

Advances

Supporting research to give the best care to animals



Foreword

We understand how critical clinical research is for generating new evidence that supports us in providing the best care to animals. In this report we do celebrate the breadth of research undertaken within CVS that is relevant to clinical practice and the profession, covering important topics such as antimicrobial stewardship, environmental impacts of veterinary products and workplace injuries.

This year CVS Group has adopted a new Clinical Governance Framework; a system through which we hold ourselves accountable for improving the quality of its services and cultivate a culture in which clinical care will continue to improve. It represents the first dedicated veterinary clinical governance framework for those involved in animal healthcare in the UK.

Research and development is one of the six pillars that has been outlined in this framework to represent our clinical priorities in delivering high quality of care, and further highlights the integral role that research activities, and their outcomes, have in driving clinical improvement.

In this report we outline some of the impactful research activities that are undertaken by our colleagues to support us to provide the best care to animals. We are paying particular focus to research undertaken by CVS Equine and how their strong collaborative approach has led to the generation of valuable new evidence from within general practice.

We also provide updates on a handful of the projects we are funding through our Research Grants. To maximise our ongoing impact, over the next year we will be prioritising research related to antimicrobial stewardship and have now expanded the research we fund within CVS, with all CVS residents eligible to receive upto £5,000 to contribute to research required as part of their board accreditation.

We hope you enjoy reading about our work.

Dr Imogen Schofield

Director of Clinical Research



Research & Development within CVS

Our aim:

To foster and sustain a research-positive culture that drives change through a generation of new knowledge. We want our research partners and colleagues to feel supported and empowered to participate in clinical research within their area and to capture, consolidate and disseminate key outputs.

Our priorities:

- Welfare centred research – research which is clinically important to animals, their owners, the profession or has 'one health' benefits and where further evidence is required to answer the research question through a robust study.
- Open and accessible research - research which is conducted with integrity and transparency. Findings should be disseminated and outputs reported.
- Ethical research - research which maximises benefit and minimises risk and harm to those involved. Owners should be appropriately informed; lines of responsibility and accountability should be clearly defined.

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Emily Parr, project lead and Advanced Practitioner (Small Animal Medicine), said:

“This one-of-a-kind research project led by general practitioners will provide meaningful data, relevant to first opinion practice to help us provide the best care.”

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Small animal practices lead lungworm prevalence study

CVS general practices in South West England are participating in a study looking at the prevalence of lungworm (*Angiostrongylus vasorum*) in their canine patients¹.

The study aims to increase data available on how many dogs are affected, what worming practices undertaken by dog owners and which dogs are most at risk in the geographic area - so that the disease can be caught early, to stop its spread, and so that the most relevant preventative health and treatment recommendations can be provided.

Lungworm is a potentially fatal disease caused by a parasitic worm, which travels through the blood vessels, affecting organs such as the heart and lungs. Clinical signs can include coughing, breathing problems, vomiting or diarrhoea, weight loss, not wanting to exercise and loss of appetite.

Dogs contract lungworm by eating larvae from infected snails, slugs or frogs, with foxes an intermediary host. As larvae is passed in faeces, it infects more molluscs and amphibians, making the disease spread. It has been suggested that lungworm is more prevalent in south England² but there is a general sparsity of evidence of lungworm prevalence in the UK.

If coming in for a blood test, CVS practices participating in the study are offering dogs a free lungworm test, on residual blood left over from the main sample. If positive, the practices will make contact with owners to discuss appropriate treatment.

At the time of their dog's blood test, owners will also complete a short survey on their dog's lifestyle – focusing on current worming treatment and frequency, reported clinical signs and information about their dog's exposure to certain risk factors. The survey is accessible via QR code in practice consultation rooms and completed during the time taken to obtain a blood sample with handheld tablets that have been provided. The survey results will be used to assess factors associated with identified positive cases, and to support the practices in making risk-based decisions for lungworm prevention.



The study is being run by veterinary nurses and general practitioners in participating sites from November 2023 until Spring 2024. It is expected to recruit almost 800 participants, with 600 dogs already having been tested. If successful, there will be the opportunity to expand it to more CVS practices across the country.

¹Participating practices include: White Lodge Veterinary Surgery, Okeford Veterinary Centre, Lamorna House Veterinary Centre, Tone Veterinary Centre, Clifton Villa Veterinary Surgery, Filham Park Veterinary Clinic, Seymour Vets, Silverton Vets, Rosemullion Veterinary Practice, Torbridge Vet Group and Dart Vale Veterinary Group

²Lungworm Map | My Pet and I (elanco.com)

Using CVS data to support veterinary nurse retention

First of its kind research has identified factors associated with UK veterinary nurse resignations through an examination of CVS veterinary practice data.

The research was undertaken to support the wider industry in reducing the number of nurses leaving their roles and the sector entirely. Prior to this research, evidence relating to veterinary practice staff attrition has been solely based on survey responses, which has its limitations, and further research was needed.

The CVS research identified the factors associated with lower odds of future nurse resignations. They included longer employment tenure¹ ($p < 0.001$) and working at practices with greater property and facilities ratings² ($p < 0.049$). Nurse role was associated with future resignations ($p = 0.008$), with head nurses and student nurses least likely to resign, adding to the evidence to support nursing career pathways for career development.

The employee engagement metric, eNPS, was also identified as a predictor of nurse retention reflecting similar findings in other healthcare professions. Regular measurement of employee engagement has been advocated in healthcare settings and eNPS is assessed monthly across CVS. From CVS data, eNPS has been demonstrated to be positively correlated with frequency of, and increases in,

line manager discussions, further highlighting the benefits of eNPS in identifying proactive routes to improve engagement and attrition.

The CVS study included the anonymised employment data of 1,642 veterinary nurses working across 418 UK primary-care companion animal veterinary practices at the end of 2020. It included both qualified and student nurses. Of these, 278 (16.9%) nurses resigned from their veterinary practice between 1 January to 31 December 2021³.

Schofield I, Jacklin BD. Identifying factors associated with UK veterinary nurse resignations through examination of veterinary practice data. *Vet Rec.* 2023;e3165. <https://bvajournals.onlinelibrary.wiley.com/doi/full/10.1002/vetr.3165>.

CVS¹ launches new Nursing Career Pathway. 

¹The median job tenure of all nurses was 4.3 years and differed for resigners (3.2 years) and non-resigners (4.6 years). Tenure was strongly predictive of retention, even after taking age into account which could indicate that time within a particular practice, rather than age and perhaps experience, is of particular importance.

²Assessing veterinary properties using a standard scoring system to ensure consistency. The practice property scoring was based on the combined score for three measures: appearance of the practice, clinical facilities and expected pet owner perception.

³Compared to veterinary nurse figures to date of 24.8-53.8%. [Jeffery A, Taylor E. Veterinary nursing in the United Kingdom: Identifying the factors that influence retention within the profession. *Frontiers in Veterinary Science.* 2022;9:Hagen JR, Weller R, Mair TS, Batt-Williams S, Kinnison T. Survey investigating factors affecting recruitment and retention in the UK veterinary nursing profession. *Veterinary Record.* 2022;191(12):e2078]. In human healthcare, reported turnover rates for nurses working in profession vary, with estimates ranging from 13.4% to 44.3%. Moscelli G, Sayli M, Mello M. Staff engagement, coworkers' complementarity and employee retention: evidence from English NHS hospitals. IZA Discussion Paper No. 15638. 2022. Duffield CM, Roche MA, Homer C, Buchan J, Dimitrelis S. A comparative review of nurse turnover rates and costs across countries. *J Adv Nurs.* 2014;70(12):2703-12.



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Imogen Schofield, author and Director of Clinical Research at CVS, said: *“Little objective industry data was available on the reasons behind nurse attrition. We believe this is the first study to outline the risk factors for nurse resignations using practice data, providing an important addition to the evidence-base surrounding this complex topic. Reflecting on our research, we’ve since seen our attrition rate fall and our employee engagement measure increase as we have focused on developing career pathways, empowering nurses to take on more responsibilities, developing a range of wellbeing programmes, launching a variety of colleague benefits, and significantly investing in our practices.”*

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Xavier Salord Torres, lead author and Resident in Internal Medicine at Lumbry Park Veterinary Specialists, said: ***“It is not uncommon to be presented with a cat with raised total serum bilirubin concentration in first opinion practice. But deciding on the importance and relevance of that can be difficult, even after thorough diagnostic investigations. Availability and experience with hepatobiliary surgery, and examination of biliary ducts via abdominal ultrasonography may not be widely assessable in primary practice. Therefore this evidence-based cut-off could be a very useful guide to determine when specialist referral, or advanced diagnostic investigations are required.”***

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Supporting evidence-based decisions for emergency action for cats with high serum bilirubin

Data collected from 216 cats across three CVS veterinary referral hospitals has identified a key factor that can help vets in practice predict the cats that are most at risk of biliary obstruction and therefore in need of emergency action.

Total serum bilirubin concentration is a useful biochemical variable often reported on a blood test panel as part of a thorough clinical assessment, and can provide information on several physiological functions and disease processes. Cats with hyperbilirubinaemia (high serum bilirubin concentration) often are presented with clinical icterus (jaundice) that may be identified on clinical examination. However there are many underlying causes for hyperbilirubinaemia being identified on a cat's blood test, some of which are more immediately critical than others.

This study has demonstrated that the level of hyperbilirubinaemia is important, and crucially, that cats with a bilirubin concentration $\geq 66\mu\text{mol/L}$ are more likely to have biliary obstruction, which may require emergency surgery, than those with a mildly raised bilirubin concentration.

Previous cut-offs have been reported, but were based on expert opinion and were previously higher than that identified in this new study, which could have resulted in some emergency cases being missed or investigations delayed. Therefore the study recommends that cats with bilirubin over this newly identified cut-off would be those most warranting further diagnostic imaging investigations, specifically to rule out biliary duct obstruction.

The study also identified older age to increase the likelihood of biliary obstruction, based on the cats studied, so this is useful to assess alongside bilirubin concentration.

The research was undertaken in collaboration with University of Surrey School of Veterinary Medicine.

Salord Torres X, Jeevaratnam K, Schofield I, et al. Diagnostic and predictive ability of hyperbilirubinemia severity in cats: A multicenter retrospective study. *J Vet Intern Med.* 2024; 1-8. doi: [10.1111/jvim.17005](https://doi.org/10.1111/jvim.17005).

Generation of much needed evidence into guinea pig lumps and bumps

Research on the underlying histopathological diagnoses of biopsy samples from guinea pig lumps has furthered the understanding of their health and has provided information that can support vets in practice in their discussions with concerned guinea pig owners.

Guinea pigs are reported as the fifth most common UK pet however currently there is a dearth of research dedicated to these pets¹. Various skin diseases, including palpable masses, are a major reason for presentation for veterinary care².

The study retrospectively analysed over 600 biopsy samples from guinea pigs presenting with externally palpable masses. It aimed to determine the most common tissue origins, the most frequent pathological diagnoses, and signalment data for the most commonly diagnosed lesions.

Of the 619 samples submitted from 493 animals³, 8.7% had arisen from the **mammary glands**⁴ and 2.4% from the **thyroid glands**, with the remaining 88.9% involving the skin and **subcutis**, muscle (n = 1), **salivary glands** (n = 4), lips (n = 2), ears (n = 4) and peripheral **lymph nodes** (n = 23).

7.6% of the masses were diagnosed as inflammatory, including dermatitis, panniculitis, lymphadenitis, cheilitis, myositis, sialoadenitis, abscess and chronic inflammation with osseous metaplasia. Non-neoplastic, non-inflammatory lesions accounted for a further 5.0%, namely cysts, hamartomas, hyperplastic lesions, polyps, ectopic bone formation and salivary gland steatosis.

The remainder were neoplastic (541; 87.4%) with 99 masses classified as epithelial, 347 as mesenchymal, 23 as round cell, five as melanocytic and eight as unclassified malignant neoplasms. Of these, mesenchymal neoplasms were further subdivided into benign (288) and malignant (59). Lipomas were the most common, accounting for 286 of all samples submitted.

The eight most common lesions were lipoma (46.2%), trichofolliculoma (12.3%), sarcoma (9.5%), inflammation (7.6%), lymphoma / leukaemia (3.4%), mammary carcinoma (4%), mammary adenoma (3.2%) and thyroid carcinoma (1.5%). These accounted for 87.7% of all submissions.

Dobromylskyj MJ, Hederer R, Smith KC. Lumpy, bumpy guinea pigs: a retrospective study of 619 biopsy samples of externally palpable masses submitted from pet guinea pigs for histopathology. *J Comp Pathol.* 2023 May;203:13-18. doi: 10.1016/j.jcpa.2023.04.001. Epub 2023 Apr 30. PMID: 37130485.

<https://www.sciencedirect.com/science/article/abs/pii/S002199752300213X?via%3Dihub>

¹UK Pet Food. UK pet population. (2022 April 06)

²A. Minarikova, K. Hauptman, E. Jeklova, Z. Knotek, V. Jekl. Diseases in pet Guinea pigs: a retrospective study in 1000 animal. *Vet Rec*, 177 (2015), p. 200.

³Biopsy data from Finn Pathologists, November 2013 and July 2021. Samples comprised 0.24% of all submissions to the laboratory over the study period.

⁴Masses arising from mammary glands accounted for 54 lesions in the study, with some guinea pigs having more than one mammary lesion biopsied. Of those 54 masses, 28 came from females (5 neutered), 23 from males (1 neutered) and three were from cases for which the sex had not been specified.



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Author and Finn Pathologists Diagnostic Histopathologist Melanie Dobromylskyj, said: *“This study illustrates the importance of neoplasms of the skin and subcutis in pet guinea pigs, with 87% of cases analysed having one of eight diagnoses. While most of these neoplasms are benign, a substantial minority are malignant and identifying those lesions is especially important in treatment planning. It’s also great to have had this paper picked out by the as ‘Editor’s choice’ by the Journal of Comparative Pathology.”*

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Project supervisor Pieter Defauw, Internal Medicine Specialist at Lumbry Park Veterinary Specialists, said: ***“Even though feline lower urinary tract disease is one of the most common reasons for vets to prescribe antibiotics, the prevalence of bacterial strains in the urine of cats with this condition, and their resistance to commonly used antibiotics, had not been widely studied in the UK to date. We hope this study can add to the current evidence to making well-justified and practical recommendations in practices about which antibiotics to choose and those to avoid.”***

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Investigating antimicrobial resistance in feline urine

A study has investigated the prevalent strains of bacteria in feline urine and their antimicrobial sensitivity profiles.

Bacterial urinary tract infections in European cats with feline lower urinary tract disease (FLUTD) are reported in 8–19% of cases¹. However, FLUTD is a common reason for antimicrobial drug use and therefore important when considering minimising use and development of resistance².

The study sought to understand the prevalence of bacterial species in 2,712 urine samples. Findings showed that 15.7% of these samples had a positive culture, with *E. coli* (43.7%), other Enterobacterales (26.4%) and Enterococcus spp. (14.9%) being the most common isolates identified.

Antimicrobial susceptibilities and resistances were also tested. Enterococcus species were frequently found to be resistant to multiple antibiotics, and several other isolates demonstrated resistance to frequently used antibiotics. Enterococcus spp. were much less susceptible to trimethoprim and sulfamethoxazole (TMPS) than previously documented (with 94.3% of isolates resistant). Other Enterobacterales also had resistance against cephalosporins and penicillins.

Cephalosporin resistance is particularly problematic as recent data shows the cephalosporin, cefovecin is commonly prescribed³ for cats presenting with lower urinary tract disease. The study data adds to existing evidence that the use of cephalosporins may be ineffective and therefore should be avoided, unless antimicrobial susceptibility results support their use. Its inappropriate use for bacterial cystitis could not only be ineffective, but promote further antimicrobial resistance.

To conduct the study, urinalysis results from feline urine samples were submitted and analysed by CVS' Axiom Veterinary Laboratories and Finn Pathologists over 14 months⁴. Urine samples had to have been obtained by cystocentesis and signalment information recorded by their submitting vet⁵.

D'Août, C.; Taylor, S.S.; Gelendi, S.; Atkinson, C.; Defauw, P. Bacteriuria in Cystocentesis Samples from Cats in the United Kingdom: Prevalence, Bacterial Isolates, and Antimicrobial Susceptibilities. *Animals* 2022, 12, 3384. <https://doi.org/10.3390/ani12233384>

¹ Gerber, B.; Boretti, F.S.; Kley, S.; Luluha, P.; Müller, C.; Sieber, N.; Unterer, S.; Wenger, M.; Flückiger, M.; Glaus, T.; et al. Evaluation of clinical signs and causes of lower urinary tract disease in European cats. *J. Small Anim. Pract.* 2005, 46, 571–577. <https://doi.org/10.1111/j.1748-5827.2005.tb00288.x>. Sævik, B.K.; Trangerud, C.; Ottesen, N.; Sørum, H.; Eggertsdóttir, A.V. Causes of lower urinary tract disease in Norwegian cats. *J. Feline Med. Surg.* 2011, 13, 410–417. <https://doi.org/10.1016/j.jfms.2010.12.012>. Teichmann-Knorrn, S.; Dorsch, R. Signifikante Bakteriurie der Katze: Bakterielle Harnwegsinfektion und subklinische Bakteriurie. *Tierarztl. Prax. Ausg. K Kleintiere Heimtiere* 2018, 46, 247–259. <https://doi.org/10.15654/TPK-180521>.

² Murphy, C.P.; Reid-Smith, R.J.; Boerlin, P.; Weese, J.S.; Prescott, J.F.; Janecko, N.; McEwen, S.A. Out-patient antimicrobial drug use in dogs and cats for new disease events from community companion animal practices in Ontario. *Can. Vet. J.* 2012, 53, 291–298. PMID: 22942447, PMCID: PMC3280785. Schmitt, K.; Lehner, C.; Schuller, S.; Schüpbach-Regula, G.; Mevissen, M.; Peter, R.; Müntener, C.R.; Naegeli, H.; Willi, B. Antimicrobial use for selected diseases in cats in Switzerland. *BMC Vet. Res.* 2019, 15, 94. <https://doi.org/10.1186/s12917-019-1821-0>.

³ Weese, J.S.; Stull, J.W.; Evason, M.; Webb, J.; Ballance, D.; McKee, T.; Bergman, P.J. A multicenter study of antimicrobial prescriptions for cats diagnosed with bacterial urinary tract disease. *J. Feline Med. Surg.* 2021, 24, 806–814. Burke, S.; Black, V.; Sánchez-Vizcaino, F.; Radford, A.; Hibbert, A.; Tasker, S. Use of cefovecin in a UK population of cats attending first-opinion practices as recorded in electronic health records. *J. Feline Med. Surg.* 2016, 19, 687–692.

⁴ January 2018 – February 2019.

⁵ Breed, age, sex and neutering status.

Neurologist receives BSAVA Veterinary Award for epileptic seizures research



CVS neurologist, Matthew James at Dovecote Veterinary Hospital has received the BSAVA PetSavers Veterinary Achievement Award 2024 for research providing insights into the approach to initial management of epileptic dogs in first opinion practice.

The award is presented to the first named author of the most valuable peer-reviewed research paper published in the previous 12 months, following a BSAVA PetSavers grant. Matthew's award is in recognition of his paper

Approach to initial management of canine generalised epileptic seizures in primary-care veterinary practices in the United Kingdom¹, which was selected by the

BSAVA Committee as being the most valuable of those assessed, with respect to veterinary practice. His study has explored the management of canine generalised epileptic seizures as part of data collected by the Small Animal Veterinary Surveillance Network at the University of Liverpool.

To read his peer-reviewed paper [The approach to initial management of canine generalised epileptic seizures in primary-care veterinary practices in the United Kingdom](#) please visit the [Journal of Small Animal Practice Approach to initial management of canine generalised epileptic seizures in primary-care veterinary practices in the United Kingdom - James - 2022 - Journal of Small Animal Practice - Wiley Online Library](#).

Peter Rossdale EVJ Open Award for predictors of laminitis development equine research

Edd Knowles, RCVS and European Specialist in Equine Internal Medicine at Bell Equine, was presented with the 2023 Peter Rossdale EVJ Open Award by HRH Princess Anne at this year's BEVA congress.

The award is given each year for the paper published in the Equine Veterinary Journal (EVJ) that best influences and improves clinical practice or the scientific knowledge that underpins equine veterinary medicine.

Edd has broad interests in all aspects of equine medicine with a particular interest in laminitis and hormonal disease, which he researches at the Royal Veterinary College. The award was presented to Edd for his recent paper on laminitis entitled Predictors of laminitis development in a cohort of non-laminitic ponies.

To read Edd's peer-reviewed paper please visit [Predictors of laminitis development in a cohort of nonlaminitic ponies - Knowles - 2023 - Equine Veterinary Journal - Wiley Online Library](#).

¹Which received a PetSavers grant in 2019



Edd Knowles, RCVS and European Specialist in Equine Internal Medicine at Bell Equine, was presented with the 2023 Peter Rossdale EVJ Open Award by HRH Princess Anne at this year's BEVA congress.



Research Focus: CVS Equine

CVS equine practices demonstrate their strong culture of undertaking clinical research through successful collaborative research projects. Here we highlight some key examples of this teamwork in research within both first opinion practice and our referral hospitals.

Important analysis of antimicrobial use in CVS first opinion equine practice

CVS Equine has undertaken a significant audit of antimicrobial use in first opinion practices, to deepen the understanding of prescribing patterns, identify areas for clinical improvement and create opportunities for further clinical research and guideline development.

An initial preliminary audit¹ used sales data to record antimicrobial prescriptions in 11 of the group's 22 first opinion practices. This demonstrated a decline in the quantities of antimicrobials prescribed from 2014 to 2018, including highest priority critically important antimicrobials (HPClAs) enrofloxacin and ceftiofur.

A further audit was undertaken in all 22 first opinion practices and hospitals to look more closely at the clinical indications for antibiotic use; to investigate the age, breed and estimated weight of each horse; the drugs prescribed; their dose rates; the route of administration; and, whether culture and sensitivity were used to guide antimicrobial selection.

This secondary audit was conducted using a repeated 'point prevalence' survey², where CVS Equine Quality Improvement Leads gathered information about all systemic antibiotics prescribed by each practice on one day a month for 12 consecutive months.

The project has yielded information on 331 cases where systemic antimicrobials were prescribed. Complete data about the first-line-drug selection were available for 261 prescriptions.

The commonest prescribed antimicrobial was sulfadiazine/trimethoprim (41%), followed by oxytetracycline (23%), procaine penicillin (16%), doxycycline (13%), gentamicin (4%), metronidazole (1%), ceftiofur (1%) and enrofloxacin (1%). HPClAs (ceftiofur and enrofloxacin) were only prescribed in four horses (clinical indications for these included possible sepsis, skin infection, lower respiratory tract infection and a wound complication). Overall, the clinical indications for antimicrobial use were recorded in 246 cases; the commonest indications were cellulitis/lymphangitis (27%), uncomplicated wounds (19%), surgical prophylaxis (15%), respiratory infections (11%) and skin infections (8%).

Sinclair, C., Schofield, I. & Mair, T. (2024) Antibiotic use in first opinion equine practice in the United Kingdom: Serial point prevalence surveys in 17 practices. *Equine Veterinary Education*, 00, 1–8. Available from: <https://doi.org/10.1111/eve.13945>.

CVS Equine's research has received a 'highly commended' in RCVS Knowledge Antimicrobial Stewardship Award.

¹Mair, T.S. and Parkin, T.D. (2022) Audit of antimicrobial use in eleven equine practices over a five-year period (2014-2018). *Equine Vet.Educ.* 10.1111/eve.13438).

²Used extensively in human healthcare to collect information on the prescribing practices of antibiotics, and other information relevant to the treatment and management of infectious diseases.



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Charlotte Sinclair, author, CVS Equine Development Lead and Advanced Practitioner in Equine Practice, said: ***“We have a major focus on antimicrobial stewardship. Our point prevalence surveys have been a labour-intensive piece of work, raising awareness amongst our veterinarians and requiring real collaborative effort of all practices involved. The results will be used to help develop and inform clinical guidelines for antimicrobial use in horses.”***

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Practices generate huge amount of data for equine pastern dermatitis study

CVS Equine practices have recently completed a collaborative clinical study to gather information about the clinical signs and aetiology of equine pastern dermatitis (EPD). It is expected results will help inform how to better manage these cases.

EPD, known as 'mud fever', is a common skin disease of the heels and pasterns that can have several different underlying causes, including bacterial infection, parasite (mite) infestation, fungal infection (ringworm) and inflammation of the blood vessels in the skin (vasculitis). The disease is commonly encountered in first opinion practice but can prove difficult to treat.

It is often associated with chronic wetting of the skin of the lower limbs from rain and mud, and is significantly more common in winter and on white rather than pigmented skin. The commonest clinical signs include redness of the skin, hair loss, crusting and oozing of serum. The lesions are painful, and some horses may show lameness on the affected limb(s).

Despite being a common disease, little research has been undertaken in the UK. In addition, numerous different treatments are currently used, for which there is not always robust scientific evidence.

Involving 12 CVS practices¹, samples have been collected from over 80 cases from horses that have been diagnosed with EPD throughout the UK between 2022-2024. Full blood profiles have been analysed, in addition to bacterial culture and sensitivity analysis of the lesions, PCR analysis for dermatophytes (fungi), microscopy for ectoparasites (mites, etc) and skin cytology, have been made possible through funding from a CVS research grant. An owner questionnaire has also been completed to gather information on EPD management, with supporting photographs taken. Each horse's lesions have been graded and descriptive data relating to the lesions were recorded.

Collection of all this data is now complete and a full report on the findings, along with treatment and management recommendations, is expected later in 2024.

¹Wessex Equine Veterinary Practice, B&W Equine Group, Corner House Vets, Endell Equine Hospital, Bell Equine Veterinary Clinic, Seadown Vets, South Wales Equine Vets, Severn Edge Vets, Animed Equine Veterinary Clinic, Alnorthumbria Veterinary Group and Oaklands Equine Hospital.



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Manuela Diaz Ramos, project lead and Clinical Director at Wessex Equine Veterinary Practice said: ***“We have collected a huge amount of data from this project which is going to provide us with really useful information about the underlying causes and the resistance profiles of cultured bacterial infections, and therefore inform us about the appropriateness of possible treatments. Working as a vet in first opinion practice, it is important for me that we encourage research that is relevant and can lead to changes in practice. This is the first piece of research that I have led, and it has been a really valuable experience.”***

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Characterising eosinophilic keratitis in horses in the UK

A new study has characterised the clinical appearance of horses with eosinophilic keratitis (EK), an inflammatory eye disease of the cornea and conjunctiva, by investigating their response to treatment and exploring whether there is any seasonality to the condition. The researchers also compared EK findings with horses diagnosed with non-EK ulcerative keratitis.

EK is considered to be a rare condition in horses in the UK. Anecdotal evidence suggests that the frequency of diagnosis is increasing. However, no data on EK in horses in the UK has been available.

EK is an inflammatory disease of the cornea and conjunctiva¹. Numerous aetiologies have been postulated, although the direct pathogenesis is unknown. A type IV hypersensitivity response (i.e. a delayed hypersensitivity response) is suspected and may be associated with an environmental or parasitic allergen². Treatment and management can involve topical antimicrobials as well as debridement of corneal lesions, in particular if plaques are evident. Systemic anti-inflammatories, in some cases steroids, may be important in refractory cases.

To conduct the study, corneal cytology samples were obtained from horses with ulcerative keratitis from veterinary surgeons at CVS practices and hospitals and submitted for cytological analysis using CVS research grant funding. Any horse with ulcerative keratitis, as determined by ophthalmic examination and fluorescein staining, was eligible for inclusion. A standardised form was also utilised to gather information about the horse and the lesion characteristics. A diagnosis of EK was confirmed by cytological evidence of eosinophils in the corneal sample.

Sample collection is still ongoing with 100 horses expected to be sampled. Preliminary data on 44 horses were presented as a research abstract with 9 of these diagnosed with EK (estimated prevalence 20.9%, 95% CI 11.1–36.1%)³, suggesting that EK is more common in the UK than previously thought. These preliminary results also indicated that a diagnosis of EK was significantly more likely if bilateral lesions were present ($p = 0.04$; 6/34 unilateral ulcers were EK, 3/4 bilateral ulcers were EK). Yellow/white plaques were seen in 13/39 horses with ulcerative keratitis but were not significantly associated with a diagnosis of EK ($p = 0.70$).

Eosinophilic keratitis in horses in the United Kingdom I. Johns and T. Mair study can be viewed at https://doi.org/10.1111/evj.7_13972. Preliminary results were presented as an abstract at the 2023 BEVA Congress.

¹Brooks DE, Matthews A, Clode AB. Diseases of the cornea. In: Equine Ophthalmology 3rd ed. (ed. Gilger B). John Wiley & Sons, Inc: Hoboken, NJ, USA, 2017: 252–368.

²Lassaline-Utter M, Miller C, Wotman KL. Eosinophilic keratitis in 46 eyes of 27 horses in the Mid-Atlantic United States (2008–2012). *Veterinary Ophthalmology* 2014;17(5):311–320. [PubMed] [Google Scholar]. Grinninger P, Sanchez R, Kraijer-Huwer IM, Kitslaar WJ, Schoemaker NJ, Grinwis GC, Boeve MH. Eosinophilic keratoconjunctivitis in two rabbits. *Veterinary Ophthalmology* 2012; 15(1): 59–65.

³B&W Equine Group, Corner House Vets, Valley Equine Hospital, Western Counties Equine Hospital, Wessex Equine Veterinary Practice, Scott Dunns Equine Clinic, Endell Equine Hospital, South Wales Equine Vets, Bell Equine Veterinary Clinic, Cinder Hill Equine Vets, Severn Edge Vets, Alnorthumbria Veterinary Group and Equine Veterinary Centre.

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Imogen Johns, author, Equine Medicine Specialist at B&W Equine said: *“These are preliminary results, so seasonality cannot as yet be determined. However, initial findings show bilateral lesions should increase the index of suspicion for a diagnosis of EK, whilst characteristic yellow white plaques are highly suggestive of the disorder but are not pathognomonic of EK and not always present. We hypothesise the condition will be seen in younger horses over the summer period, with clinical signs similar to those described in other countries. And we’d recommend corneal cytology is used in cases of ulcerative keratitis to diagnose potential eosinophilic keratitis.”*

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In-depth study aims to investigate colitis in adult horses

A team of CVS researchers aim to investigate and document the clinical and clinicopathological features, treatments and outcomes of colitis in UK adult horses.

There are very little published data on the underlying causes and outcomes of colitis in adult horses in the UK. Most published studies originate from North America. It is recognised that the causes of colitis vary in different geographical locations, and some of the diseases causing colitis in North America are not present in the UK.

Colitis (inflammation of the large colon) is a serious and life-threatening disease in horses. Affected animals present with diarrhoea and can rapidly become dehydrated and toxic, resulting in severe shock, multi-organ failure and death. Reports from North America suggest that about 50% of affected horses will die of the disease, despite attempted treatments.

There are many potential causes, including a variety of different bacterial and viral infections, parasites and toxicities. Unfortunately, the clinical signs of colitis (diarrhoea and signs of hypovolaemia / endotoxaemia) are similar regardless of the cause.

Diagnosis of the underlying cause depends on laboratory testing, but in many cases (around 50%) no precise cause will be established. This limits the ability to provide specific treatment. In addition, the cost of laboratory testing prevents many owners from undertaking the full range of diagnostic tests.

The new study will review 100 cases of colitis in adult horses and 100 controls referred to seven equine veterinary hospitals in the UK; five CVS equine veterinary hospitals¹ as well as Rossdales Equine Hospital and University of Liverpool's equine hospital.

A set of diagnostic tests on blood and faeces will be performed in these horses. The laboratory tests will include: small redworm serology, culture and PCR of faeces for *Salmonella* spp, PCR of faeces for *Clostridioides difficile* and *Clostridium perfringens*, ELISA of faeces for toxins of *C.difficile* and *C.perfringens*, PCR of faeces for coronavirus. The clinical features, laboratory results, treatments and outcomes will also be recorded.

The study started at the beginning of 2024 and the first horses have been recruited.

The study is supported by a research grant from CVS, and funding for the small redworm ELISA will be given from Austin Davis Biologics².

¹Bell Equine Veterinary Clinic, Endell Veterinary Hospital, B&W Equine Group, Valley Equine Hospital and Western Counties Equine Hospital
²<https://www.austindavis.co.uk/>



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Tim Mair, author, Specialist in Equine Internal Medicine at Bell Equine Veterinary Clinic, and Equine Veterinary Director of CVS , said: ***“Acute colitis accounts for around 5% of admissions to referral hospitals. And of those who are referred with it, half will not survive but there is very limited evidence available. So it’s vital that we build our evidence-base of this life-threatening condition. We hope that the outcomes of our new study will lead to a greater understanding of the causes and better inform veterinary treatment of colitis in UK adult horses.”***

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Clinical Research Grants

Two years on since the launch of our unique Clinical Research Grants, we are supporting a range of projects that are undertaken at Universities or Research Institutes. Here we share updates on some of our funded university projects and announce the scope of our next funding call.

University of Liverpool study on veterinary workplace injuries indicates that a change in attitudes to injuries and accident reporting is needed

In 2023, researchers at the University of Liverpool launched a survey on veterinary workplace injuries with CVS staff to explore how veterinary professionals define injuries, their specific causal mechanisms, and attitudes towards reporting injuries or seeking medical treatment. Analysis and write up of the 1271 survey responses are underway, with part of this work currently under peer review.

An audit of SafetyHub (CVS' Health and Safety accident reporting portal) is in progress, which will provide an estimate of the level of under-reporting of injuries that occur within veterinary practice and the context surrounding injuries that are not reported. The final 18-months of the project will be used to publish this research and disseminate the findings with the wider veterinary community, as well as to focus on the identified areas for improvement to develop evidence-based education packages around working safely to address these.

Key findings related to defining work-related injuries in the veterinary workplace:

- There is a wide-ranging perception of injury risk in practice with some harms seen as “everyday norms”.
- There are clear divisions within different veterinary sectors, and job roles, in how injuries are perceived. Small animal veterinarians expected injuries to involve blood, while equine and production animal veterinarians were more likely to expect injuries to reduce their ability to perform work and require medical treatment. In comparison, veterinary nurses, animal care assistants, receptionists, and administrators follow the standard definition of a work-related injury by the Health and Safety Executive.
- Many suggested that “all” workplace injuries should be reported, however “minor” injuries were often overlooked, for example needlestick injuries did not always meet the criteria of being an “injury”.
- Many consider hazards, such as horse kicks, needlesticks, dog bites, as everyday risks and so some do not deem them worthy of reporting.
- The work provides evidence-based direction for future improvements into veterinary workplace health and safety.



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Rebecca Jackson, CVS Head of Health and Safety, said: *“The veterinary industry is considered one of the more dangerous professions to work in; within it a sense of normalisation and inevitability of injury by veterinary professionals pervades. Within CVS we already have a strong culture of safety and are always striving for improvements. The results from this research will provide us, and the profession, with valuable information to strengthen prevention measures and improve reporting rates.”*

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University of Bristol starts to assess environmental risk from ectoparasite treatments

PhD student Clodagh Wells, a biologist with a Master's from Imperial College London's Centre for Environmental Policy, started the three year Assessing the Environmental Risk from Ectoparasite Treatments in Companion Animals study in September 2023.

She will be undertaking a large 'citizen science' study with pet owners - to understand owner use and attitudes, and laboratory assessments of companion animal ectoparasiticide residues - to provide evidence-based information on their potential environmental impact. To support her research within the University of Bristol, Clodagh will soon be undertaking placements at CVS' Highcroft Vet Group, to observe some of the discussions that accompany ectoparasiticide prescribing.

There is concern ectoparasiticides could be having an environmental impact on aquatic ecosystems¹, with studies² identifying compounds used in certain flea-treatments³ in UK waterways. It is hoped the new research will help develop appropriate approaches to prescribing and use of ectoparasiticides in the future, and inform educational strategies to support owners with 'responsible use'.

RVC assesses equine PPID quality of life using new tool

The RVC has started to assess the quality of life of equines with pituitary pars intermedia dysfunction (PPID), in a two-year longitudinal study, using its newly developed objective assessment tool.

PPID is a common hormone disease of older equines, affecting 25% over the age of 15 years. It can result in painful laminitis (50%), weight loss and lethargy. Once diagnosed, owners face increased financial and emotional burdens, due to the additional care required by the animal.

The pioneering health-related quality-of-life (HRQoL) tool allows an objective assessment of the factors that impact upon the animals, and will aid decision-making - related to treatment and euthanasia.

Owners with horses and ponies recently tested for PPID and Cushings⁴ are now being encouraged to sign up to the study. They are being asked to complete a standardised online questionnaire every three months which includes; an assessment of the animal's QoL using the RVC HRQoL tool; recording any clinical signs associated with PPID; and noting any additional veterinary-related problems. Repeated direct validation visits are also being undertaken with a subset of animals. Results from the study are expected to provide important information for veterinary professionals and owners of older horses, to minimise adverse impacts to these horses' welfare and quality of life.

More information about the study, and how to enrol, is available here: <https://rvc.uk.com/PPID-Research>.

¹Leather, S.R. (2018) "Ecological Armageddon" - more evidence for the drastic decline in insect numbers. *Annals of Applied Biology*, 172, 1-3. <https://onlinelibrary.wiley.com/doi/10.1111/aab.12410>

²Perkins, R., Whitehead, M., Civil, W. & Goulson, D., (2021) Potential role of veterinary flea products in widespread pesticide contamination of English rivers. *Science of the Total Environment*, 755, 143560. <https://www.sciencedirect.com/science/article/abs/pii/S0048969720370911?via%3Dihub>

³Fipronil and Imidacloprid

⁴That are or are not being treated with Pergolide. Pergolide is prescribed for the treatment of PPID, but its effect on laminitis frequency and QoL has not been assessed.

University of Edinburgh farm resident support for sheep mastitis project

In collaboration with CVS (Dr Rob Kelly, Head of Clinical Veterinary Education at CVS), a resident in European College of Small Ruminant Health and Management (Alberto Luque Castro) and colleagues at the University of Edinburgh (Prof Alastair Macrae and Prof Neil Sargison, Farm Animal Services) are conducting a pilot study on subclinical mastitis and its dynamics between lactations in meat producing sheep.

The main aims of this research are to investigate whether:

- Ewes without gross lesions on the udder are subclinically infected at weaning;
- Such subclinical infections are self-cleared during the dry period;
- New infections are acquired during the dry period; and,
- Ewes with subclinical mastitis at weaning and/or at lambing are likely to develop signs of clinical mastitis during lactation.

The project is being carried out on a single flock of 300 Cheviot cross breeding ewes with historically high reported incidence of mastitis. The data and milk samples are collected at two time points: weaning (summer 2023) and lambing (spring 2024).

Follow up data on clinical mastitis (acute and chronic) will be collected throughout the lactation and at the next weaning. Milk samples from each udder half will be submitted for somatic cell counts (SCC). Bacteriology will be performed only in the samples with SCC above the established threshold (according to previous literature).

The preliminary results showed that the incidence of chronic mastitis (ewes with lumps) at weaning was almost 7% (15/226). However, 40% (80/205) of the sampled ewes had at least one udder half with a SCC result above the cut off of 500,000 cells/ml, suggestive of intramammary infection.

Further analysis of the data is being carried out and final results will be obtained in August 2024.



CVS Research Grants 2024

We are proud to offer funding to colleagues and academics for veterinary clinical research that aims to benefit the animals under veterinary care, and research that supports the veterinary profession in providing the best possible care to animals. All of our funded research needs to demonstrate a clinical benefit and future impact upon veterinary practice.

Our clinical research grant funding is unique in the industry. To maximise our ongoing impact moving forward, we will be setting specific scopes around each call that we announce and have expanded the research we fund within CVS, with all CVS residents automatically eligible to receive upto £5,000 to contribute to research required as part of their board accreditation.

Scope of funding call in 2024: Research to support antibiotic stewardship across the veterinary profession

This funding call will support one PhD of upto £30,000 per annum, for a maximum of 3 years. The research must demonstrate a route to support responsible antibiotic prescribing, or infection prevention and control processes.

Examples of themes that would fall within the scope of this call include:

- i. development of novel diagnostic or sequencing methods to support antibiotic prescribing*
- ii. development and evaluation of prescribing interventions*
- iii. assessment of behavioural barriers/facilitators to implement effective infection control processes*

Apply for a CVS Research Grant

To apply to one of our awards or to find out further details about eligibility, please follow the guidance online, [here](#). Please contact us with questions at any time at clinicalresearchawards@cvs vets.com.

Applications undergo a detailed review and are scored by at least two members of the CVS Clinical Research Panel. Each application is scored on three areas: i) quality and study design, ii) clinical impact and iii) likely productivity of the proposed research.

Shortlisted applicants will be invited to join a meeting, in person or virtually, to answer specific questions from the panel before a final decision is made.

Important dates:

- Deadline for applications: 30th August 2024
- Shortlist decision and feedback communicated by: 11th October 2024
- Shortlisted application meetings: Held through November

Disc herniation is higher in Dachshunds compared with Basset Hounds

Both Basset Hounds and Dachshunds are chondrodystrophic breeds, predisposed to intervertebral disc extrusions (IVDE) however their presentation and risk factors vary. The medical histories of 188 Basset Hounds and 270 Dachshunds were retrospectively assessed at three referral hospitals. The study found that only 36.2% of Basset Hounds compared with 77.4% of Dachshunds had presented with IVDE. Basset Hounds were older (median 87.5 months), compared with Dachshunds (66.5 months). They also had a greater proportion of midlumbar (L2-L5) IVDE and were more frequently ambulatory at discharge.

Link to: Thatcher H, Targett M, Alcoverro E, Stee K, Schofield I, Lowrie M, et al. Incidence and clinical characterisation of thoracolumbar intervertebral disc extrusions in Basset Hounds compared with Dachshunds. *Vet Rec.* 2023;e3212. <https://doi.org/10.1002/vetr.3212>.

Radiographic examination study changes systematic patient follow-up

A study conducted at CVS' Bristol Vet Specialists (BVS) and Manchester Vet Specialists (MVS) has reduced the number of follow up x-rays performed for routine medial patella luxation (MPL) surgery.

Findings from the study demonstrated that if a dog made an uneventful recovery after medial patellar luxation (MPL) surgery and no abnormality was found on specialist orthopaedic examination, then radiographic findings only led to a change in treatment in 3% (13/432) of cases. This study reflects similar research on follow-up radiographs in tibial plateau leveling osteotomy (TPLO) studies, also conducted at BVS and MVS.

As a result of the MPL and TPLO studies, BVS and MVS have provided evidence that systematic follow-up radiographs for these cases need only to be performed if clinically justified.

Brincin C. The value of routine radiographic follow up in the postoperative management of canine medial patellar luxation. *Veterinary Surgery*, Volume 52, Issue 3, April 2023. <https://onlinelibrary.wiley.com/doi/abs/10.1111/vsu.13933>.



Author and BVS Surgery Resident Charlie Brincin said: ***“Radiographs are not without additional costs or risks - including radiation exposure, sedation-associated risks and strain on veterinary staff. Radiographic intervention should be clinically justified. If the dog had an uneventful recovery and is presented without owner or clinician raised concern then repeat radiographs might not be necessary. A thorough owner history and clinical examination for clinical decision-making when re-examining dogs following this orthopaedic surgery is also valuable.”***



A close-up photograph of a dog's tail and back. The dog has a reddish-brown coat with a prominent white stripe running down its back and a white tip on its tail. The background is a soft-focus green lawn.

“

Sergio Gomes, author and Head of Neurology at Dovecote Veterinary Hospital, said: ***“This is the first time that IVDE data for Basset Hounds has been directly compared with that for Dachshunds. There appears to be a marked difference between the incidence of the disease in each breed. We now need to look closely at the conformation and anatomy of the Basset Hound to see what learnings we can take. This could have positive future implications for Dachshund breeding programmes, so longer term we can try to minimise this painful and common condition.”***

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TTA offers good medium to long-term treatment for cruciate ligament failure

New research by Weighbridge Referral Centre has found tibial tuberosity advancement (TTA)-Rapid, a technique to treat cruciate ligament rupture, offers a good medium to long-term treatment outcome for canine cranial cruciate ligament failure.

Cranial cruciate ligament insufficiency (CCLI) is one of the most prevalent orthopaedic problems in canines, affecting 3% to 5% of dogs¹. It is a degenerative condition that is a common cause of pelvic limb lameness, resulting in stifle instability, mobility dysfunction and pain.

TTA is a popular surgical procedure to treat dogs showing lameness associated with CCLI. Though past research has highlighted satisfactory short (6-12 weeks)² and medium (mean 16 months)³ term outcomes, there is limited research on a longer (>16 months) follow-up periods. It has also been speculated that dogs with tibial plateau angles (TPA) of greater than 30° are not well suited for a TTA⁴.

The researchers reviewed patient records for 149 TTA-Rapid procedures. They also reviewed owner Liverpool Osteoarthritis in Dogs questionnaires from six months after surgery. The outcome was judged to be satisfactory, based on frequency of lameness,

in 63 (98.4%), while satisfactory outcomes were achieved in 61 (95.3%) based on severity of lameness and in 50 (78.1%) based on mobility score. Statistical analysis showed age, bodyweight, tibial plateau angle (TPA), meniscal injury, and concurrent patellar surgery did not influence the outcome, but time to follow-up positively correlated with mobility score (suggesting mobility declined with time from surgery).

The researchers concluded that the long-term outcome for dogs undergoing TTA-Rapid for cranial cruciate ligament disease is satisfactory. Their study also revealed no evidence to support the suggestion that dogs with TPAs of greater than 30° may be inappropriate candidates for TTA - after testing several parameters to judge outcome including frequency of lameness, severity of lameness, distance walked daily and mobility score.

TTA-Rapid for treating the canine cruciate deficient stifle: Medium to long-term outcome and analysis of risk factors **TTA-Rapid for treating the canine cruciate deficient stifle: Medium to long-term outcome and analysis of risk factors - Butterworth - Veterinary Record - Wiley Online Library.**

¹Hynes J, Manfredi JM, Shull SA. Cranial cruciate ligament disease is perceived to be prevalent and is misunderstood in field trial sport. J Am Vet Med Assoc. 2023 Jul 14:1-6. doi: 10.2460/javma.23.01.0004. Epub ahead of print. PMID: 37451677. Butterworth SJ, Kydd DM. TTA-Rapid in the treatment of the canine cruciate deficient stifle: short- and medium-term outcome. J Small Anim Pract. 2017;58:35-41. Dyall B, Schmökel H. Tibial tuberosity advancement in smallbreed dogs using TTA-Rapid implants: complications and outcome. J Small Anim Pract. 2017;58:314-22.

²1. Samoy Y, Verhoeven G, Bosmans T, Van der Vekens E, de Bakker E, Verleyen P, et al. TTA Rapid: description of the technique and short term clinical trial results of the first 50 cases. Vet Surg. 2015;44:474-84.

³Boudrieau RJ. Tibial plateau leveling osteotomy or tibial tuberosity advancement? Vet Surg. 2009;38:1-22.

⁴Boudrieau RJ. 2007 ACVS Veterinary Symposium - the surgical summit: pre-symposium laboratories: TTA Lab. October 18-21 Chicago, Illinois. Published ACVS Germantown, MD, 2007. Williams N. Cranial cruciate ligament rupture and tibial tuberosity advancement. Veterinary Times. September 14, 2009. <https://www.vettimes.co.uk/app/uploads/wp-post-topdf-enhanced-cache/1/cranial-cruciate-ligament-rupture-and-tibial-tuberosity-advancement.pdf>.



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Steve Butterworth, Orthopaedic Specialist at CVS' Weighbridge Referral Centre, said: *“This research is important in trying to ensure that decisions on whether to use this treatment modality, are based on sound clinical evidence. The only factor identified that influenced the outcome measure was that of time since surgery. All other factors, including TPA, had no effect on the outcome.”*

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