

EVIDENCE-BASED VETERINARY MEDICINE MATTERS

OUR COMMITMENT TO THE FUTURE



OUR COMMITMENT TO EVIDENCE-BASED VETERINARY MEDICINE

EVIDENCE-BASED VETERINARY MEDICINE IS KEY TO
THE DELIVERY OF MODERN VETERINARY MEDICINE.

It means veterinary surgeons and veterinary nurses making clinical decisions according to their professional judgement, based on the best available evidence at the time and what is right for the individual animal and owner. When rigorous research underpins medical decisions, adverse events can be minimised and patient outcomes can be improved.

Veterinary medicine faces challenges from treatments that avoid rigorous scrutiny, as well as from managing patients with multiple and often chronic diseases. By working towards a recognised evidence base for treatments, we give the veterinary professions and clients the best foundation on which to base decisions.

We believe evidence-based veterinary medicine reinforces the sound scientific principles of the profession and strengthens the commitment to put animal health and welfare at the forefront of all we do.

**ANIMAL AND PLANT
HEALTH AGENCY**

**BRITISH CATTLE
VETERINARY ASSOCIATION**

**BRITISH EQUINE
VETERINARY ASSOCIATION**

**BRITISH SMALL ANIMAL
VETERINARY ASSOCIATION**

**BRITISH VETERINARY
ASSOCIATION**

**BRITISH VETERINARY
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RCVS KNOWLEDGE

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INTRODUCTION

DELIVERING VETERINARY CARE BASED ON RATIONAL SCIENTIFIC PRINCIPLES REMAINS AS RELEVANT TODAY AS IT WAS WHEN THE PROFESSION BEGAN.

Veterinary surgeons and veterinary nurses must maintain and develop the knowledge and skills relevant to their professional practice as part of the Code of Professional Conduct. Veterinary teams are often called upon to make quick decisions in complex, uncertain and emotionally charged environments. To do this well, they must combine clinical experience with the best available scientific evidence, while also considering what is right for the individual animal or owner.

Generating evidence for every possible circumstance is a formidable task, and it can also be difficult for veterinary surgeons and nurses to stay up to date with new research and guidelines as they become available. Yet by practising evidence-based veterinary medicine (EBVM), they have the power to transform the quality of animal care.

The mission of RCVS Knowledge is to advance the quality of veterinary care for the benefit of animals, the public and society. Sense about Science is a charity that promotes understanding and use of scientific evidence and challenges its misrepresentation. Working together, we asked leading veterinary associations, universities and institutions about the practical impact of evidence-based veterinary medicine. The 14 landmark stories included in this report are the result.

Together, these stories illustrate the breadth of the veterinary professions and the variety of evidence being used to support practice. They also highlight

the vital role played by veterinary nurses in the development and use of evidence, and how new technology is enabling the prescription of directed and tailored therapies. Further, the stories show how EBVM can drastically change our understanding of which treatments should be used, and how our perception of the 'cutting edge' can change incredibly quickly.

Challenges remain, however. The lack of a comprehensive evidence base; lack of time and funding; uncertainty about what we mean by evidence-based medicine, and how to apply it; not to mention the sheer variety of species treated by the professions, makes it difficult to generate evidence to support every possible circumstance that veterinary teams may find themselves in. Keeping pace with the changing landscape of evidence can be daunting, and it can sometimes take a long time for veterinary practice to change.

Veterinary practitioners hold a responsibility to ground their decisions on sound, objective and up-to-date evidence. The stories presented here show that veterinary professionals are making considerable progress with this approach, and as a result great advances are being made — with a tangible impact on patient care.

We hope that this collection of stories will inspire an even stronger commitment from everyone in the profession to get involved in research and put evidence into practice.

RCVS KNOWLEDGE AND SENSE ABOUT SCIENCE

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A PLAGUE ON RINDERPEST

British Veterinary Association

For millennia, rinderpest (cattle plague) was an acute and highly contagious viral disease affecting ruminant animals — primarily cattle. As such, it had a devastating and centuries-long impact on communities in Europe, Africa, the Middle East and the Indian subcontinent, who depended heavily on livestock for food production. Today, however, it is gone — an eradication which is estimated to avoid losses of \$920 million each year on the African continent alone¹. This triumph would not have been possible without the evidence-led work of veterinary surgeons dedicated to the regional, national, and international control of the disease.

Like measles, rinderpest likely originated several thousand years ago as a result of cattle and human beings living in close proximity. Symptoms included internal ulceration, diarrhoea, dehydration and immunosuppression, and resulted in high mortality and morbidity rates. Rapidly growing human populations dependent on cattle for food caused the disease to spread, and this was exacerbated by the trade of livestock and war.

Control methods at the beginning of the 20th century used vaccines produced in live animals, which gave good immunity but could not be produced in the quantities required for large-scale programmes. They sometimes also caused clinical disease.

The development of a tissue culture vaccine by Lincolnshire-born veterinary surgeon Walter Plowright in the late 1950s represented a key milestone in efforts to control the disease. The vaccine provided lifelong immunity, was fully

attenuated so did not cause clinical disease, and could be grown in large quantities. However, it required strict cold-storage and handling conditions, which impeded its use in the field.

“The impact of Plowright’s vaccine on the world’s food supply has been huge, adding tens of millions of tons of meat, and hundreds of millions of litres of milk to the food supply in the developing world.”

Control during the 1960s and 1970s focused on suppressing rinderpest through mass annual vaccination programmes, and this achieved a great deal. By 1979, just one country, Sudan, admitted to having rinderpest, compared with 17 countries in 1960². However, the resulting complacency

and failure to further monitor vaccination and disease meant that resurgence in sub-Saharan Africa looked inevitable by the early 1980s.

It was not until 1992 that a heat-resistant version of the original Plowright vaccine became commercially available, following a research programme and the subsequent transfer of technology to African production facilities². This, combined with the formation of the UN’s Food and Agriculture Organization global eradication programme in 1994 and focus on those areas where rinderpest was persisting, led to great leaps forward in the recognition and control of the disease. Transmission models, constructed from information provided by livestock owners in the pastoralist communities, also played an important part in the ultimate eradication of the disease.

Rinderpest is only the second infectious disease to be eradicated from the planet, after smallpox in humans. The impact of Plowright’s vaccine on the world’s food supply has been huge, adding tens of millions of tons of meat, and hundreds of millions of litres of milk to the food supply in the developing world³. Many of the lessons learned during the process are relevant to the way in which we approach other disease control programmes — a long-lasting legacy for all those who played their part.

¹ Food and Agriculture Organization of the United Nations. (2017) Maintaining global freedom from rinderpest. Available at: <http://www.fao.org/3/a-i8228e.pdf>

² Roeder P. et al. (2013) Rinderpest: The veterinary perspective on eradication. Philosophical Transactions of the Royal Society of London. Series B, Biological sciences, 368, 20120139. DOI: 10.1098/rstb.2012.0139

³ The World Food Prize. 1999: Plowright. Available at: https://www.worldfoodprize.org/en/laureates/19871999_laureates/1999_plowright/

AVIAN INFLUENZA: REDUCTION OF THREAT TO UK USING ACTIVE SCIENCE INTELLIGENCE

Animal and Plant Health Agency

The threat posed by highly pathogenic avian influenza (HPAI) — or bird flu — hasn't gone away. Yet data from ongoing surveillance and research programmes are being used to develop effective disease control policies and mitigation strategies. This evidence-based approach is significantly reducing the risk to UK birds and their keepers.

HPAI is a severe infection of birds that poses a particular threat to all types of poultry. In the past decade there has been an unprecedented spread of a group of viruses within Asia, Africa, Europe and North America. This has had a great impact on global food security, poverty alleviation and bird welfare within different poultry production systems. An estimated one billion birds have died or been culled to stem the spread of the disease, at a cost to the global economy of at least \$30 billion¹.

Although the viruses originated in South-East Asia, their spread through migratory wild waterfowl has enabled them to travel over substantial distances in a relatively short time². 2016–2017 saw the largest European epidemic to date, and resulted in 13 outbreaks at UK poultry farms, affecting farmers' livelihoods as they could no longer trade with other countries. Vaccines have been shown to be ineffective, so are not used in the UK, where alternative conventional control methods have historically worked very well.

“Data have been used to inform UK poultry producers of the risks they face, and to develop more effective disease control policies.”

The Animal and Plant Health Agency is conducting several research programmes, designed to protect all birdkeepers in the UK, both commercial producers and back-yard enthusiasts. The work has principally covered: tracking and monitoring the spread of the virus on a global scale; how the virus is maintained

in the environment after it has been shed by infected wild birds; and studying how efficiently the virus spreads between different birds^{3,4}.

All of these data have been used to inform UK poultry producers of the risks they face, and to develop more effective disease control policies. This includes reducing the chances of wild birds and poultry coming into contact, by housing birds in risk periods; keeping feed undercover and away from wild birds; and basic hygiene measures such as keeping bird cages and runs clean and ensuring that boots are disinfected⁵.

As a result, the UK has mitigated this ongoing global threat — at least for now. Instances of the disease in UK poultry have been many-fold lower than in countries where these approaches have not been applied². However, the fight against bird flu goes on, as the virus continues to shape-shift and spread.

¹ Food and Agriculture Organization of the United Nations. (2009) Highly Pathogenic Avian Influenza and beyond. Available at: http://www.fao.org/ag/againfo/resources/en/publications/agapubs/HPAI_and_beyond.pdf

² Brown IH. and Sims L. (2016) Multi-continental epidemic of H5 highly pathogenic avian influenza (1996-2015). *Animal Influenza*, 9, Wiley-Blackwell, Hoboken. DOI: 10.1002/9781118924341.ch9

³ Alarcon P. et al. (2018) Comparison of 2016–17 and previous epizootics of highly pathogenic avian influenza H5 Guangdong lineage in Europe. *Emerging Infectious Diseases*, 24, 2270–2283. DOI: 10.3201/eid2412.171860

⁴ Slomka M.J. et al. (2019) Ducks are susceptible to infection with a range of doses of H5N8 HPAIV (2016, clade 2.3.4.4b) and are largely resistant to virus-specific mortality, but efficiently transmit infection to contact turkeys. *Avian Diseases*, 63, 172–180. DOI: 10.1637/11905-052518-Reg.1

⁵ Defra Avian Influenza guidance (2019) Biosecurity Best Practice for poultry keepers. Available at <https://www.gov.uk/guidance/avian-influenza-bird-flu#biosecurity-advice>

CALL FOR EVIDENCE ON THE PROVISION OF 24-HOUR EMERGENCY VETERINARY COVER

Royal College of Veterinary Surgeons

In 2013, the Royal College of Veterinary Surgeons (RCVS) launched a consultation with veterinary surgeons, veterinary nurses and animal owners on the provision of 24-hour emergency first aid and pain relief to animals.

The reasons for this consultation were two-fold. Firstly, over the preceding two years, Lay Observers on the RCVS Preliminary Investigation Committee had raised questions about the veterinary profession's ability to provide 24/7 emergency cover to the extent required by the supporting guidance to the *RCVS Code of Professional Conduct*, and said there was a disconnect between the public's expectations and the profession's capacity to meet those expectations.

Secondly, in June 2013, an RCVS Disciplinary Committee Inquiry found against a veterinary surgeon for unreasonably delaying attending to an injured dog on a farm. The case raised a number of issues about home visits by veterinary surgeons and veterinary nurses, including speed of response, travelling time and distance, daytime versus out-of-hours obligations, individual versus corporate responsibility, and staffing levels and contingency plans¹. Many in the profession were unhappy with the committee's decision, again highlighting the different expectations of professionals and owners.

Over the previous decade, two separate consultations had not significantly altered veterinary professionals' emergency care responsibilities, and yet there now seemed to be a groundswell of opinion for changing the status quo. The RCVS decided that only a thorough evidence-gathering process involving everyone with an interest in the issue could resolve this apparent gap in expectations.

This process involved a number of stages. The initial call for evidence in December 2013 garnered some 650 pages of written submissions, as well as a petition on home visits supported by more than 2,800 signatures. Following this, in March 2014, there was a three-day hearing in which fifteen organisations and ten individuals were invited to attend to give evidence to the RCVS Standards Committee, which is responsible for the Code. Also taken into account were

more than 1,000 responses from veterinary surgeons taking part in the *RCVS Survey of the Professions 2014* and an online survey with 1,250 animal owners.

"A thorough evidence-gathering process led to new guidance for veterinary professionals and, for the first time, for animal owners on the provision of 24-hour emergency veterinary cover."

Following analysis of this evidence, the Committee proposed new guidance for veterinary professionals, and — for the first time — animal owners, on the issue of 24-hour emergency first aid and pain relief².

Veterinary professionals received fuller explanations of their legal and professional responsibilities

and detailed guidance on a range of associated topics, including provision of information for clients, planning and protocols for 24/7 emergency cover, service provision and location (including in remote regions), response times, personal safety, non-client requests and costs.

For the public, there was guidance on who was responsible for an animal under animal welfare legislation; a description of the five basic animal welfare needs, with a reminder about ensuring these were met; and guidance on seeking veterinary attention, including registering their animal with a veterinary practice and planning ahead for emergencies.

These proposals were formally incorporated into the supporting guidance to the Code in June 2014.

By making the legal and professional obligations of veterinary professionals and the welfare obligations of animal owners clearer, this new guidance helped to allay some of the frustrations and concerns of the profession, and to provide a platform from which to improve understanding between veterinary surgeons and veterinary nurses, and their clients.

¹ Royal College of Veterinary Surgeons. (2013) Response to feedback on recent disciplinary hearing. Available at: <https://www.rcvs.org.uk/news-and-views/news/response-to-feedback-on-recent-disciplinary-hearing/>

² Royal College of Veterinary Surgeons. (2018) 24-hour emergency first aid and pain relief. Supporting Guidance to the RCVS Code of Professional Conduct, 3. Available at: <https://www.rcvs.org.uk/247care>

NURSES MAKING A DIFFERENCE

British Veterinary Nursing Association



Registered Veterinary Nurses (RVNs) are involved in many aspects of an animal's care, and are an important component of the veterinary practice team. There are more than 14,000 RVNs in the UK, and over the last few years upwards of 1,000 newly qualified RVNs have completed their studies in the UK each year. So, they play an increasing role in ensuring an evidence-based approach to treatment.

The qualifications framework within the UK has been reviewed many times over the last two decades, with new frameworks being introduced in 2006, 2010 and, most recently, 2016. With each review, changes have been made in response to evidence to ensure advances in care are adopted in practice. For example, after extensive research into methods of reducing disease transmission in human healthcare settings, the World Health Organization launched

its guidelines on hand hygiene in 2009¹. The following year, the WHO hygiene method was adopted into the veterinary nursing qualifications framework (Nursing Progress Log Skills List, 2010).

Another example is the World Small Animal Veterinary Association nutrition guidelines for patient assessment. These were published by the Global Nutrition Committee in 2011² and introduced to the qualification framework in 2016³. Nutrition

“A study that investigated the use of nutritional assessments and feeding plans in hospitalised cats found that their introduction prevented weight loss during their hospital stay.”

is a key factor in an animal's response to disease and injury, and the guidelines help to ensure a consistent and thorough assessment of the animal (including body and muscle condition scoring), its environment, and its current diet and feeding management, allowing positive interventions to be made. A recent study that investigated the use of nutritional assessments and feeding plans in hospitalised cats found that their introduction prevented weight loss during their hospital stay⁴.

Further changes have also been seen in the list of 'day-one' skills and competencies which are expected of newly qualified nurses. Since 2016, these have included an ability to review and evaluate literature, and use it to inform decisions about the procedures they use. A recent survey of veterinary professionals revealed that the vast majority agreed that practising evidence-based veterinary medicine made them feel that they'd provided the best medical care for their patient, and that it gave them more confidence in their clinical decision-making⁵.

Such changes to the qualifications framework for RVNs show the commitment of the veterinary nursing profession to evidence-based nursing. Future reviews of the qualifications framework should continue to reflect new evidence to improve the welfare of the animals within our care.

¹ World Health Organization. (2009) WHO guidelines on hand hygiene in health care. World Health Organization. Available at <https://www.who.int/gpsc/5may/tools/9789241597906/en/>

² Freeman L. (2011) WSAVA nutritional assessment guidelines. *Journal of Small Animal Practice*, 52, 385-396. DOI: 10.1111/j.1748-5827.2011.01079.x

³ Royal College of Veterinary Surgeons. (2016) RCVS Day one skills for veterinary nurses. Available at: <https://www.rcvs.org.uk/document-library/rcvs-day-one-skills-for-veterinary-nurses/>

⁴ Harper Adams University. (2019) Nutritional assessments and feeding plans for hospitalised cats: Preventing weight loss. Available at: <http://ofi.direct/1.19010329>

⁵ Hauser S. and Jackson EL. (2017) A survey of the non-clinical benefits of EBVM. *Veterinary Evidence*, 2. DOI: 10.18849/ve.v2i3.102

AN IMPROBABLE CONNECTION RELIEVES DOGS' SUFFERING

British Small Animal Veterinary Association

At first glance, there may appear little to connect anal furunculosis in dogs with human Crohn's disease. This painful and chronic condition is characterised by the formation of sinus tracts in the area surrounding the anus (the perianal tissue) and is particularly common in German Shepherds. Historically, surgery was considered the only worthwhile treatment, but it often led to severe post-operative complications such as fibrosis, incontinence and stricture. In many cases, dogs endured such poor quality of life after surgery that the decision was taken to put them down^{1,2,3}.

However, in the early 1990s, the British Small Animal Veterinary Association (BSAVA) funded a study through the Clinical Studies Trust Fund (now PetSavers) to find out more about the condition's cause. It involved examining

“Findings led to a trial of ciclosporin – a drug used to regulate the immune response in human Crohn's patients – as a potential treatment. Ciclosporin is now the recommended treatment.”

surgically resected tissue from several hundred anal furunculosis cases under the microscope and using special stains to determine the nature of the cells present¹. Separate work identified high concentrations of antibodies against the bacterium *Staphylococcus pseudintermedius* in the blood of affected dogs⁴. The similarity between anal furunculosis in dogs and Crohn's disease in humans was noted⁵. Together, this research pointed to an immune-mediated cause for anal furunculosis (i.e. the dog's own immune system

was causing the symptoms). Over the next 20 years, further research shed additional light on the immunological nature and genetics of the disease^{6,7}.

The BSAVA is committed to evidence-based medicine, and this story exemplifies how research can be translated into better clinical veterinary practice, to the great benefit of the animals involved. In the late 1990s, the findings of these initial studies led to a trial of ciclosporin — a drug used to regulate the immune response in human Crohn's patients — as a potential treatment. It saw all presenting signs of anal furunculosis resolve within a week of treatment and a reduction in lesion size of up to 90%⁸. Ciclosporin is now the recommended treatment for the condition, with reports of complete lesion resolution in 85% of treated dogs after 16 weeks⁹. Most newly diagnosed dogs now avoid surgery and the potential post-operative complications as a result.

¹ Day MJ. (1993) Immunopathology of anal furunculosis in the dog. *Journal of Small Animal Practice*, 34: 381-388. DOI: 10.1111/j.1748-5827.1993.tb02726.x

² Robins GM. and Lane JG. (1973) The management of anal furunculosis. *Journal of Small Animal Practice*, 14: 333-342. DOI: 10.1111/j.1748-5827.1973.tb06467.x

³ Houlton JEF. (1980) Anal furunculosis: a review of seventy cases. *Journal of Small Animal Practice*, 21: 575-584. DOI: 10.1111/j.1748-5827.1980.tb01359.x

⁴ Shearer DH. and Day MJ. (1997) Aspects of the humoral immune response to *Staphylococcus intermedius* in dogs with superficial pyoderma, deep pyoderma and anal furunculosis. *Veterinary Immunology and Immunopathology*, 58: 107-120. DOI: 10.1016/s0165-2427(97)00029-9

⁵ Day MJ. and Weaver BMQ. (1992) Pathology of surgically resected tissue from 305 cases of anal furunculosis in the dog. *Journal of Small Animal Practice*, 33: 583-589. DOI: 10.1111/j.1748-5827.1992.tb01062.x

⁶ Kennedy LJ. et al. (2008) Risk of anal furunculosis in German Shepherd dogs is associated with the major histocompatibility complex. *Tissue Antigens*, 71: 51-56. DOI: 10.1111/j.1399-0039.2007.00964.x

⁷ Cain CL. (2019) Canine perianal fistulas: Clinical presentation, pathogenesis, and management. *Small Animal Practice*, 49: 53-65. DOI: 10.1016/j.cvasm.2018.08.006

⁸ Griffiths LG. et al. (1999) Cyclosporin as the sole treatment for anal furunculosis: preliminary results. *Journal of Small Animal Practice*, 40: 569-572. DOI: 10.1111/j.1748-5827.1999.tb03023.x

⁹ Mathews KA. and Sukhiani HR. (1997) Randomized controlled trial of cyclosporine for treatment of perianal fistulas in dogs. *Journal of the American Veterinary Medical Association*, 211: 1249-1253.

AN EVIDENCE-BASED PLAN TO CONTROL MASTITIS IN DAIRY COWS

British Cattle Veterinary Association

Controlling mastitis in dairy cattle saves farmers money, improves animal welfare and leads to large reductions in the use of antimicrobial agents. An evidence-based approach that gathers and uses farm-specific data to tailor infection control to individual farms has led to significant reductions in clinical and sub-clinical cases of mastitis on farms that have complied with the scheme advice to date.

Mastitis in dairy cattle is a significant problem. In the UK, 31% of dairy cows are affected by clinical mastitis, and at any time, 18% are affected by sub-clinical mastitis, at an annual cost of around £200 million^{1,2,3}.

As well as these financial losses, mastitis also affects the quality of milk, has a negative impact on cow welfare, and is responsible for a large percentage of the antimicrobial doses administered within the dairy industry⁴ — so its control is imperative.

Generic approaches, such as those in a five-point plan introduced in the 1970s⁵, including following proper milking procedures; ensuring proper maintenance and use of milking equipment; and monitoring udder health⁶

“A farm-specific approach to the control of mastitis, with evidence at its heart, resulted in a reduction in clinical and sub-clinical mastitis of 20% in a one-year period.”

have been implemented to varied extents for many decades, and have helped reduce the incidence of contagious mastitis (organisms spreading from cow to cow) to some degree. However, environmental mastitis, where the reservoir of pathogens is in the cow's environment, has continued to be a substantial problem⁷.

In 2009, the UK's Agriculture and Horticulture Development Board introduced a Mastitis Control Plan⁸ based on a farm-specific, rather than generic, approach to the control of mastitis, with evidence at its heart. The plan included a novel strategy to evaluate farm data to 'diagnose' infection patterns, using a trained advisor to identify likely contributory factors and a software-enhanced method to select the most beneficial interventions for individual farms. A randomised controlled trial showed that the plan resulted in a reduction in clinical and sub-clinical mastitis of 20% in a one-year period⁹. Subsequent analysis of farms enrolled in the scheme showed an average reduction of 10–20% year-on-year.

Since then, the scheme has been further refined to identify the most cost-effective control strategies tailored to specific farm circumstances. An automated software tool is now also used for making the initial farm disease pattern 'diagnosis'¹⁰.

More than 500 veterinary surgeons and advisors have been trained to deliver the plan. This training is ongoing, with new participants being enrolled each year and current plan deliverers participating in continuing professional development to keep their skills up to date.

So far, the Mastitis Control Plan has been implemented either in full, or in part, on farms holding 25–30% of British dairy cows, and is estimated to have generated savings to the British dairy industry to the order of £5–10 million per annum².

¹ Bradley A.J. (2002) Bovine mastitis: an evolving disease. *The Veterinary Journal*, 164: 116–128. DOI: 10.1053/tvjl.2002.0724

² GB Cattle Health and Welfare Group. (2018) Fourth Report. Available at: <http://beefandlamb.ahdb.org.uk/wp-content/uploads/2018/10/CHAWG-Fourth-Report-2018.pdf>

³ Hanks, J. et al. (2012) Key Performance Indicators for the UK national dairy herd. A Study of Herd Performance in 500 Holstein/Friesian herds for the year ending 31st August 2018. Available at: <https://www.nmr.co.uk/download/documents/32>

⁴ Elkins, P. et al. (2018) The use of an antimicrobial practice sales report to identify prescribing patterns and as an active tool in herd health management. 30th World Buiatrics Conference 2018, 31–32.

⁵ Dodd, F.H. et al. (1970) Mastitis control. *Biennial Review National Institute Research Dairy*, 21–60.

⁶ National Mastitis Council. (2007) NMC's 10-point mastitis control plan. *Western Dairy Digest*, Winter 2007. Available at: <http://www.dairyweb.ca/Resources/WDD82/WDD8212.pdf>

⁷ Bradley, A.J. et al. (2007) Survey of the incidence and aetiology of mastitis on dairy farms in England and Wales. *Veterinary Record*, 160: 253–258. DOI:10.1136/vr.160.8.253

⁸ Agriculture & Horticulture Development Board. (2009) Dairy Mastitis Control Plan. Available at: <http://www.mastitiscontrolplan.co.uk/>

⁹ Green M.J. et al. (2007) National intervention study of mastitis control in dairy herds in England and Wales. *Veterinary Record*, 160: 287–293. DOI:10.1136/vr.160.9.287.

¹⁰ Agriculture & Horticulture Development Board. (2018) Mastitis Pattern Analysis Tool. Available at: <http://dairy.ahdb.org.uk/mastitis-pattern-tool>

MAKING SOUND CLINICAL DECISIONS ABOUT COLIC



British Equine Veterinary Association

Colic is one of the most common causes of death in horses¹ — but differentiating between life-threatening cases requiring surgery, and more straightforward ones, has been a major challenge. A non-invasive technique called transabdominal ultrasound examination is now transforming the evaluation of colic in many equine hospitals and practices.

Colic is defined as acute abdominal pain, and it can have numerous causes — most of which respond favourably to medical treatment, such as pain killers. However, in some 10–15% of cases, colic is the result of life-threatening intestinal disease, which requires urgent surgery^{2,3}. Differentiating 'surgical colics' from 'medical colics' can be difficult, especially in the early stages, because the clinical signs of abdominal pain are non-specific and similar, regardless of the underlying cause. However, an early diagnosis and early surgical treatment are vitally important to maximise survival in more serious cases⁴.

Numerous studies have demonstrated the value of abdominal ultrasound in the initial evaluation of horses with colic^{5,6,7,8,9}. A rapid scan protocol (less than 15 minutes) called a Fast Localised Abdominal Scan in Horses (FLASH) was established for equine patients in 2011¹⁰ after initially being used to detect internal bleeding in people who were admitted to hospital for blunt trauma to the abdomen¹¹. The principle of this ultrasonographic technique is to aid the rapid assessment and decision-making for cases where differentiating between medical and surgical colic cases is imperative.

Although a definitive diagnosis can be obtained in only a minority of cases — such as the identification of small intestinal or caecal intussusceptions, gastrosplenic entrapments and pedunculated lipomas — ultrasound enables earlier detection of characteristic features such as small intestinal distension and reduced motility, which are highly suggestive of an obstructive lesion that usually requires immediate surgery. In one study of 158 horses with colic, distended small intestine with impaired motility was significantly associated with a diagnosis of small intestinal obstruction¹².

"The FLASH ultrasound examination provides invaluable information that, in conjunction with other clinical procedures, enables a more accurate diagnosis of the cause of acute colic."

In another study, 80% of horses with small intestinal obstruction had dilated small intestinal loops identified by ultrasound, whereas 96% of those without small intestinal obstruction did not have these findings¹⁰. Ultrasound is more sensitive than other clinical procedures (such as rectal examination) for detecting evidence of small intestinal distension⁵; the sensitivity of ultrasound for identifying small intestinal obstruction is 97% compared to only 51% for rectal examination¹³. Additionally, ultrasound can be used

in situations where rectal examination is not possible (such as in small ponies and foals). Ultrasound can also help diagnose diseases of the large colon, including left and right dorsal displacements of the colons and colon torsions.

The FLASH ultrasound examination provides invaluable information that, in conjunction with other clinical procedures, enables a more accurate diagnosis of the cause of acute colic, thereby aiding and accelerating the decision of whether or not to proceed to surgery. Since early surgical treatment is so important in maximising the success rates, the procedure has come to play a major role in optimising the outcomes of treatment of surgical colics, or, indeed, speeding up the decision to undertake euthanasia where surgery is not feasible.

- 1 Tinker MK. et al. (1997) Prospective study of equine colic incidence and mortality. *Equine Veterinary Journal*, 29: 448-453. DOI: 10.1111/j.2042-3306.1997.tb03157.x
- 2 Salem S. et al. (2016) Prevention of post-operative complications following surgical treatment of equine colic: Current evidence. *Equine Veterinary Journal*, 48: 143-151. DOI: 10.1111/evj.12517
- 3 Bowden A. et al. (2017) Early indicators of critical outcomes in horses presenting with abdominal pain (colic): retrospective study of out-of-hours first-opinion emergency cases from two practices over a three-year period (2011-2013). [Clinical research abstract]. *Equine Veterinary Journal*, 49: 13. DOI: 10.1111/evj.18_12732
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ENSURING A HUMANE DEATH FOR YOUNG FARM ANIMALS

University of Bristol

Since the first domestication of animals for farming, producers have had to make difficult decisions about newborn animals that are diseased or injured at birth. For example, it is estimated that 1 in 12 piglets may require disposal before they reach weaning age¹. Historically, these animals were either left with their mother in the hope that they might improve, left to die naturally, or dispatched as humanely as possible if there was no viable veterinary intervention.

The latter choice, humane dispatch, was traditionally achieved by manual blunt force trauma to the head, either using a weighted instrument such as a hammer or by swinging the animal against a hard surface with enough force to produce brain death. However, this method was disliked by farmers on animal welfare grounds, as it caused severe harm if unsuccessful. So, starting in 2013, experiments were conducted by the University of Bristol Animal

Welfare at Slaughter Group to ascertain whether two devices designed to mechanically stun/kill poultry would be suitable for the humane dispatch of young piglets, lambs and goats.

The initial trials involved shooting anaesthetised animals and recording brain activity to determine if the devices provided enough force to cause brain death before the animal could feel the procedure. Once both devices were found to produce an immediate and painless brain death, they were tested on animals in farm settings and post-mortem examination was

“Experiments demonstrated that both devices designed to mechanically stun or kill poultry produced enough energy to consistently and humanely kill piglets, lambs and kids up to 10kg in weight.”

subsequently carried out on the heads. These experiments demonstrated that both devices produced enough energy to consistently and humanely kill piglets^{2,3,4}, lambs⁵ and kids⁶ up to 10kg in weight.

Because of this research, farmers have a reproducible method of euthanasia for young animals that has been shown to be humane, as the devices cause brain death before the animal can feel the injury. Drawing on this research, the Department for Environment, Food and Rural Affairs is now considering recommending this method in its code of practice for farmers.

¹ Agriculture & Horticulture Development Board. (2016) AHDB Pork Yearbook 2016–2016.

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⁶ Grist A. et al. (2018) Use of a non-penetrating captive bolt for euthanasia of neonate goats. *Animals (Basel)*, 8: 58. DOI: 10.3390/ani8040058

IMPROVED DIAGNOSTICS HELPS BULLDOGS BREATHE EASIER

University of Cambridge

Their short faces may endear them to their owners, but breathing and sleeping difficulties, together with exercise intolerance and reflux problems, are common issues for Bulldogs and pugs. A recent project, which sought to identify which dogs were the most likely to benefit from surgery by gathering data from large numbers of animals, has led to the introduction of new surgical techniques to alleviate some of these breeds' difficulties. It has also prompted the development of a screening tool (the Kennel Club and University of Cambridge Respiratory Function Grading Scheme) that could help dog breeders select which animals are the most likely to produce healthy offspring.

Brachycephalic obstructive airway syndrome (BOAS) is found predominately in the extreme brachycephalic dog breeds — the pug, French Bulldog and Bulldog. It affects around 50% of dogs in each breed and is caused by breeding for a wide, flat head¹. The physical difficulties faced by dogs suffering from this condition impact their quality of life and shorten their lifespan.

A major problem with BOAS is that it is often under-recognised by both the public and veterinary professionals. The BOAS research group partly developed out of frustration from reading papers on good and excellent outcomes in dogs after surgery, which did not match the clinical cases that the group was seeing.

Over the past ten years the research group has developed and published a non-invasive objective method for diagnosing BOAS in the three extreme brachycephalic breeds. This diagnostic test is called whole body barometric plethysmography (WBBP) and involves dogs sitting in a clear perspex chamber, similar in size to a kennel, where

pressure changes caused by humidifying air during breathing are translated into respiratory flow. It was developed after collecting data from large numbers of dogs that were affected by BOAS to different degrees, including control dogs that had no evidence of disease^{1,2}.

Using the same data, the group also investigated risk factors for BOAS within its data set (which now includes more than 1,500 dogs), and the effectiveness of surgical treatments and the different diagnostic

“A project which sought to identify Bulldogs and pugs most likely to benefit from surgery by gathering data from large numbers of animals has led to new surgical techniques to alleviate difficulties.”

techniques for the condition. The risk factors include narrowed or 'stenotic' nostrils and having a high body condition score or obesity³. The group also developed a clinical grading system based on examining the throat before and after a short exercise test designed to increase breathing demand. This enables an assessment of whether the BOAS is severe enough to require intervention. This grading system has also allowed the group to interrogate the genetic background of this disease — using the presence or absence of airway disease to search for changes in the genome — which the group will use to develop a genetic test to aid dog breeders.

Having established that this surgery is effective⁴, but that some dogs respond better than others, the research group has introduced a new surgical technique to its clinic called laser assisted turbinectomy (LATE), which was previously only available in one other clinic in Germany. This procedure removes some of the excessive nasal tissue (aberrant turbinates) to improve airflow. The research group uses LATE on dogs that do not respond to traditional surgery and has documented that it results in less obstructive breathing and an improvement in clinical signs — particularly decreased sleep disorders and regurgitation⁵.

¹ Liu NC. et al. (2016) Whole-body barometric plethysmography characterizes upper airway obstructions in 3 brachycephalic breeds of dogs. *Journal of Veterinary Internal Medicine*, 30: 853-65. DOI: 10.1111/jvim.13933

² Liu NC. et al. (2015) Characterisation of brachycephalic obstructive airway syndrome in French bulldogs using whole-body barometric plethysmography. *PLoS ONE*, 10: e0130741 DOI: 10.1371/journal.pone.0130741

³ Liu NC. et al. (2017) Conformational risk factors of brachycephalic obstructive airway syndrome (BOAS) in pugs, French bulldogs, and bulldogs. *PLoS ONE*, 12: e0181928. DOI: 10.1371/journal.pone.0181928

⁴ Liu NC. et al. (2017) Outcomes and prognostic factors of surgical treatments for brachycephalic obstructive airway syndrome in 3 breeds. *Veterinary Surgery*, 46: 271-280. DOI: 10.1111/vsu.12608.

⁵ Liu NC. et al. (2019) Objective effectiveness of and indications for laser-assisted turbinectomy in brachycephalic obstructive airway syndrome. *Veterinary Surgery*, 48: 79-87. DOI: 10.1111/vsu.13107

HORMONAL ROOTS OF EQUINE LAMINITIS

University of Liverpool



Laminitis, one of the most common causes of lameness in horses, ponies and donkeys, may be caused by dysregulated hormones. This discovery, which overturns previously held theories about laminitis, is paving the way for a more evidence-based approach to diagnosing, preventing and treating this debilitating condition.

Laminitis is a painful condition of the tissues (lamellae) that bond the hoof wall to the pedal (coffin) bone in horses' hooves, and it affects up to a third of equids during their lifetime. In severe and recurring cases, it can result in chronic painful lameness or the horse being euthanised to prevent further suffering.

Although researchers have been investigating the causes of laminitis for many years, most of the attention has centred on laminitis associated with severe acute illness as a result of gastrointestinal accidents such as grain overload.

"Systematic investigation led to the ground-breaking discovery that laminitis can be directly caused by insulin."

However, laminitis can also develop when horses have hormonal dysregulation caused by more insidious endocrine disease.

Over the past decade and a half, researchers at the University of Liverpool Institute of Veterinary Science have systematically investigated such 'endocrine laminitis' in horses and ponies with naturally occurring

endocrine disease. This led to the ground-breaking discovery that laminitis can be directly caused by insulin — an important hormone that is involved in the uptake of dietary glucose by the body's tissues¹.

By demonstrating a distinct new cause, laminitis is now considered to be a clinical syndrome associated with an underlying disease in the majority of cases, rather than a discrete disease entity.

Indeed, further research has shown that endocrine laminitis is responsible for over 90% of laminitis in animals presenting (primarily) for lameness.

As a result, clinical decision-making is now focused on investigating the underlying cause of laminitis and directing treatment and prevention strategies appropriately. Veterinary surgeons and horse owners are increasingly aware that this approach is pivotal for improving laminitis management.

Meanwhile, the discovery has opened up new areas of research into the endocrine diseases that cause laminitis — equine metabolic syndrome and equine pituitary pars intermedia dysfunction (Cushing's disease) — together with the best ways to manage them. It is also paving the way for an improved understanding of laminitis by the veterinary industry — particularly the identification of treatable causes to prevent recurrence. This should, in turn, feed into future research and treatment.

¹ Patterson-Kane JC. et al. (2018) Paradigm shifts in understanding equine laminitis. The Veterinary Journal, 231: 33-40. DOI: 10.1016/j.tvjl.2017.11.011

It's common for horse owners to be distressed if their animal is showing signs of colic: up to a fifth of such cases may be 'critical', requiring intensive care, surgery, or for the horse to be euthanised (which happens in around 70% of such cases)^{1,2}. Yet, colic can be difficult for owners to recognise because the signs and severity can vary³ — and there are various possible causes of the abdominal pain. There is also significant variation in the advice given by veterinary practice staff taking emergency calls from owners on colic⁴, and how vets assess and investigate horses with the condition⁵.

The Nottingham Equine Colic Project was set up to review current evidence about the condition⁶; to generate new data from horse owners and vets about how colic is recognised and responded to^{1,2}; and to work with horse owners, vets and charities to develop educational resources to help with decision-making⁷.

In response to this evidence, the project team collaborated with The British Horse Society to develop and launch the REACT campaign in 2016. It provides free resources for horse owners, including fact sheets, videos, posters and pocket cards based on the common and critical signs of colic, as well as the key steps in decision-making⁸.

"In response to evidence, the team provided free resources for horse owners on signs of colic and decision-making steps, and for vets on primary assessment, differentiating critical cases and telephone triage."

Free resources for vets on primary assessment, and on differentiating critical cases were also launched in 2017⁹. The final resource with guidance on telephone triage of cases with colic (again based on evidence from veterinary practices⁴) closes the link between owner and veterinary assistance and is now freely available to vet practices through the British Equine Veterinary Association website.

Surveys of vets and horse owners in 2017 showed that 37% of owners were aware of the REACT resources, and 12.9% were actively using them in decision-

making; 56% of vets were aware of the resources, and although the majority (70–77%) had not changed their assessment or diagnostic approach, 32% reported increased confidence in their decisions¹⁰. Another, unpublished survey conducted the following year assessed whether owners had changed their behaviour, were thinking about doing so or were not going to change what they currently did. It showed that those who were aware of the REACT campaign were more likely to implement preventative recommendations, such as performing regular health monitoring (taking heart rate and temperature) and having an emergency plan in place.

To further increase the impact of the campaign, the team launched the 'REACT Colic Champions' scheme with The British Horse Society in December 2018. Currently, there are 66 vet practices acting as 'champions' across the UK, each of which will hold two client education evenings and release six newsletter articles and ten social media posts over a 12-month period, using materials produced by the REACT team.

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³ Bowden A. et al. (2015) Colic: Horse owner knowledge and experience. [Clinical research abstract]. Equine Veterinary Journal, 47: 4. DOI: 10.1111/evj.12486_8

⁴ Lightfoot KL. et al. (2018) Investigation into the telephone triage of colic cases within UK veterinary practice. [Clinical research abstract]. Equine Veterinary Journal. 50: 7-8. DOI: 10.1111/evj.05_13008

⁵ Curtis L. et al. (2015) Veterinary practitioners' selection of diagnostic tests for the primary evaluation of colic in the horse. Veterinary Record Open, 2: e000145. DOI: 10.1136/vetreco-2015-000145

⁶ Curtis L. et al. (2014) Systematic review of risk factors for equine colic. [Clinical research abstract]. Equine Veterinary Journal, 46: 21. DOI: 10.1111/evj.12323_47

⁷ Freeman SL. and Curtis L. (2015) Developing best practice guidelines on equine colic. Veterinary Record, 176: 38-40. DOI: 10.1136/vr.g7688

⁸ The British Horse Society. (2019) REACT now to beat colic. Available at: www.bhs.org.uk/colic

⁹ Vet React. Available at: <http://www.react.vet>

¹⁰ Lightfoot KL. et al. (2018) Impact of an educational campaign on owner knowledge and approach to equine colic. [Clinical research abstract]. Equine Veterinary Journal, 50: 7. DOI: 10.1111/evj.04_13008

RAPID DIAGNOSTIC TESTS TO REDUCE ANTIMICROBIAL RESISTANCE

University of Surrey

Treating infections in animals is a tricky balance: ideally, you'd like to know the pathogen you're dealing with to enable the prescription of targeted, narrow-spectrum antibiotics. However, traditional diagnostic tests can take days, so many clinicians will instead prescribe broad-spectrum antibiotics. These kill sensitive bacteria but leave behind resistant species, which then thrive and may spread between animals, resulting in infections that are increasingly difficult to treat. Thanks to a more rapid and accurate method of identifying causative pathogens, clinicians should increasingly be able to make more evidence-based decisions about the best course of treatment for sick animals.

Antimicrobial resistance (AMR) is a global issue and by 2050 will cost the worldwide economy an estimated \$100 trillion due to increased healthcare costs in humans, reduced livestock outputs of between 2.6% and 7.5% per year, its impact on global GDP and the loss of human and animal life¹. Modern veterinary medicine depends on effective antibiotics to reduce morbidity and mortality in both food-producing animals and domestic pets. In livestock alone, 63,151 tons of antibiotics were used globally in 2010, with estimates suggesting an increase of 67% by 2030². It is imperative that

the efficacy of antibiotics is preserved for the future treatment of bacterial infections in animals. There are several reasons for the acceleration of AMR worldwide, but one of the main and most difficult issues to address is the unnecessary and inappropriate prescription and use of antimicrobials.

The School of Veterinary Medicine at the University of Surrey has developed a new molecular diagnostic technique, called loop-mediated isothermal amplification (LAMP). It allows bacterial pathogens

"A new molecular diagnostic technique allows bacterial pathogens and the factors that determine resistance to be detected and identified within minutes."

and the factors that determine resistance to be detected and identified within minutes, rather than hours or days, as is often the case with traditional diagnostics^{3,4}. It therefore has the potential to improve infection survival rates in animals and reduce healthcare-associated costs and morbidity resulting from AMR.

The new approach has been evaluated and validated using clinical samples provided by the School's veterinary partner practices in the UK. The evidence from the evaluation shows that it delivers crucial diagnostic information more rapidly than traditional methods and has led to the accurate diagnosis of infection-causing bacteria in hundreds of companion animals, such as dogs and cats, over the past seven years.

The next challenge is miniaturising this technology onto a portable device — similar to a pregnancy test — which would allow a pathogen to be detected from an animal sample in minutes and, crucially, at the point of care, enabling the immediate prescription of directed therapies.

¹ The Review on Antimicrobial Resistance. (2016) Tackling drug-resistant infections globally: Final report and recommendations. Available at https://amr-review.org/sites/default/files/160518_Final%20paper_with%20cover.pdf

² Van Boeckel TP. et al. (2015) Global trends in antimicrobial use in food animals. PNAS, 112: 5649-5654. DOI: 10.1073/pnas.1503141112

³ Diribe O. et al. (2014) Design and application of a loop-mediated isothermal amplification assay for the rapid detection of *Staphylococcus pseudintermedius*. Journal of Veterinary Diagnostic Investigation, 26: 42-48. DOI: 10.1177/1040638713516758

⁴ Hornsey M. et al. (2017) Development and validation of loop-mediated isothermal amplification (LAMP) assays for the detection of *Acinetobacter* spp., *Corynebacterium* spp., *Enterobacter* spp. and *Streptococcus canis* recovered from surgical site infections (SSIs) of companion animals. Poster presented at the Bridging the Gaps National Symposium, University of Warwick. DOI: 10.13140/RG.2.2.17336.03841

REDEFINING EPILEPSY IN DOGS

Royal Veterinary College

Faced with a seizing dog, many vets will turn to human epilepsy drugs — even though these are often ineffective. However, a refinement in thinking about both the causes of epilepsy and its treatment is prompting the development of novel therapies for the condition.

Dogs experiencing seizures are common visitors to UK veterinary practices. Although vets usually work hard to identify a specific underlying cause, such as poisoning, trauma, a brain tumour or inflammation, most animals are eventually diagnosed with epilepsy of unknown origin. Such 'idiopathic epilepsy' is the most common chronic brain condition in pet dogs, affecting around 70,000 out of the 11.6 million dogs in the UK. It is typically diagnosed between six months and six years of age, with German Shepherds and Border Terriers particularly susceptible to it.

Traditionally, veterinary medicine has defined epilepsy as a purely seizure disorder, with a number of anti-epileptic drugs (AEDs) originally developed for people becoming the mainstay of treatment. Yet, a recent meta-analysis that

"Studies are widening the management options for dogs with epilepsy, and put the use of dietary supplements on more solid scientific ground."

reviewed the efficacy of 11 AEDs for the treatment of canine epilepsy concluded that just four medications were likely to be effective¹. Indeed, using this traditional medical approach, more than two-thirds of dogs with epilepsy continue to have seizures longterm and 20–30% remain poorly controlled — often earning them the label 'drug resistant'.

Increasingly, however, those treating human epilepsy are recognising the value of a more holistic approach, and this is being investigated in veterinary medicine as well. Following the success of ketogenic diets in paediatric epilepsy patients, a randomised controlled trial (RCT) of a diet enriched with medium chain triglycerides (MCTs) proved effective in a subset of dogs with drug-resistant epilepsy, reducing seizure frequency². In the same study, the MCT-enriched diet was also found to improve recently discovered behavioural comorbidities of epilepsy, such as anxiety and hyperactive behaviour, in dogs with idiopathic epilepsy³. Meanwhile, a new RCT is investigating whether supplementation with MCT oil can help to manage seizures and other comorbidities when added to a variable base diet⁴. Such studies widen the management options for dogs with epilepsy, and put the use of dietary supplements — often given by owners without good evidence for their efficacy or tolerance⁵ — on more solid scientific ground.

¹ Charalambous M. et al. (2014) Treatment in canine epilepsy – a systematic review. BMC Veterinary Research, 10: 257. DOI: 10.1186/s12917-014-0257-9

² Law TH. et al. (2015) A randomised trial of a medium-chain TAG diet as treatment for dogs with idiopathic epilepsy. The British Journal of Nutrition, 114: 1438-1447. DOI: 10.1017/S000711451500313X

³ Packer RM. et al. (2016) Effects of a ketogenic diet on ADHD-like behavior in dogs with idiopathic epilepsy. Epilepsy & Behavior, 55: 62-68. DOI: 10.1016/j.yebeh.2015.11.014

⁴ American Kennel Club Canine Health Foundation. (2016) Investigating a ketogenic medium-chain triglyceride (MCT) supplement for the treatment of drug-resistant canine idiopathic epilepsy and its behavioral comorbidities. Available at: <http://www.akcchf.org/research/research-portfolio/2252.html>

⁵ Berk BA. et al. (2018) Investigating owner use of dietary supplements in dogs with idiopathic epilepsy. Research in Veterinary Science, 119: 276-284. DOI: 10.1016/j.rvsc.2018.07.004

TRANSLATING EVIDENCE INTO POLICY

Veterinary Policy Research Foundation



A wise man proportions his belief to the evidence, wrote the Scottish philosopher David Hume. Similarly, the success of a democratic society surely lies with the ability of its leaders and policy-makers to make well-informed judgements. Yet, primary scientific research published in journals often describes a very technical and specific area of interest, which may be impenetrable or of limited use when it comes to writing policy.

Evidence-informed policy-making uses the same core principles as evidence-based medicine, but also considers the wider political context surrounding decisions, such as public opinion or cost. Getting to grips with the technical or socioeconomic context of any policy, however, relies on the existence of sufficiently good quality research.

Sitting at the interface between science and politics, the Veterinary Policy Research Foundation (VPRF) aims to facilitate this process by providing an accessible review of existing evidence and its political context. We do this by synthesising

multiple sources of evidence across a broad topic area, and then reporting it in an impartial and concise way, while trying to reflect the depth of complexity that surrounds many policy issues. These publicly available FactFiles are rigorously researched, acknowledge any limitations in the evidence base, and include a one-page summary to meet the demands of even the most time-pressed decision-makers.

To date, our FactFiles have addressed issues core to ongoing work in the UK Parliament, including antimicrobial resistance, non-stun slaughter and

"In the face of new evidence, the Chief Medical Officer and the former Department of Health Under Secretary of State have acknowledged the improvements achieved in the UK agriculture sector."

conformation deformities in dogs¹. In the case of antimicrobial resistance, the continued collation of data from both the medical and veterinary sectors has helped to quash the blame culture that previously existed between them, where antibiotic use in farm animals for growth promotion was often cited as a driver, when in fact its practice had been banned in Europe in 2006². In the face of new evidence, medical leaders such as the Chief Medical Officer, Sally Davies, and former Department of Health Under Secretary of State, Lord Prior, have since acknowledged the improvements achieved in the UK agriculture sector³.

Politicians have also drawn on insights from the FactFiles in policy debates at Westminster. For instance, peers including former Department for Environment, Food and Rural Affairs minister Lord Rooker were able to use relevant evidence set out in our FactFiles on non-stun slaughter during the sometimes controversial parliamentary debates on this issue, during which the practice was often conflated with religious slaughter⁴. Statistics detailed in the same document were also used to support a change in the debate title from — Ritual Slaughter to the more appropriate Non-Stun Slaughter — when we presented them to the Hansard staff charged with creating the official parliamentary record of proceedings⁵.

Documents such as these can often be the missing link between published evidence and driving change in the real world, and this is just as important in veterinary science as it is in other areas of government policy.

¹ Veterinary Policy Research Foundation. (2018) Fact files and Briefings. Available at: <https://vprf.wordpress.com/publications/>

² Hansard House of Lords Debate. (2016) Drug-resistant infections. Available at: <https://hansard.parliament.uk/Lords/2016-09-15/debates/D3D73A1B-5818-413D-A57E-BC09598429FE/Drug-ResistantInfections>

³ Sky News. (2018) Chief medical officer urges public to buy organic meat. Available at: <https://news.sky.com/story/buy-organic-meat-to-avoid-antibiotic-resistance-top-medical-officer-says-11557913>

⁴ Hansard House of Lords Debate. (1981) Meat exports and ritual slaughter. Available at: <https://api.parliament.uk/historic-hansard/written-answers/1981/apr/01/meat-exports-and-ritual-slaughter> and [https://hansard.parliament.uk/Lords/1981-12-07/debates/95676715-c18c-4881-9b65-67bbb0c67bc9/SlaughterOfAnimals\(Amendment\)BillHl](https://hansard.parliament.uk/Lords/1981-12-07/debates/95676715-c18c-4881-9b65-67bbb0c67bc9/SlaughterOfAnimals(Amendment)BillHl)

⁵ Hansard House of Lords Debate. (2018) Abattoirs: Non-stun slaughter. Available at: <https://hansard.parliament.uk/Lords/2018-02-07/debates/F6F1A838-A275-4205-A2C9-EFBE097F63AE/AbattoirsNon-StunSlaughter>



LOOKING TO THE FUTURE

EVIDENCE-BASED VETERINARY MEDICINE MATTERS.

We believe that evidence-based veterinary medicine (EBVM) is core to the future development of the profession and its ongoing drive to deliver high-quality care. Yet we know that implementing EBVM is challenging. Not only do veterinary professionals have limited time in which to keep up to date with the current published evidence, the evidence may be weak or absent for certain species and conditions.

For EBVM to truly flourish, a large body of high-quality, relevant and patient-centred research needs to be available to all veterinary surgeons and veterinary nurses, to enable them to appraise the literature and translate the evidence into everyday practice. This will require continued training at postgraduate and undergraduate levels to ensure that all members of the professions are armed with the skills required to make clinical decisions based on current, valid and relevant evidence, within the context of available resources.

It requires veterinary practices, groups and individual professionals who are committed to best practice to develop the infrastructure to provide full and rapid access to a broad library of the latest published evidence. The evidence base itself must also expand to reflect the breadth of veterinary medicine. It should provide answers for key clinical questions — some of them rare — based on well-designed and well-executed published studies, which are relevant, replicable and accessible to the end user. This, in turn, will require additional researchers and research funding.

While all of this may sound daunting, the profession continues to move towards embracing EBVM, building on the great progress it has made so far — as shown by the success stories documented here. We hope that these examples will inspire veterinary surgeons and veterinary nurses to use evidence in all clinical decision-making and will strengthen the case for greater funding for research.

RCVS KNOWLEDGE AND SENSE ABOUT SCIENCE

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ABOUT RCVS KNOWLEDGE

RCVS Knowledge's mission is to advance the quality of veterinary care for the benefit of animals, the public, and society. We are the charity partner of the Royal College of Veterinary Surgeons, and provide tools, resources and education to the professions.

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