, focussing upon *IL8* and *TLR4*, as examples of genes pertinent to inflammation (at 24 h). Uterine neutrophil cell numbers in both treatment groups increased at 8 ($P < 0.001$), 16 ($P < 0.01$) and 24 ($P < 0.01$) h after insemination, indicative of MIE and distinguished between different treatments because neutrophil numbers were greater from FTS mares than FTEx mares 8h after challenge. Uterine neutrophil cell numbers, assessed by histology, increased ($P < 0.001$) 24 and 72 h after treatment. Prostaglandin $F_{2\alpha}$ concentrations increased ($P < 0.05$) 16 h after treatments, while SAA concentrations and bacterial growth scores were not significantly different after treatment. Endometrium from pony mares expressed mRNA for *IL8* and *TLR4* but expression was not altered after insemination. The protocol induced MIE, as confirmed by uterine cytology and maybe used hereafter as a repeatable and robust method for studying immune mechanisms that underlie MIE and so may aid the understanding of progression to persistent inflammation. It can be concluded that of the range of parameters tested, neutrophil cell numbers by cytological analysis and $PGF_{2\alpha}$ were regarded as the most accurate markers of inflammation during MIE and important for use in practice.

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Endometrial explant culture to study the response of equine endometrium to insemination

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Reproduction in Domestic Animals 45, 670–676 (2010)

Mating-induced endometritis (MIE) is ubiquitous in the horse after natural mating and artificial insemination with frozen/thawed semen causing the most aggressive response. The majority of mares eliminate MIE 24–48 h after insemination. An endometrial explant culture was tested as a potential *in vitro* exemplar for sperm-induced MIE. Endometrial prostaglandin $F_{2\alpha}$ (PGF_{2 α}) secretion and expression of interleukin-8 (*IL-8*) were used as markers of inflammation. Endometrial explants were cultured from uteri collected from follicular phase mares. Explants were challenged with 1 or 10 × 10⁶ sperm/ml frozen/thawed semen, chilled semen, washed sperm or seminal plasma. Medium was collected 24 and 72 h after challenge and assayed for PGF_{2 α} by radioimmunoassay. Treatment of endometrial explants with frozen/thawed, chilled semen or washed sperm did not change the secretion of PGF_{2 α} compared with untreated controls. However, 24 h after challenge cultured explants expressed *IL-8*. The *in vitro* endometrial explant system did not represent the *in vivo* response to semen when PGF_{2 α} was used as a marker of inflammation, yet the use of gene expression as an inflammatory marker warrants further investigation.

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Essential elements and heavy metal concentrations in a small area of the Castlecomer Plateau, Co. Kilkenny, Ireland: Their potential to impact on animal performance

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Many ruminants are solely or mostly dependant for their nutrients, including essential elements, on the forage available to them, either in its natural state or conserved as hay or silage. A soil and herbage survey was carried out in April and September 2007, in a 3.1 km × 3.0 km grid, incorporating 106 and 46 sampling points, respectively, on the Castlecomer Plateau, Co. Kilkenny, Ireland. The aim was to determine the nutrient and heavy metal status of soil and herbage in the sampling area, and to examine the concentrations observed for their potential to impact on animal performance. Low soil pH and high soil lime requirements were identified within the sampling area. The concentrations of Ca, Cu, Se and Zn were low in soils and herbage. These conditions are similar to those found on other farms in Ireland. Fluoride was detected in 61 of the 97 herbage samples in April 2007, but only four exceeded 40 mg/kg dry matter, the maximum tolerable level for cattle. Mineral imbalances (Ca, Cu, Se and Zn) observed in pastures caused by low soil mineral status, exacerbated by low soil pH, could impair animal performance in the area studied.

Small area study/milk recording data

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The aim was to determine the influence of local industry on milk production in surrounding farms. Data were collected from all dairy farms ($n = 14$) participating in a national milk recording scheme within 8 km of a brick factory. Herd identifier, individual cow identifier, date of birth, most recent calving date, parity, date of test, 24 hour milk, fat, protein

and lactose yield, somatic cell count at each milk recording event ($n = 13,773$). A herd mean 24 hour estimated milk yield was calculated per herd per month over the six year period ($n = 557$). There was a significant effect of herd of origin ($P < 0.0001$), parity ($P < 0.05$) and number of days in milk ($P < 0.01$) on the herd average milk yield. Mean milk yields were lower ($P < 0.01$) on the index farm compared with all farms with the exception of herds 5 and 10. There was no effect ($P > 0.05$) year, or number of cows in herd, or somatic cell counts on herd average milk production. Milk yield was highest ($P < 0.001$) in second quarter of year and lowest ($P < 0.001$) in fourth quarter of year. Univariate analysis demonstrated that herds located within 5 km of the brick manufacturing unit, milk production was lower ($P < 0.0001$) when the brick manufacturing unit was in production (18.8 ± 0.37 kgs/day) compared with when it was closed (21.7 ± 0.41 kgs/day). Milk production was not different for herds that were located between 5 to 8 km from the unit. Mixed model analysis will be conducted to determine the overall effect of brick manufacture, accounting for biologically important factors including herd of origin, parity and time of year, on milk production in the surrounding herds.

Image quality & radiological safety

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X-rays have long been used in veterinary practice both as a screening tool for developmental conditions and for diagnostic purposes when dealing with sick animals. However there is limited information regarding the radiographic protocols, image quality and radiation safety standards of veterinary practices in Ireland. This project is designed to assess the changes that have occurred in radiographic protocols and image quality over a ten-year period that has seen great technological advancement and to determine the attitudes and perceptions of the personnel involved in veterinary radiography towards radiation safety.

Can a national fertility programme improve dairy herd performance in Ireland? A review

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Dairying is a key element of the Agri-food industry in Ireland. Although the number of dairying units is decreasing, milk productivity and value are increasing. All indicators suggest that farms are set to expand. Reproductive performance is reducing worldwide and infertility is a serious constraint to farm expansion. Intensively managed dairy herds must achieve fertility targets to ensure long-term economic viability. Computer programmes to manage fertility were developed in the sixties and recent advances enable the development of sophisticated integrated computerised programmes for fertility, health and production facilitate herd management. The analysis of herd management records allows for accurate assessment of the current status of the herd, a crucial decision making tool to implement effective change. Monitoring of such changes to ensure their effectiveness is essential to the success of any programme. Furthermore, participation in discussion groups, allows for peer comparisons, a key factor in motivating herd management change. A national programme such as the InCalf programme offers Ireland the opportunity to avail of a highly resourced effective reproductive performance programme that is in operation for similar production systems in the Southern Hemisphere. We must be mindful of the excellent resources already in existence in the country; the ICBF database offers us opportunities to amalgamate the InCalf programme with a key database to further enhance the possible outcomes for our dairy industry. Additionally, successful farmer discussion groups are already operational in Ireland run by our farm advisory service Teagasc. Capacity building must be at the forefront of the programme and the encouragement of farmer, advisor and industry participation is paramount. These are challenges our industry must embrace to enhance the Irish agriculture.