

Advances

Supporting research to give the best care to animals



The CVS Research Report

Foreword



Welcome to the first edition of Advances, our CVS Group research report.

We have written this report to highlight the

breadth of research we are undertaking with our partners and colleagues- to further improve the quality of clinical care we give to animals.

All of our funded research has a direct clinical benefit and will impact upon veterinary practice. It covers a range of conditions we see every day.

We are grateful for this critical work to date- to further knowledge, develop skills and stimulate improvement and drive our profession forward.

We are now looking to build our CVS Research Awards programme by broadening our funding support. We're keen to work with new partners on new projects to break new ground in veterinary care.

To date we are supporting 16 research projects- and we are making many more grants available this year.

So we would be keen to hear from you with your best ideas.

We hope you enjoy reading about our work to date in this issue.

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About CVS Group

CVS Clinical Research Awards

CVS is proud to grant awards to fund veterinary clinical research that aims to benefit the animals under our care, and research that supports the veterinary profession in providing the best possible care to animals.

What we fund:

- **Clinical veterinary research:**
 - We support clinical veterinary research, including Quality Improvement projects, which aim to generate new knowledge that has a direct benefit to animals under veterinary care.
- **Research supporting the veterinary profession:**
 - We fund research that aims to generate further knowledge to support veterinary practice and veterinary professionals.

These awards are eligible for CVS staff, and academics from universities or research institutes in the UK, Ireland and the Netherlands.

What we do not fund:

- We do not fund experimental research. Any interventions on animals (including obtaining samples) must be considered part of recognised veterinary practice (and fall under The Veterinary Surgeons Act in the UK). Investigators should be familiar with UK law regarding research on animals and these standards will be applied to all territories (advice is available if necessary to applicants from Ireland and the Netherlands).

Our awards:

- **Flexible research awards**
 - These could support a range of projects including PhD studentships, research projects of up to three years or small-scale projects.
 - Applications are open to CVS staff, and academics UK, Ireland and the Netherlands. Applications from practising vets and nurses are encouraged.
 - For applications where the lead applicant is from a university/research institute in the UK, Ireland and Netherlands, inclusion of a CVS employee within the investigator team is encouraged.
 - Funding of up to £45k per annum is available for up to three years. Funding can be used to cover salary costs/stipend, consumables and utilities/software specifically required for the research.
 - If supporting a PhD project, we would expect to see university funding for student fees.
- **CVS residency awards**
 - These awards support clinical veterinary research required as part of a CVS residency programme.
 - They are open to CVS residents only.
 - Funding of up to £5k for each CVS resident can be requested to cover research consumables, expenses and publication costs.
- **University residency awards**
 - These awards support clinical veterinary research required as part of a residency programme.
 - They are open to residents enrolled on a residency programme within a veterinary school in UK, Ireland or Netherlands.
 - Inclusion of a CVS employee within the supervisory team is encouraged.
 - Funding of up to £5k can be requested per resident, to cover research consumables, expenses and publication costs.



CVS Clinical Research Awards case studies



John Tulloch, Research Fellow and European Specialist in Veterinary Public Health at the University of Liverpool.

“Without the open scope of the CVS research grant - including research that benefits the veterinary profession - it is very unlikely that our research would have been funded, with veterinary funders traditionally focusing solely on animal health. By collaborating with CVS it is likely that we will have significantly more respondents to our planned survey than I could have possibly imagined through normal dissemination routes. This means the results will be highly representative of the veterinary sector and will have more power to elicit industry wide change.”



Hélène Vandenberghe, Neurology Clinician at Highcroft Veterinary Specialists. *“Our successful award has provided us with the scope to undertake research into epilepsy in Border Collies on a scale that wouldn't have otherwise been possible.”*



Melanie Dobromylskyj, Histopathologist at Finn Pathologists. *“As a successful co-applicant for a grant with researchers at the Wellcome Sanger Institute, our collaborative research links together samples collected from our large diagnostic labs, expertise from veterinary pathologists alongside dedicated researchers and world class facilities. By taking this collective approach we can contribute to veterinary knowledge on a larger scale.”*

16
awards
to date

£486,000
committed
to date

3
calls for
applications

3D printed guide to aid pituitary surgery in dogs with Cushing's disease

A new approach to improve surgery for dogs with Cushing's disease has been developed by neurology clinicians at CVS' Highcroft Veterinary Referrals¹ (Drs Nicolas Granger & Leticia Escauriaza).

The team worked to develop and assess the design of a 3D printed guide to enable safer brain surgery for a challenging procedure in dogs with Cushing's disease.

Cushing's disease is a common endocrine disease in ageing dogs that results in high levels of cortisol in the blood. Most frequently, this is due to a mass within the pituitary gland secreting cortisol. With transsphenoidal hypophysectomy surgery, the mass is removed and this offers a cure. However, this advanced surgery is challenging because of the deep location of the gland underneath the brain. The region is accessed through the mouth but this is hard to locate and contains many important blood vessels that the surgeon needs to avoid. Precision is therefore at the essence of this surgery.

The study explored whether a 3D printed surgical guide, placed in the dog's mouth, could aid specialist neurosurgeons identify the exact location of the body cavity containing the pituitary gland with accuracy.

The final design, developed with collaborators at Vet3D², Dr Bill Oxley, is a guide that locks on the dog's molar teeth and is bespoke to each patient. The 3D printed guide is created for the patient based on their CT images.

The technic is feasible in cats with acromegaly that we also operate, although we have only tested the guide on one.

The new research offers a way to support surgeons undertaking this surgery more safely. It could also help specialist veterinary neurosurgeons wishing to be trained to perform hypophysectomy, making this surgery more accessible to companion animals in the long run³.

Escauriaza L, Fenn J, McCue J, et al. A 3-Dimensional Printed Patient-Specific Surgical Guide to Facilitate Transsphenoidal Hypophysectomy in Dogs. Front Vet Sci. 2022 Jun 20;9:930856.3



Leticia Escauriaza, Neurology Clinician at Highcroft Veterinary Referrals: *“As part of my residency training, and to achieve diploma*

accreditation, I needed to undertake and publish a research project. So this award assisted me to progress with my accreditation and to publish this as a paper in the veterinary journal Frontiers in Veterinary Science. The CVS research awards meant that I could afford to pursue an area of research that I am passionate about and publish the results in a high impact journal.”

¹ soon to be Bristol Vet Specialists

² www.vet3d.co.uk

³ <https://www.frontiersin.org/articles/10.3389/fvets.2022.930856/full>



Investigating procalcitonin as a biomarker for antimicrobial stewardship in equine practice

Funded as part of the Clinical Research Awards, this antimicrobial stewardship project will assess the potential value of procalcitonin (PCT) as a biomarker for monitoring bacterial infections in adult horses.

In human and veterinary clinical practice, it can be challenging to detect early bacterial infection, and to differentiate between different types of infection. Recently, PCT has gained interest as an antimicrobial stewardship tool.

PCT is a biomarker that has been shown in people to increase in infections, specifically bacterial infections. As such it can be used to determine when antibiotics are appropriate to use, and when is the correct time to stop using them.

However, there have been limited studies looking at PCT's use in equine practice.



Currently, the only available biomarkers that can be used to guide antimicrobial therapy are serum amyloid A and

fibrinogen, but these are markers of inflammation and are not specific for bacterial infection.

This study, due to be completed in 12 months, aims to gather more information about the value of PCT as a marker of bacterial infection in horses. It could be an important step in enabling a point-of-care test to indicate appropriate antibiotic use in horses.

The project is being undertaken at CVS' Bell Equine Veterinary Clinic, led by Senior Clinician and Equine Veterinary Director, Dr Tim Mair. Over 200 adult horses admitted to the hospital are currently being enrolled into the study and are having PCT concentrations measured at various time points.

It is hoped that the research findings will help to manage the appropriate usage of antimicrobials in equine practice, both to improve patient outcomes and reduce the impact of antimicrobial resistance.



University of Bristol to assess environmental risk from ectoparasite treatments

A project at the University of Bristol has been accepted for funding, which will assess the environmental risk from ectoparasite treatments in companion animals.

Concern has been expressed over environmental contamination from these treatments. Recently there has been a fall in terrestrial invertebrate populations¹. While this has been linked to agricultural chemicals, there is concern ectoparasiticides could be a contributing factor, with a recent study² confirming compounds from flea-treatments³ in UK waterways.

However, the association with companion animal ectoparasiticides is poorly understood, with little research available to assess their true environmental consequences.

Planned to start later in 2023 and led by Professor Richard Wall, Professor of Zoology and Veterinary Entomologist, 'Assessing the Environmental Risk from Ectoparasite Treatments in Companion Animals'



will be conducted as part of CVS Clinical Research Awards. It will run for three-years as a PhD studentship.

The research intends to address questions surrounding the wider impacts of ectoparasiticide use. It will include a large 'citizen science' study with pet owners to understand owner use and attitudes. It will also include laboratory assessments of ectoparasiticide residues collected from companion animals to provide evidence-based information on their potential environmental impact.

It is hoped the 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'. The study will also look to benefit companion animals, as the research hopes to inform strategies to ensure the most appropriate control of parasitic burden to pets.



¹ Leather, 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>

² Perkins, 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>

³ Fipronil and Imidacloprid



University of Liverpool conducts largest ever study on veterinary workplace injuries

Research is being led Dr. John Tulloch, Research Fellow and European Specialist in Veterinary Public Health at the University of Liverpool, to understand more about veterinary workplace injuries and what can be done to prevent them.

The veterinary industry is considered one of the most dangerous professions to work in. In the USA it is the fifth highest profession for non-fatal injuries. These injuries can significantly impact the health and well-being of veterinary professionals.

The context, consequence and prevention of veterinary workplace injuries: a qualitative and quantitative study in the UK will be undertaken over three years in collaboration with CVS as part of its Clinical Research Awards.

First, researchers will roll out the largest ever survey to explore veterinary workplace injuries with CVS staff to explore how veterinary professionals define injuries, their specific



causal mechanisms, and why individuals do or do not report injuries or seek medical treatment. Following this an independent audit of CVS' full accident reporting system 'Safety Hub' will occur.

The results will highlight areas of the profession where injury prevention training and strategies can be developed and adopted. It will lead to the development of a suite of industry leading 'open access' educational tools aimed at promoting injury awareness and prevention to help drive behaviour change and support injury avoidance.



RVC to develop ground-breaking tool to assess quality of life for equines with common hormone disorder

The Royal Veterinary College has been awarded funding to develop a new assessment tool to evaluate the quality of life of equines suffering from common hormone disorder, Pituitary Pars Intermedia Dysfunction (PPID).

PPID is a hormone disease affecting the pituitary gland. Approximately 25-50% of equines with PPID also develop laminitis which affects the soft tissue that attaches the pedal bone to the hoof wall, and can be recurrent and potentially serious.

This can lead to extreme pain, instability of the pedal bone within the hoof capsule and in some cases, euthanasia. PPID can also manifest in weight loss, behavioural changes and lethargy – which can have a negative impact on an animal's quality of life.

The project started at the beginning of 2023 and will develop an assessment tool that can be used to objectively evaluate the quality of life in equines with PPID.



Led by Nicola Menzies-Gow, Professor in Equine Medicine, the research will take place over three years. It will; qualitatively interview equine vets and owners to determine the PPID aspects that impact quality of life most; quantitatively question a large number of owners to determine the frequency each aspect impacts quality of life; then develop a question-based tool numerical score to allow quality of life assessment interpretation.

The new quality of life tool will then be tested with 140 equines newly diagnosed with PPID over a two-year period to see how their quality of life is impacted and whether treatment with pergolide¹ improves quality of life.

Longer-term, it will help vets and owners in their decision-making when considering treatments (or in some cases, euthanasia), and help determine whether pergolide¹ has an impact on quality of life of equines.



¹ currently licensed for the treatment of PPID

Further awards funded to date

Project title	Project lead	Type of award
Pilot study to assess the role of pancreatitis in adult horses presenting with colic	Bell Equine Veterinary Clinic, CVS	Flexible research award
Eosinophilic keratitis in the UK – do we see it?	B&W Equine Vets, CVS	Flexible research award
Does invasive systolic arterial blood pressure correspond more closely to the oscillation of the sphygmomanometer needle or the return of audible sound when using non-invasive Doppler ultrasound blood pressure measurement?	Lumbry Park Veterinary Specialists, CVS	CVS residency award
Wireless ultrasound-guided peripheral artery cannulation in companion animals	Manchester Veterinary Specialists, CVS	Flexible research award
Are Border Collies with idiopathic epilepsy deficient in cobalamin?	Highcroft Veterinary Referrals, CVS	Flexible research award
Influence of radiographic examination findings on recommendations made during routine clinical re-evaluation of dogs with medial patellar luxation correction	Highcroft Veterinary Referrals, CVS	CVS residency award
Can neural language models be trained to improve clinical insights leveraged from unstructured veterinary clinical data	University of Liverpool	Flexible research award
A clinical study of pastern dermatitis (mud fever) in horses in the UK	Wessex Equine Vets, CVS	Flexible research award
Feline pan-cancer oncogenomic profiling for precision veterinary medicine and understanding of disease biology	Wellcome Sanger Institute	Flexible research award
Assessment of potential biomarkers to aid the diagnosis of canine non-indolent lymphoma, for monitoring disease remission during and after chemotherapy, and for detection of relapse	Finn Pathologists, CVS	Flexible research award
Preliminary characterisation of urinary biomarkers and urine metabolome in dogs fed raw meat-based diets versus heat-treated processed food	Lumbry Park Veterinary Specialists, CVS	CVS residency award

Apply for an award

Upcoming award deadlines

There will be one call a year for flexible research award and university residency research award applications, and two calls a year for CVS residency research awards

Current deadlines are:

Award	Deadlines(s)	Decision
Flexible research awards	12 th June 2023	August 2023
CVS residency awards	December 2022 (closed) 12 th June 2023	February 2023 August 2023
University residency awards	12 th June 2023	August 2023

How to apply:

Please submit your applications or any queries to clinicalresearchawards@cvs vets.com.

We ask for the following four documents to be submitted when applying for an award:

1. An application form (as can be found on our website www.cvsukltd.co.uk/research-awards)
2. A CV Pro-Forma for each applicant (a template is included within the application form)
3. Letter of support from line manager or head of department:
4. Ethics approval documents:

Please find further information on how to apply on our webpage.

What happens after you apply?

Your application will undergo a detailed review by at least two members of the CVS Clinical Research Panel (CRP) before being presented, considered and scored at a meeting of the CVS CRP. Each application will be scored on three areas: i) quality and study design, ii) clinical impact and iii) likely productivity of the proposed research.

We will notify you of our decision shortly after the relevant CRP meeting. Some applicants may be asked additional details about their project proposals based on questions that arose during the CRP meeting. The responses to these questions will aid the CRP in making a final decision.

If successful, you will receive communication confirming the decision outlining total project costs and specifying the date by which the project must commence. We will require a response from you accepting the award and confirming the project start date. All awards will be subject to signed acceptance of the CVS grant funding agreement (for external applicants) or CVS employee terms of agreement.

If unsuccessful, you are welcome to resubmit your application once more in a future round of award calls.



Research Focus: Neurology

Within CVS, neurology specialists and residents are actively involved with research and are helping to further advance their field. In this edition of 'Advances' we highlight some of the research that is being led by our colleagues within this discipline.

Understanding canine generalised epileptic seizure management in practice



Neurologists at Dovecote Veterinary Hospital, have provided insights into the approach to initial management of epileptic dogs in first opinion practice.

This study¹ explored data² for 3,150,713 consultations (917,373 dogs) from 224 UK veterinary practices. Findings concluded that the majority (98%) of dogs presenting for a single epileptic seizure were not started on long-term therapy; in accordance with the approach recommended by the International Veterinary Epilepsy Task Force (IVETF).

Other key findings from the study included:

- Phenobarbitone and imepitoin were the most frequently chosen anti-seizure drugs.
- Less than half of dogs presented with cluster seizures³ were prescribed anti-seizure drugs. Imepitoin was frequently selected in the treatment of cluster seizures despite no authorisation for this purpose..
- Dogs presented for cluster seizures were more likely to be prescribed anti-seizure drugs, or to be referred to a specialist, than dogs without cluster seizures.
- Of the dogs presenting with a single seizure and at least 6-month follow-up (n=165), 33 (20%) did not have subsequent seizures recorded.

From these findings, the management of cluster seizures in primary care practice appears to be one area for future focus and improvement. Unlike phenobarbitone, it is noted that the market authorisation for imepitoin does not include the treatment of cluster seizures and should be considered as "off-licence"; however, imepitoin was more frequently prescribed than phenobarbitone

in response to cluster seizures. Additionally, more than half of dogs with cluster seizures were not prescribed any anti-seizure drugs, however the presence of cluster seizures is typically considered an indication to start long-term therapy by the IVETF.

These findings may ultimately contribute to improved cohesion in the management of canine epileptic seizures between primary care and referral institutions.

Green, M., Lowrie, M., Singleton, D., et al. (2022), Approach to initial management of canine generalised epileptic seizures in primary-care veterinary practices in the United Kingdom. J Small Anim Pract, 63: 801-808.⁴



Lead author, Matthew Green: "We believe this research contributes to an improved understanding of the current management strategies for canine epilepsy in general

practice and how this compares to the current guidelines advised by the Veterinary Epilepsy Task Force. Given the prevalence of epileptic seizures within the UK canine population, as well as the large proportion of dogs that will be managed entirely within general practice without referral to a neurologist, it is vital to ensure that the level of care being provided is optimal. We therefore hope that this research ultimately supports and guides general practitioners in their approach to canine epilepsy, thereby improving the quality of life of affected dogs and their owners."

¹ the approach to initial management of canine generalised epileptic seizures in primary-care veterinary practices in the United Kingdom

² Small Animal Veterinary Surveillance Network data collected at the University of Liverpool which was funded through a grant from PetSavers

³ more than one epileptic seizure in a 24-hour period

⁴ <https://doi.org/10.1111/jsap.13543>

Does mannitol speed recovery of walking in the acute phase of paralysis in dogs?

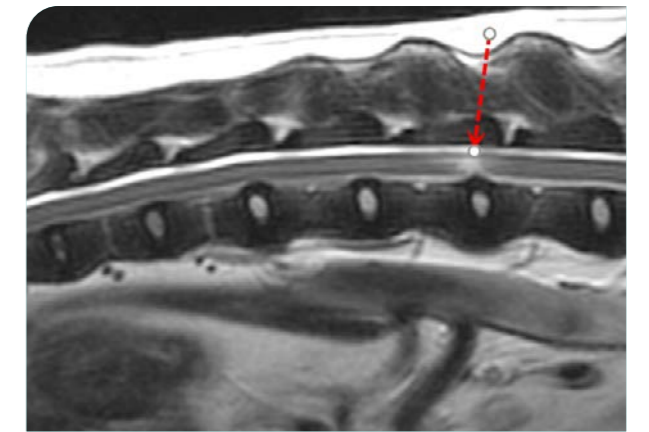
Over the last six months, the clinical neurologists at Highcroft Veterinary referrals have been undertaking a randomised control clinical trial for dogs with acute spinal cord injury.

Led by neurologists Helene Vandenberghe and Nicolas Granger, the research aims to assess the effect of mannitol on the recovery of walking function in dogs presented as emergencies for paralysis caused by disc herniation.

The team is proposing that mannitol, a sterile solution known to be effective to reduce brain swelling after trauma, can also reduce swelling in the spinal cord. The brain and spinal cord together form the central nervous system therefore in theory, the spinal cord could respond similarly to the brain to treatments against swelling when injured. This idea might help dogs to regain walking faster, compared to routine intravenous perfusion solutions currently in use.

To date 30 dogs have been successfully recruited into a preliminary analysis. As a next stage Highcroft, Dovecote and Chestergates CVS referrals hospitals have joined to increase case recruitment into a multi-centre trial and look into the magnitude of the effect of mannitol.

The result of the research could have a major impact in first opinion and referral practice on the way we manage spinal cord injury in the first hours and days after onset.



In connection with this research, the neurology team at Highcroft (Led by Drs Jon Prager and Nicolas Granger) is undertaking another research project with the objective to 'measure' swelling of the spinal cord in surgery. This is possible using the ultrasound machine at Highcroft Veterinary referrals which is uniquely equipped with a specific software that can measure how sound waves propagate within tissue, a technique called 'elastography'. In essence, ultrasound elastography gives a reading of the 'stiffness' or 'elasticity' of tissue. Due to the delicate nature of the spinal cord, it is hypothesised that its structure and therefore its elasticity changes after injury. Further data is needed to answer this however preliminary data appears to support it.





CVS neurologists further diagnosis of discospondylitis in dogs and cats

CVS neurologists at Dovecote and Vet Oracle have furthered the diagnosis of discospondylitis in dogs and addressed a paucity of research on the disease in cats.

Discospondylitis describes the infection (commonly bacterial or fungal) of an intervertebral disc and its adjacent cartilaginous end plates and vertebral bodies. The disease can be challenging to diagnose as signs are variable and sometimes vague.

Led by neurologist Sergio Gomes, the research group have published three studies based on retrospectively examined cases which presented at multiple referral sites that have furthered the understanding, clinical and imaging features of discospondylitis in dogs and cats.

During the three studies*, the researchers found that:

- Presentations of discospondylitis in cats is similar to that in dogs, although there was possible evidence of a higher prevalence of neurological dysfunction in cats. Spinal hyperaesthesia was present in all cats and pyrexia was identified in a minority of cases. Accompanying nonspecific clinical signs included lethargy, reluctance to move and jump, anorexia and weight loss. Bacterial culture was unrewarding in most cases, as in dogs, but antibiotic therapy for a mean duration of three months provided a favourable prognosis, with no long-term evidence of recurrence.
- MRI is currently the imaging modality of choice for discospondylitis however with the availability of CT in clinical practice this research

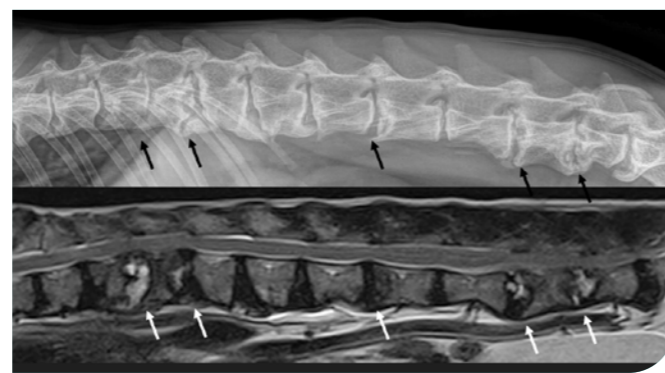
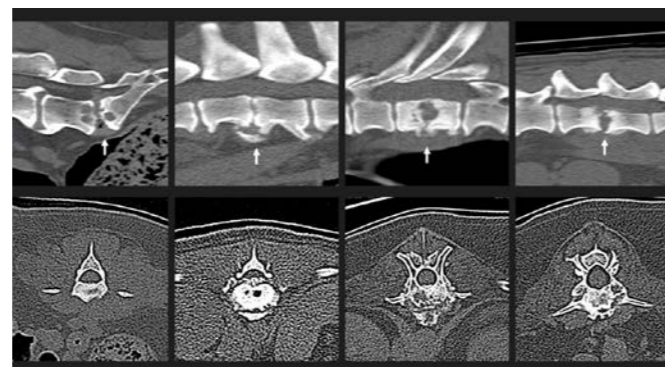
was warranted. CT presents some advantages over MRI in the diagnosis of discospondylitis such as excellent depiction of bone, FNA guidance and enhanced utility in preoperative planning of spinal surgery in instances of subluxation or fractures.

- CT imaging features can support the diagnosis of discospondylitis when performed in all three planes although equivocal cases on CT might still require MRI. Prior to this study, CT imaging features of discospondylitis in dogs and cats had not been reported.

Gomes, SA, Targett, M, Lowrie, M. Computed tomography features of discospondylitis in dogs. *J Vet Intern Med.* 2022; 36(6): 2123- 2131.¹

Gomes SA, Garosi LS, Behr S, et al. Clinical features, treatment and outcome of discospondylitis in cats. *Journal of Feline Medicine and Surgery.* 2022;24(4):311-321.²

Gomes SA, Behr S, Garosi LS, et al. Imaging features of discospondylitis in cats. *Journal of Feline Medicine and Surgery.* 2020;22(7):631-640.³



¹ <https://doi.org/10.1111/jvim.16551>

² <https://doi.org/10.1177/1098612X211020159>

³ <https://doi.org/10.1177/1098612X19869705>



About CVS Group

CVS Group is one of the leading integrated veterinary service providers in the UK, Netherlands and the Republic of Ireland.

The Group employs over 8,200 colleagues working in small animal, equine, farm and mixed practices across its three territories.

The business is focused on providing a high quality, people-led service to its customers, with outstanding and dedicated clinical and support services teams at the core of its strategy.

The Group operates an integrated model with over 500 practice sites across its three markets, including nine specialist referral centres and 34 dedicated out-of-hours sites.

The Group's diagnostic laboratories, pet crematoria and Animed Direct online pharmacy and retail business provide their services to CVS practices and third parties.



Paul Higgs, Chief Veterinary Officer at CVS Group. "Knowledge never stays still and there will always be more to learn and understand for the better of our patients, our pet owners and veterinary professionals alike. We believe it is important that the CVS Research Awards fund is available to all of our brilliant colleagues inside and outside of CVS so that, together, we can help continually improve the care our amazing profession can provide to the animals under our care."

CVS publications in 2022

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