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THE AUSTRALIAN VETERINARIAN MAGAZINE

Credabl's Helping Hand Grants return to celebrate medical, dental and veterinary practices p12

TAFE NSW sets Sydney veterinary nurse on course to boost native conservation awareness p16

Robot dog simulates heat stroke symptoms and warns of the dangers of a hot car p24

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References: 1 Paterson S, 2018. "The use of antibiotics and antimycotics in otitis." Companion Animal. 23(11): 608-613

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CONTENTS

CREDABL'S HELPING HAND GRANTS RETURN TO CELEBRATE MEDICAL, DENTAL AND VETERINARY PRACTICES

TAFE NSW SETS SYDNEY VETERINARY NURSE ON COURSE TO BOOST NATIVE CONSERVATION AWARENESS

ROBOT DOG SIMULATES HEAT STROKE SYMPTOMS AND WARNS OF THE DANGERS OF A HOT CAR P24

Cover photo by: Kerry Martin. Kyaking with her Border Collie X, Summer on Lake Argyle, Western Australia

THE AUSTRALIAN VETERINARIAN

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FIVE VETERINARY PRACTICES IN PERTH COLLECTIVELY JOIN CVS AUSTRALIA

FIVE WELL-KNOWN VETERINARY PRACTICES IN PERTH HAVE COLLECTIVELY DECIDED TO JOIN CVS AUSTRALIA.

The group of five practices - Dalkeith Veterinary Clinic, Grantham Street Vet Clinic, Mosman Park Veterinary Hospital, North Perth and Northam Veterinary Centres - are based in west, central, north and east areas of Perth in Western Australia.

The group's six owners – Clinical Directors Dr. Cameron Murray, Dr. Graeme Penno Dr. John Rees, Dr. Paul Davey, Dr. Philippa Hodgen and Lisa Penno - decided to join the CVS family believing the vast resources and support offered by the company and access to the extensive network of new colleagues will take their culture and expertise to new heights. They will all remain within the practice group.

With practice histories stretching back over 20 years, the group of veterinary practices comprise of five very well-equipped small animal clinics.

> **"We have been part of a partnership for a long time, and it feels like we have been welcomed into a larger group of friendly partners. Everyone has been so welcoming and I am looking forward to making more connections."**
>
> ***Dr. Cameron Murray***

The five general practices are community-based and well known in their local areas. They offer clients and their pets a friendly caring environment and a wide range of veterinary services including; routine health checks, vaccinations, routine surgeries, sterilisations, radiology, medical case management, dental care, nutrition counselling, parasite control, and in-house lab testing, along with grooming, boarding kennels and puppy training.

The clinical directors love the eclectic range of cases that come through their doors, while Dr John Rees enjoys challenging himself with orthopaedic surgeries, and Dr Philippa Hodgen has recently commenced offering acupuncture to her patients. Dr Graeme Penno and his wife Lisa have been servicing the rural upper Avon Valley region for over a quarter of a century, an area popular with hot-air balloon enthusiasts.

The group of veterinary practices employ a large team of 61 colleagues across their five sites. There are 23 vets who mainly treat dogs and cats but will treat all species including a wide variety of wildlife. Thirty-three veterinary nurses and support staff also work at the practices to conduct surgical cases, run nurse clinics, and care for patients.

In addition, the practices offer significant continual professional development programmes to nurture, develop and support their clinical staff with veterinary training. This also includes supporting the Australian Veterinary Association's Graduate Mentoring Programme by assisting new vets when they are starting their careers.

Dr. Paul Davey said: *"Our group chose CVS because of their focus on their people. I'm looking forward to enhancing the already great culture in our clinics through access to the many impressive resources and people offered within CVS. I can see great opportunities in career progression for my team, and am keen to harness the expertise and educational platforms now available to my team to deliver a higher quality support experience for my staff."*

Dr. Cameron Murray said: *"We have been part of a partnership for a long time, and it feels like we have been welcomed into a larger group of friendly partners. Everyone has been so welcoming and I am looking forward to making more connections."*

Graeme Cramb, Managing Director of CVS Australia, said: "*This is an exceptional group of practices with some outstanding people at its heart. We are thrilled to welcome, Cameron, Graeme, John, Lisa, Paul, Philippa and their highly experienced teams into our family. We look forward to doing everything we can to support them in their best-in-class work to provide care for animals."*

Established in 1999, CVS is one of the largest veterinary service providers in the UK. The group is now expanding its network of quality, independent practices in Australia. The group is investing up to AU$90m million each year in its practice facilities and equipment, in addition to offering industry leading training and support, to give the best possible care to animals. For more information about careers with CVS Australia visit: www.cvsvets.com.au.

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1. Data on file. **2**. MOMETAMAX Ultra Ear Drops Suspension for Dogs is a single application anti-inflammatory, anti-fungal and broad-spectrum antibacterial suspension indicated for the treatment of canine otitis externa associated with strains of bacteria susceptible to gentamicin and fungi susceptible to posaconazole. Read label for full claims.

MSD Animal Health

VETERINARY CHARITY DELIVERS RABIES PREVENTION LESSONS TO OVER 10 MILLION PEOPLE GLOBALLY

An international veterinary charity, Worldwide Veterinary Service (WVS), is celebrating educating ten million people on rabies prevention through its Mission Rabies project. The initiative, which launched in 2013, is working to eliminate canine-mediated human rabies deaths by running mass canine vaccination and community education in the world's worst hotspots for the disease.

Dogs serve as a reservoir for the disease and are the main source of transmission to humans. The charity's education programmes, conducted within schools, workplaces, and community groups, provide key information on how the rabies virus transmits, dog behaviour, and the steps to take if bitten by a dog. Members of the public are also encouraged to bring dogs for vaccination and sterilisation, and report suspect rabid animals to the local authorities or through the charity's rabies hotline.

Dr Luke Gamble, CEO and Founder of Worldwide Veterinary Service, tells us:

'Rabies kills over 59,000 people a year, the majority of whom are children. The advice given during these lessons can mean the difference between life and death.'

'Educating ten million people is a remarkable achievement of which we are all immensely proud of. I'd like to express my deepest gratitude to our supporters, donors, volunteers, partners on the ground and local governments that we work with, and of course our dedicated education team, who are saving lives from this deadly yet entirely preventable disease. Together, we are making a real and lasting difference in areas impacted by rabies.'

Mission Rabies' education programmes run concurrently to mass rabies vaccination campaigns where it aims to vaccinate 70% of a given dog population, the coverage needed to achieve herd immunity and stop transmission. Rabies has the highest fatality rate of any infectious disease and once symptoms show, it is already too late to receive treatment.

Gareth Thomas, Director of Education at Worldwide Veterinary Service, explains:

'Rabies is always fatal once symptoms develop. Washing a wound correctly can reduce the chance of rabies transmission by a third, while receiving the correct vaccination immediately after an exposure will save a person's life. In our project areas, these lessons have increased awareness of rabies, empowering communities with the knowledge to protect themselves. This is a horrible disease that takes a devastating toll on some of the poorest communities in the world, but rabies can be stopped if the risks are widely understood and people know how to treat a dog bite.'

Children are at high risk of dog bites and the charity's work within schools reaches ages five up to sixteen, with lessons delivered directly to children in their classes and assemblies. Additionally, training is provided for teachers, with over 192,000 teachers trained since 2013. Every single school visit and community workshop is recorded via a 'rabies app' to aid real-time project management aligning education work with vaccination campaigns and disease surveillance. This also allows the charity to produce incredibly accurate data on the reach of their work. The charity's local teams keep in touch with schools and communities to provide ongoing support – particularly whenever there is a suspect rabies case in a given area.

Marjory Banda, School Health and Nutrition Coordinator for Blantyre Urban, Malawi, tells us:

'Because of the rabies lessons provided by Mission Rabies through School Health and Nutrition (SHN) teachers, school children in Blantyre now know the dangers of rabies and how to prevent the disease. The children are very engaged during the workshops and have learnt how to behave around dogs to avoid bites. This is an incredibly important programme for children in Malawi and it is great to be part of it.'

Mission Rabies' education programme reached 1.4 million people last year and continues to expand this year. The team have already reached over 900,000 children in just the first half of 2024, as part of an effort to accelerate the pace of global elimination. The charity aims to grow its education programme in India, Malawi, and Cambodia this year while delivering small proof of concept programmes in Tanzania, Ghana, Uganda, Sierra Leone and Mozambique. You can learn more and support the work of Mission Rabies by visiting missionrabies.com.

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CROWN-OF-THORNS

CROWN-OF-THORNS STARFISH DECIMATE CORAL REEFS AS THEY FEAST ON 'SEA SAWDUST'

Researchers have uncovered an under the sea phenomenon where coral-destroying crown-of-thorns starfish larvae have been feasting on blue-green algae bacteria known as 'sea sawdust'.

The team of marine scientists from The University of Queensland and Southern Cross University found crown-of-thorns starfish (COTS) larvae grow and thrive when raised on an exclusive diet of Trichodesmium – a bacteria that often floats on the ocean's surface in large slicks.

UQ's Dr Benjamin Mos from the School of the Environment said scientists had thought almost nothing touched this threadlike bacteria because of its toxicity and poor nutritional content.

"Until now, not much has been known about sea sawdust as a food source, so we were certainly surprised to say the least," Dr Mos said.

"Blue-green algae blooms can extend hundreds to thousands of kilometres across the ocean and often float on the surface in large rafts like sawdust – hence the name.

"It plays a crucial role in marine ecosystems by making nitrogen from the atmosphere available to other sea life, but now we know it is also a food source.

"By knowing how sea sawdust helps COTS thrive, we can potentially change the way we combat this very damaging coral predator."

By tracing atoms from bacteria to COTS larvae, researchers found the larvae digested nitrogen from sea sawdust, with the nitrogen moving into their tissues for sustenance.

"With sea sawdust blooms on the rise in recent years, our findings suggest this could help explain the increase in COTS populations, which have devastated our coral reefs for decades," Dr Mos said.

These findings build on earlier research that suggests human activities, such as fertiliser use, sewage treatment, and stormwater runoff, may be responsible for the increase in blue-green algae blooms.

"It's important we understand the flow-on effect of how human impacts in one ecosystem might flow on to other seemingly unrelated ecosystems," Dr Mos said.

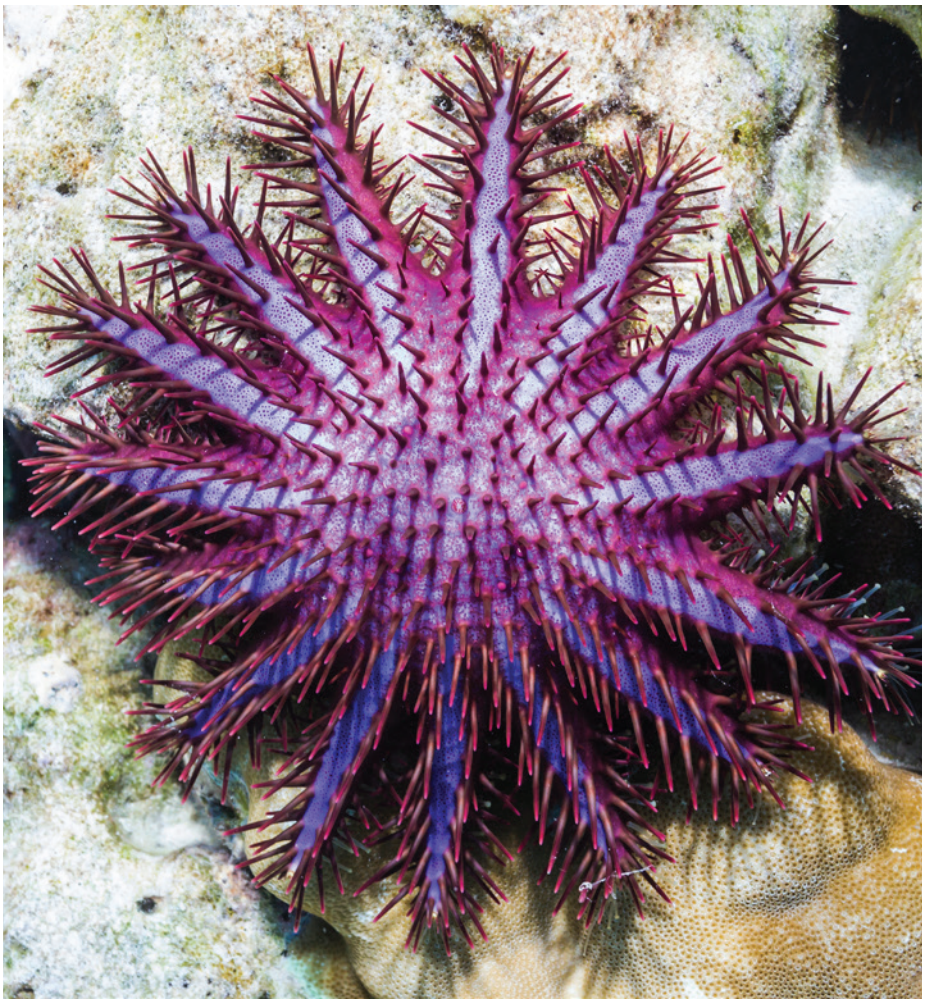
Professor Symon Dworjanyn from Southern Cross University's National Marine Science Centre said further work was needed to investigate the potential connection between sea sawdust blooms and the number of coral-eating COTS.

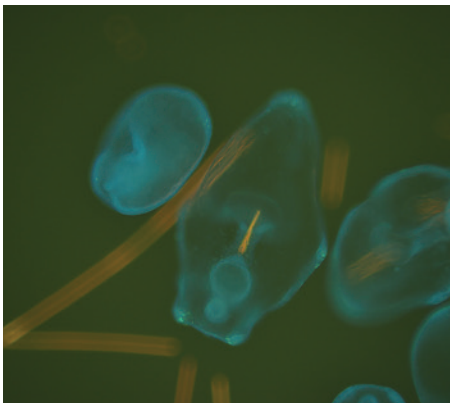
"If we can figure out how to reduce the impact of COTS, we might give coral reefs a little more time," Professor Dworjanyn said.

"We don't yet know if sea sawdust blooms result in more adult COTS on coral reefs, so this research needs more work.

"However, our findings could be an important part of cracking that puzzle."

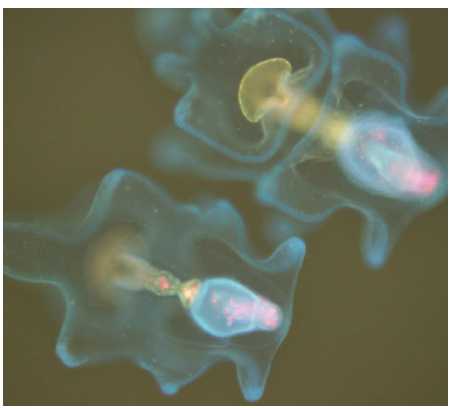
Source: University of Queensland





ABOVE: Scientists were surprised to see crown - of - thorns starfish (Acanthaster sp.) larvae feasting on Trichodesmium cyanobacteria. Under a florescence microscope, UV (ultraviolet) light show s starfish larvae glowing blue while Trichodesmium trichomes appear fiery orange. A larva (centre) has a trichome in its oesophagus. Photo Credit : Benjamin Mos

BELOW: Two - week old crown - of - thorns starfish (Acanthaster sp.) larvae viewed under a florescence microscope . Such microscopes use UV (ultraviolet light) which causes the starfish larvae to glow blue and yellow and the microalgae food in their stomach to appear as pink/red dots. Photo Credit: Corinne Lawson



PUPPY TALES EM-BARKS ON ANOTHER GRAND ADVENTURE TO CAPTURE THE HEART AND SOUL OF DOGS ACROSS AUSTRALIA

CALLING THE MOST ADORED DOGS OF AUSTRALIA TO BE PHOTOGRAPHED IN *DOG TALES OF AUSTRALIA 2: PAWTRAITS* AND SUPPORT CHARITY!

Esteemed Australian phodographer and dog travel adventurer Ms Kerry Martin of Puppy Tales em-barks on another epic and charitable canine adventure across Australia, and your dog can play a part!The Australian Pet Photographer of the Year and Master of Photography is set on immortalising the profound love we have for our loyal companions, celebrating the connections we share and capturing the magic of Aussie dogs in a glorious nationwide coffee table book.“Every dog is a one-of-a-kind individual that enriches our lives and makes them worthy of admiration and appreciation,” says Kerry.

> **“We’re su-paw excited to be on the road again, this time supporting Assistance Dogs Australia and photographing even more gorgeous dogs than last time!”**
>
> *Kerry Martin of Puppy Tales*

On this new mission, Kerry is travelling with her husband Sam and their dogs Keiko and Summer to every state (and nearly every region) in Australia over the next two plus years. She'll be offering her offering her award-winning photography services to dog lovers all around the country in the creation of a stunning coffee table book, *Dog Tales of Australia 2: Pawtraits*. *Dog Tales of Australia 2: Pawtraits* will feature Australia’s most beloved dogs against the backdrop of the country’s stunning scenery. Participation in this project starts from $100, with $100 from each session photographed donated to Assistance Dogs Australia, a national charity that provides fully trained Assistance Dogs to people with mobility needs, autism or post-traumatic stress.

This new grand voyage comes after completing a 13-month, 56,400km caravan road trip around Australia, culminating in the *Dog Tales of Australia* guidebook of dog-friendly destinations across the country and raising funds to sponsor a Defence Community Dog.

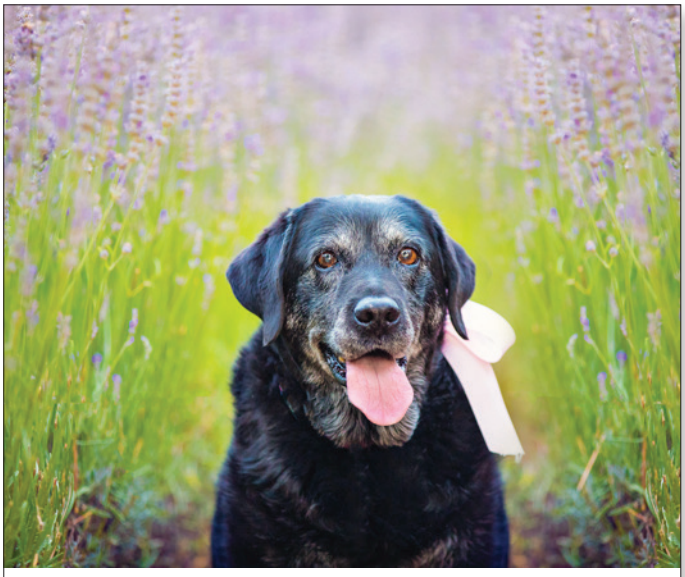
“We’re su-paw excited to be on the road again, this time supporting Assistance Dogs Australia and photographing even more gorgeous dogs than last time!” says Kerry.

“We're revisiting cherished spots and exploring uncharted territories, capturing the essence of dog's around Australia in the colourful and diverse landscapes we travel through in this beautiful country.

Whether you’d love a session for your best friend somewhere meaningful near home, in a favourite scenic spot, or if you’d love to take a holiday yourself and join us in your dream session location, Kerry’s got you covered!“We know that your pets are part of the family, someone you share adventures with and cuddle on difficult (and good) days! They are the heart and soul by your side that you can’t imagine your life without.

We capture all of that to create photographic artwork inspired by them, so you can have them star with pride on your walls,” she says. If you’d like to make your best friend a star and support Assistance Dogs Australia, visit puppytales.com.au/dog-tales-of-australia-pawtraits/"Spots are limited. ONE session per town/location and FOUR per City (in different locations). Once an area is filled, that’s it!For a detailed itinerary, please visit https://puppytales.com.au/puppy-tales-on-the-road/

Bilpin NSW
Bodie, Kelly, Baxter, Quiz & Smudge



Hahndorf SA
Chelsea

Photos by Puppy Tales Photography

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CREDABL'S HELPING HAND GRANTS RETURN TO CELEBRATE MEDICAL, DENTAL AND VETERINARY PRACTICES

We are thrilled to announce the return of Credabl's Helping Hand Grants for the third instalment. These Grants are a beacon of support for practice growth and celebrate the incredible contributions healthcare professionals and their amazing teams make in their local communities.

Launched in November 2020, these Grants were designed to support medical practices facing varying challenges, yet who continued to provide outstanding care to their patients and community. At Credabl, we continuously monitor the challenges that medical, dental and veterinary professions face and endeavour to align our Grant program with the current climate.

Valued at over $10,000 for each recipient, the Helping Hand Grants will be awarded to up to five exceptional practices across Australia. We are inviting both direct applications from practices and heartfelt nominations from the general public. Applications are open now until 15 October 2024, with the much-anticipated recipients revealed on 18 November 2024.

This year's esteemed judging panel will include Dr. Patrick Aouad, a consultant neurologist, multi-business founder and the CEO of CU Health, and Beth McGuinness, Chief People Officer at Credabl and more to be announced.

Stafford Hamilton, CEO of Credabl, expressed his excitement about the return of the Helping Hand Grants, saying, "At Credabl, we understand the immense pressures healthcare practices face, from the rising cost of living to the challenges of retaining talent and maintaining patient engagement. These grants are our way of shining a light on the dedicated healthcare teams making a profound impact in their communities. We can't wait to hear the inspiring stories from this year's applicants."

For previous winner Main Street Veterinary Clinic in Bairnsdale, VIC, the grant allowed them to provide services that meant their patients didn't need to travel to Melbourne.

"Thanks to the grant, we were able to purchase equipment to improve our services and provide more surgical options for our community. While our patients would previously have had to travel more than three hours to Melbourne for certain procedures, we can now provide those ourselves. From a Bair Hugger machine to drills that allow us to perform more procedures, we were amazed how far the grant inclusions went!" – Dr. Kylie Wickham and Dr. Jade Hammer.

Previous recipients of our grants have included:

2022/23 Helping Hand Grant recipients also included Edge Dental Care Edgecliff, NSW, David McIntosh in Maroochydore, QLD, Riverland Veterinary Practice in Berri, SA and Monocle Optometry in North Fremantle, WA.

2020/21 Brentford Dental VIC, Cygnet Clinic WA, Family Dental Yamba NSW, Gatton Family Health QLD and Modbury Vet Clinic SA

Medical, dental, and veterinary businesses are encouraged to directly **APPLY** for a Helping Hand Grant via the dedicated application page by scanning the QR Code, while patients and clients can **NOMINATE** their local doctor, dentist, or vet by visiting the nomination page at: https://www.surveymonkey.com/r/helpinghandnominate24.

ROYAL VETERINARY COLLEGE RESEARCHER AWARDED PLOWRIGHT PRIZE

IN RECOGNITION OF SUBSTANTIAL CONTRIBUTIONS TO UNDERSTANDING AND CONTROL OF ANIMAL INFECTIOUS DISEASE

Professor Fiona Tomley CBE will use the prize fund to support future generations of research leaders, by forming a UK-led mentoring network for veterinary infectious disease One Health researchers

The Royal Veterinary College's (RVC) Professor Fiona Tomley CBE has been awarded the prestigious Plowright Prize by RCVSKnowledge in recognition of her key contributions to the field of animal infectious diseases. The prize fund of £100,000 will be used by Professor Tomley to establish a mentoring network to support the next leaders in infectious disease One Health research.

Spanning more than four decades, Fiona's career has included basic science discovery, technological advances, industrial collaboration, international research leadership, and knowledge exchange. She has contributed substantially to the understanding and control of animal disease, particularly viral and parasitic pathogens of poultry, and is renowned internationally for her work on Eimeria and coccidiosis. Fiona currently holds the position of Professor of Experimental Parasitology at the RVC and is Director of the UKRI GCRF One Health Poultry Hub.

The Plowright Prize is awarded to support further research or other improvement activity that contributes to the control, management and eradication of infectious diseases in animals. The mentoring network will be UK-led and include participants from across low- and middle-income countries where many diseases that pose international threats to animals and people are prevalent. One Health champions an interdisciplinary and cross-sectoral approach to infectious disease management and research which recognises the interdependencies of public, animal and environmental health due to our shared environment and the impact of climate change, connectivity, land use, health and food systems.

The first year of the mentoring scheme, funded by the prize, will focus on identifying mentors within UK veterinary schools and research institutes and from established networks within Africa and South Asia. The network will then recruit its first cohort of early career researchers in 2025, to access mentoring and establish new relationships via one-to-one mentoring, group mentoring and peer mentoring sessions. The network will also organise online lectures, workshops and speaker sessions focused on interdisciplinary learning and One Health. It also has the ambition to arrange in-person sessions within specific geographical regions and annual network-wide face-to-face events.

Professor Fiona Tomley CBE, Professor of Experimental Parasitology at the RVC and recipient of the Plowright Prize, said:

"It is a huge honour and very exciting to receive such a prestigious award from RCVSKnowledge. I am grateful to have worked with many excellent and inspirational researchers during my career and this prize means I can catalyse the formation of a network to support future generations of research leaders in One Health research globally, bolstering efforts to protect both animals and people from zoonotic threats, and empowering researchers with an international and collaborative network through which to address One Health issues."Professor Stuart Reid CBE, President & Principal of the RVC, said:"I am delighted that Professor Tomley has been awarded the Plowright Prize. It is testament to the career long commitment Fiona has shown to her science and the impact of her research in communities worldwide. I am sure Professor Plowright would fully approve that his legacy is being used to support her work and its contribution to animal and human health."

About the Royal Veterinary College

The Royal Veterinary College (RVC) is the UK's largest and longest established independent veterinary school and is a Member Institution of the University of London.

It is one of the few veterinary schools in the world that hold accreditations from the RCVS in the UK (with reciprocal recognition from the AVBC for Australasia, the VCI for Ireland and the SAVC for South Africa), the EAEVE in the EU, and the AVMA in the USA and Canada.

The RVC is ranked as the top veterinary school in the world in the QS World University Rankings by subject, 2024. The RVC offers undergraduate and postgraduate programmes in veterinary medicine, veterinary nursing and biological sciences.

The RVC is a research-led institution, with 88% of its research rated as internationally excellent or world class in the Research Excellence Framework 2021. The RVC provides animal owners and the veterinary profession with access to expert veterinary care and advice through its teaching hospitals and first opinion practices in London and Hertfordshire.

http://www.rvc.ac.uk

THE DOG PODCAST

UNCOVERS STARTLING TRUTHS ABOUT WHAT WE FEED OUR DOGS

Are you unknowingly harming your dog with the food you provide? In the latest episode of The Dog Podcast, host Charlotte Bryan welcomes Steph Orange, a leading canine nutritionist from Inner Wolf Canine Nutrition, to debunk myths and reveal the shocking realities of commercial dog food.

Steph Orange, who holds a diploma in canine nutrition and has extensive experience in breeding and training guide dogs, shares the untold story of why many commercial dog foods may be undermining your pet's health. "Dogs can survive on anything," Steph asserts, "but will they thrive?" This episode uncovers why some dogs live well into their 20s without ever visiting a vet, thanks to a raw, species-appropriate diet.

Listeners are taken on a journey through Steph's experiences growing up on a New Zealand dairy farm, where farm dogs thrived on raw milk and placentas, living vigorous lives without the intervention of modern veterinary care. This stands in stark contrast to the often overweight and lethargic dogs fed on carbohydrate-laden commercial foods, which are engineered for cost-saving rather than nutrition.

Some of the most startling revelations include the fact that many commercial dog foods contain up to 50% carbohydrates, a component not even required to be listed on the packaging. "Most processed foods don't disclose the carbohydrate content because it's not necessary by standards," Steph reveals. "But it's crucial to understand these fillers provide no nutritional value to dogs and can lead to obesity and other health issues."

Charlotte and Steph also explore the significant differences between the digestive systems of dogs and humans, challenging the common misconception that dogs are omnivores. "Dogs are scavenging carnivores," Steph explains, "designed to thrive on a meat-based diet, unlike humans who are true omnivores."

The episode highlights the dangers of rancid fats in kibble, which can contribute to cancer and other diseases. "When you buy a bag of kibble, the fats can go rancid as soon as you open it," warns Steph. "This can lead to serious health issues and is something every dog owner should be aware of."

Steph also provides practical guidance for dog owners looking to transition their pets to a raw diet, emphasising that it's never too late to make a positive change. For those unable to fully transition to raw, she advises supplementing kibble with as much fresh food as possible to boost the nutritional value of their dog's diet.

This episode is an eye-opener for dog owners who have been lulled into complacency by clever marketing and convenient feeding practices. It challenges the conventional wisdom surrounding dog nutrition and urges listeners to rethink what's in their dog's bowl.

"Dogs have evolved from wolves, and their dietary needs reflect that ancestry," Steph explains, debunking the omnivore myth that has led to widespread misconceptions about canine nutrition. By adopting a diet that mirrors their natural inclinations, dogs can enjoy longer, healthier lives free from many modern ailments.

Tune in to this revealing episode of The Dog Podcast to discover how you can transform your dog's diet and unlock their full potential. It's time to go beyond survival and ensure our pets are truly thriving.

The episode has already garnered thousands of views on YouTube. Watch the Episode here:

https://youtu.be/Fxom15BQfBs

About The Dog Podcast

The Dog Podcast, hosted by Charlotte Bryan, is dedicated to bringing listeners the latest insights, expert interviews, and practical advice on all things canine. Each episode features engaging discussions with industry professionals, trainers, and veterinarians to help dog owners make informed decisions about their pets' care.

For more information or to listen to the episode, visit https://thedogpodcast.com.au or subscribe to The Dog Podcast on your favourite streaming platform.

Host of *The Dog Podcast*, Charlotte Bryan

Guest Steph Orange, talks about canine nutrition

TAFE NSW SETS SYDNEY VETERINARY NURSE ON COURSE TO BOOST NATIVE CONSERVATION AWARENESS

Ms Heinrich is now diversifying her career further in a mission to boost native wildlife conservation and attract the next generation into animal care roles.

A TAFE NSW veterinary nurse graduate is working to inspire the next generation into the in-demand career through an upcoming book series she has authored about native wildlife conservation.

More than 2,000 new veterinary nurses are needed by 2026, and TAFE NSW is helping meet this industry demand by delivering a pipeline of workers through its Certificate IV in Veterinary Nursing.

Brie Heinrich studied that course through TAFE NSW, and since graduating, has found her dream job working for a mobile veterinary clinic in Sydney and made regular appearances as a cast member on the hit TV show Bondi Vet, sharing the knowledge and skills she learned at TAFE NSW with viewers.

“I always had an affinity with animals and wanted to work in a career where I could help make a difference,” Ms Heinrich said.

“Studying veterinary nursing at TAFE NSW was the perfect fit for me because it pieced together those two goals, as well as giving me the practical skills I needed to launch my career and work in a role I love.

“Between studying and completing more than two years of work placements through TAFE NSW, I had the necessary foundations for my veterinary career. This experience, and the skills I gained, really allowed my career to bloom.”

Ms Heinrich is now diversifying her career further in a mission to boost native wildlife conservation and attract the next generation into animal care roles. She has authored a new book series with her colleague and friend Dr Audrey Shen, which will be released in the coming months.

“We wanted everyone to fall in love with our wildlife patients the way we have, to bring awareness to the importance of protecting

these species. Each children's book will have a story about different wildlife species and highlight fun facts," Ms Heinrich said.

"We hope this series will generate excitement, develop knowledge, and inspire the next generation to help protect and love our native wildlife.

"As a community, we have a duty to protect and nurture our Australian wildlife and provide education for our current and future generations."

TAFE NSW Animal Science Head Teacher, Erica Steppat, said TAFE NSW is playing a key role in delivering more veterinary nurses to the industry.

"Veterinary nursing is a growth industry, and TAFE NSW is delivering a pipeline of workers to meet that industry demand through the courses we offer," Dr Steppat said.

"Brie's journey highlights how TAFE NSW builds practical skills and industry-specific knowledge among our students, so they can secure the job they want and start achieving career success."

"Veterinary nursing is a growth industry, and TAFE NSW is delivering a pipeline of workers to meet that industry demand through the courses we offer,"

Dr Erica Steppat
TAFE NSW Animal Science Head Teacher,

TAFE NSW veterinary nurse graduate Brie Heinrich shows off her skills treating native species

"If you love animals and science, veterinary nursing is an excellent career choice." Brie Heinrich

Ms Heinrich said her career has grown thanks to the skills and confidence she learnt through her studies at TAFE NSW, and hopes others consider a career in veterinary nursing.

"If I could go back in time and visit my younger self and tell her what we have accomplished and achieved, I wouldn't have believed it," Ms Heinrich said.

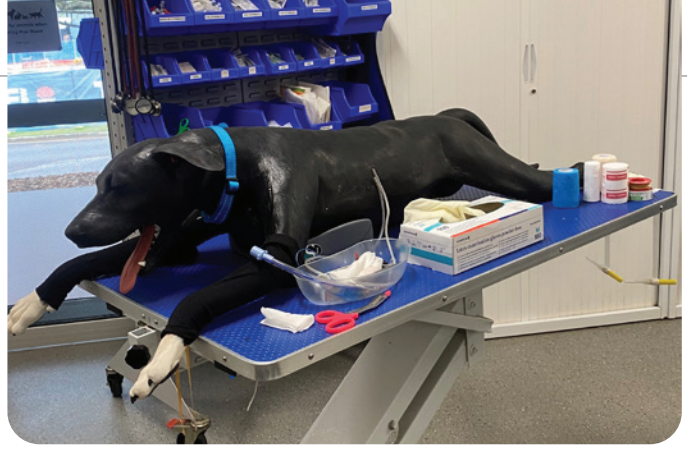
"If you love animals and science, veterinary nursing is an excellent career choice. It's a tough career, but it is so incredibly rewarding.

"I love my job, and it is a huge part of who I am; I feel very grateful to work with a wonderful team knowing we make positive changes in our patients' lives every day."

"We wanted everyone to fall in love with our wildlife patients the way we have, to bring awareness to the importance of protecting these species. Each children's book will have a story about different wildlife species and highlight fun facts,"

Brie Heinrich
Graduate - Certificate IV in Veterinary Nursing

PET PROJECT: HI-TECH DOG MANNEQUIN HELPING TAFE NSW KINGSCLIFF STUDENTS HONE REAL-WORLD SKILLS



A hi-tech and eerily lifelike canine mannequin is giving aspiring veterinary nurses at TAFE NSW Kingscliff invaluable hands-on experience.

A canine mannequin imported from the US recently arrived at the campus, allowing animal studies and vet nursing students to practice important clinical skills, such as intubation, intravenous catheterisation, venipuncture, CPR, bandaging, and ear cleaning.

TAFE NSW Kingscliff animal studies teacher and local vet Gemma Holland said the mannequin, affectionately named Barbara, supports students in honing their clinical skills without posing any risk to a live animal.

“Veterinary simulation mannequins allow students to practice and refine their skills without the pressure of working on live animals. In TAFE NSW Animal Care courses, including the Certificate IV in Veterinary Nursing, students are required to demonstrate practical skills. Using simulators provides a realistic model for students to familiarise processes and procedures before undertaking these tasks on real animals at work placement,” Ms Holland said.

The mannequin is equipped with veins, imitation blood, earwax and feedback monitors, which display a green light to indicate that students are performing cardiopulmonary resuscitation (CPR) correctly.

“Students are rarely involved in emergencies at work placement, so this training allows them to practice first aid and CPR in a controlled environment before encountering real-life emergencies,” Ms Holland continued.

The mannequin has arrived at a vital time for vet nursing students. There are now more pets than there are people in Australia. Vet nursing jobs are in a steep growth phase, with Jobs and Skills Australia predicting the number of nurses will skyrocket to 17,800 by 2026.

TAFE NSW Kingscliff veterinary nursing student Phoebe Viscardi, 38, recently switched from a career in aged care to veterinary nursing. She balances studying a Certificate IV in Veterinary Nursing studies with working as a veterinary nurse.

Phoebe says the practical training she has received allows her to feel confident in her newfound career.

“Practicing on a canine mannequin closely mimics how you would work on a real animal. You simply can’t gain the same skills working on a stuffed animal. Barbara is lifelike and even has joints that anatomically resemble a real dog. I enjoy how hands-on the course is and the equipment at TAFE NSW Kingscliff is world-class,” she says.

Media contact: Karen Farrell, TAFE NSW Communications Specialist, karen.farrell17@tafensw.edu.au, 0425 275 611.

TAFE NSW Kingscliff vet nursing student Phoebe Viscardi performing a simulated intubation on the canine mannequin, with TAFE NSW Animal Care & Management teacher, Gemma Holland.

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STAINLESS STEEL CAGES POSE 'EXCESSIVE NOISE' CHALLENGE, SURVEY FINDS

A SIGNIFICANT MAJORITY (75%) OF VETERINARY PROFESSIONALS FIND 'EXCESSIVE NOISE' TO BE A CHALLENGE WITH STAINLESS STEEL CLINICAL HOUSING, ACCORDING TO A RECENT SURVEY.

CASCO Pet surveyed more than 650 veterinary professionals at leading veterinary exhibitions and conferences in the UK and USA (London Vet Show, VMX, WVC).

Respondents – all of whom work in clinics that use stainless steel kennels – reported that the noise from the housing can be detrimental to animal patient health. Three quarters said excessive noise was an issue. Of these respondents:

- Almost nine in 10 said they had witnessed patient anxiety (89.43%).
- Nearly a quarter experienced instances of animal injury (24.18%).
- Over one in five noted that excessive noise resulted in extended recovery time for patients (22.35%).

Noise has a ripple effect within a clinic with ramifications for practice staff as well as pet patients. More than half (52.84%) of those who reported excessive noise as a challenge said it resulted in staff stress, and more than a quarter (26.42%) reported facing challenging working conditions. Additionally, almost one in five (19.30%) said they had suffered an injury as a result of noise challenges.

Reducing noise levels in clinics came out as one of the top priorities for professionals using stainless steel kennels; 84.64% declared it important to them. This was only narrowly beaten by patient comfort, by 0.3%.

Ease of cleaning (80.62%) and reducing patient stress levels (77.64%) also ranked highly, while temperature issues with stainless steel kennels were declared a challenge by over half of respondents (55.68%).

CASCO Pet CEO, Matthew Bubear, says: "These findings lay bare the true scale of stainless steel kennelling's excessive noise problem for pet patients and practice staff. Clanging, resonant and disruptive, stainless steel kennels can significantly exacerbate fear, stress and anxiety and impact recovery.

"It's clear that stainless steel is no longer suitable for today's animal housing. A 21st century solution is needed – one that truly puts patient wellbeing at the forefront."

Crafted from specialist glass, CASCO Pet's state-of-the-art WELLKennels mitigate noise for a quieter, calmer and more comfortable environment for patients and practice staff alike. The kennels are certified by the International Society of Feline Medicine and are a Fear Free Preferred Product.

Over 62% of the professionals surveyed said they believed WELLKennels would have a "significant" or "very significant" improvement on their practice – with 71% saying noise reduction was one of the most appealing features.

A separate consumer survey of cat and dog owners, conducted by CASCO Pet, reiterated the need for alternative animal housing material in clinical settings.

- A majority of pet owners (79.18%) said their pet experiences stress or anxiety when visiting the vet (514 respondents).
- When asked whether they would prefer their pet to be housed in a WELLKennel or a stainless steel cage, 70% chose WELLKennels (1,291 respondents).
- Additionally, three-quarters said they were willing to travel further to visit a veterinary clinic with WELLKennels, with 69.47% willing to pay more for this option (904 respondents).

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WSAVA AND ZOETIS TARGET ENHANCED PAIN MANAGEMENT FOR COMPANION ANIMALS WITH CERTIFICATE LAUNCH

The World Small Animal Veterinary Association (WSAVA) is to launch a Certificate in Pain Management, supported by Zoetis, to promote the importance of companion animal pain management as a discipline and offer veterinarians and veterinary nurses/technicians a recognized international qualification in the subject for the first time.

The WSAVA Certificate in Pain Management is based on the updated Global Guidelines for the Recognition, Assessment and Treatment of Pain, unveiled by the WSAVA Global Pain Council (GPC) at the end of 2022. Despite rapid advances in pain management, the GPC is concerned that pain in companion animals is under-diagnosed and under-treated.

In offering this new Certificate in conjunction with its Global Pain Management Guidelines, the GPC aims to raise awareness of the importance of pain management for patient health and welfare and provide practical help to veterinary professionals who wish to refresh or deepen their knowledge in this area.

Globally relevant and available online for ease of access, the WSAVA Certificate course comprises three modules, with tailored content for veterinarians and veterinary nurses/technicians, covering:

- Understanding and assessing pain
- Preventing and treating pain
- Pain management in practice

Each module contains recorded lectures from members of the GPC and other global experts, together with links to mandatory and suggested reading materials. Quizzes are included at the end of each lecture. The course is available free of charge to all companion animal veterinarians and veterinary nurses/technicians.

The International Veterinary Academy for Pain Management (IVAPM) is supporting the dissemination of the Certificate.

Chair of the WSAVA Global Pain Council Dr Bea Monteiro said: “The new WSAVA Certificate in Pain Management will help veterinary professionals to understand the critical importance of pain management for companion animal health and welfare. It will show them how to assess pain using the latest knowledge of pain-related behaviors and validated pain scales. Finally, it will guide them in treating pain effectively, using the most appropriate drug and non-drug therapies, based on the availability of particular analgesics and other therapies in the region of the world in which they are in practice.”

She added: “The Certificate provides recognition to professionals advancing their knowledge on pain management. It is the next step in the Global Pain Council’s campaign to raise awareness of the importance of pain management and to support veterinary teams in diagnosing and treating it effectively – a development which will benefit companion animals around the world and the humans who gain so much from their companionship. We are grateful to Zoetis and the IVAPM for their support and hope that WSAVA members will enjoy the course we have created.”

Dr Mike McFarland, Chief Medical Officer at Zoetis, said: “My personal experience has shown me that pain can affect many areas of a pet’s life, including their sleep and cognitive function. It can also affect their emotional state and social relationships. This new WSAVA Certificate in Pain Management represents a significant step forward for veterinary professionals in building awareness of the way in which new solutions to managing pain can improve the quality of life for pets and their owners and protect the precious bond between them.”

The WSAVA Certificate in Pain Management is available in English and is being submitted for RACE accreditation. Interest in the Certificate can be registered here: https://wsava.org/pain-certificate/

The WSAVA’s Global Guidelines for the Recognition, Assessment and Treatment of Pain are available for free download from the WSAVA website in a range of languages. The work of the Global Pain Council is generously supported by Zoetis.

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ROBOT DOG SIMULATES HEAT STROKE SYMPTOMS AND WARNS OF THE DANGERS OF A HOT CAR

DON'T CREATE A HEAT TRAP FOR YOUR DOG THIS SUMMER

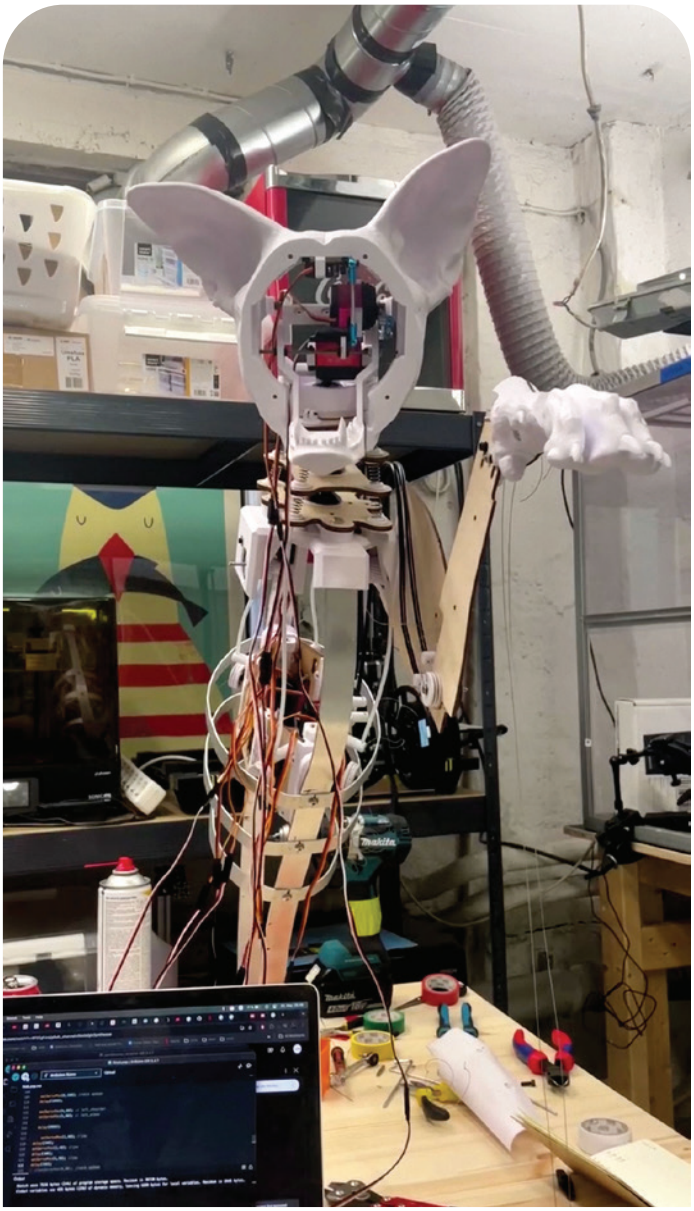
The Nordics' leading petcare brand Musti Group launched a campaign warning dog owners to never leave their dog alone in a hot car. The campaign features a custom made robotic dog that simulates the symptoms of a heat stroke. The robot is placed inside a car and its movements are triggered by changes in temperature.

While Nordic summers are not always particularly hot, dogs with their fur coats are prone to heat strokes even in milder temperatures. Dogs should never be left alone in the car during summer, because the temperature inside a car can get dangerously high even on cloudy days. Even though awareness around the issue has increased, authorities in the Nordic countries still receive numerous reports of dogs left in hot cars every summer.

With their new campaign, the Nordic pet care specialist Musti Group wants to educate both dog owners and passers-by, who might come across dogs left in a car during summer. The campaign features a fully functioning robotic dog, which shows how fast a car turns into a death trap for pets. The robot simulates the symptoms of a heat stroke, and its movements are triggered by the temperature inside the car it's placed in.

"When it comes to recognising dangerous situations, real life experience is the best form of education. By creating a tangible, cautionary example that people witness with their own eyes, we hope to increase awareness of how and when to act in these situations both as a dog owner and a passer-by," Eveliina Rantahalvari, Musti Group's Head of Nordic Marketing says.

"The temperature inside the car rises dangerously high faster than many people realise. Even leaving the car's windows open is not enough to ensure the dog is not at risk,"



Rantahalvari also states that dogs have a higher risk of suffering a heat stroke, because they are not able to regulate their body temperature by sweating through the skin.

“The temperature inside the car rises dangerously high faster than many people realise. Even leaving the car’s windows open is not enough to ensure the dog is not at risk,” Rantahalvari says and reminds that if passers-by notice a trapped dog, the animal might be in need of immediate help.

“If you notice a dog left in a hot car, the first thing you should do is try to get in contact with the owner. For example, in a store or shopping center, you can ask the staff to make an announcement to try and alert the owner,” Rantahalvari says.

The symptoms of a dog's heat stroke include, among other things, severe lethargy, dark redness of the tongue and oral mucosa, convulsions and tremors. The situation might be very serious, if the dog is no longer panting or showing signs of restlessness, but instead lies still apathetically. If the owner of the car cannot be found quickly, the helper must contact the emergency centre and ask for instructions to help the dog.

“During summer, overheating is also a threat outside the car. It can be prevented by giving the dog enough water, staying in the shade, swimming and, for example, with ice cream made for dogs,” Rantahalvari reminds.

About Musti Group

Musti makes the life of pets and their owners easier, safer, and more fun. We are the leading Nordic pet care company, and we operate an omnichannel business model to cater for the needs of pets and their owners across Finland, Sweden, and Norway. We offer a wide, curated assortment of pet products. We also provide pet care services such as grooming, training and veterinary services in selected locations.

Musti Group’s net sales were EUR 341 million in the financial year 2021. At the end of the financial year 2021, the company had 1,397 employees, 1.3 million loyal customers and 312 stores.

Read more at: ***www.mustigroup.com***

MODERN TECHNOLOGIES IN VETERINARY DIAGNOSTICS: ADDRESSING INDUSTRY CHALLENGES

Dr Richard E Goldstein DVM, DACVIM, DECVIM-CA

Vice President & Chief Medical Officer Global Diagnostics at Zoetis, multi award-winning veterinarian specialising in small animal internal medicine with 12 years' experience as a Professor at Cornell.

In Australia, pets outpopulate people – with an estimated 28.7 million pets1 to a population of 26.6 million people. 2 Boasting one of the highest pet ownership rates in the world, 69% of Australian households own pets2 and two-thirds of owners consider their animals to be part of the family. 3 This may not come as a surprise for those of us in the veterinary field, but it does underscore the growing demand for veterinary services — placing considerable pressure on our dedicated veterinary healthcare teams.

As caseloads grow worldwide, 4 veterinary clinics face a critical imbalance between labour supply and demand, with a shortage of veterinary surgeons and veterinary nurses. There is a critical domestic veterinarian shortage that has existed for years, and was further compounded by the pandemic; in 2021, 38.65% of veterinary job vacancies took more than a year to fill, a figure that rose to 46% when looking specifically at rural practices. 5 High attrition rates and negative mental health issues within the profession are exacerbated by financial and occupational stress; the industry is associated with low remuneration, high educational debt, frequent ethical dilemmas and poor work-life balance.6

Understaffed and overloaded, clinical staff are still honour bound to showcase compassion, expertise and unwavering commitment for every client. Inevitably, this places strain on the practical capabilities of teams who already face busy days, long hours and the emotional impact associated with helping animals and their owners. Burnout and stress are on the rise across the profession; 55% of early career veterinarians have been found to suffer from burnout, with the rate remaining above population norms after 20 years in the profession.7Additionally, there is pressure on clinics to provide tech-enabled conveniences and solutions that reach the same standards owners may experience within the realm of human healthcare. Despite this challenging background, the pain points faced by the industry can, in fact, be addressed and eased by impressive technological innovations.

Advanced point-of-care diagnostics

While the world races to keep up with technological developments, including the integration of artificial intelligence (AI), the veterinary field stands on the brink of a transformation in how clinics operate. Advances in innovative point-of-care diagnostic solutions are being driven by the industry's resource requirement, offering increasingly valuable and synergistic solutions for supporting veterinary staff and empowering healthcare teams.

Modern veterinary clinics benefit from the improved accessibility of tools which can expedite the diagnostics process from days to hours,8 as with Vetscan® Imagyst (Zoetis). In addition to becoming smarter, technologies are becoming lighter, smaller, and more portable: the aforementioned Imagyst weighs just over 5 kg, and the AlphaTrak 3 (Zoetis) allows both in-clinic staff and pet owners to test and monitor diabetic animals' glucose levels while they're at home. These tools, in collaboration with other products and services within the Virtual Laboratory by Zoetis, allow for a more efficient and holistic approach to point-of-care diagnostics and monitoring for clinicians and owners.

Navigating virtuality

Think back to the early days of the global pandemic. The concept of an online meeting or a 'virtual consultation' seemed far-fetched. How could we diagnose without physically seeing and assessing the animal? Yet, as we were rapidly pushed into virtual scenarios, technology revealed its advantages and we have grown to embrace the convenience offered by virtual visits with doctors, therapists, teachers and even exercise classes. In the veterinary space, the pandemic catalysed the rise of 'virtual veterinary' startups, aimed at enhancing convenience for pet owners and improving patient outcomes by allowing for a more efficient use of time for the clinics.

Looking upstream, virtual technology can now directly benefit vets themselves, streamlining workflows and improving professional interactions by connecting teams with a network of board-certified pathologists and specialist clinical consultants, accessible around the clock and from anywhere — via Zoom or email. The expert support delivered with the Virtual Laboratory by Zoetis also provides the assurance that only comes from a partner with more than 70 years of global leadership in animal health innovation.

By providing this access, veterinarians can diagnose and treat with confidence, a reassurance for those waiting for specialist support as well as those looking to discuss a particular result, aiding with medical decision-making. For more complex cases, regardless of where you are in your career — from recent graduate to seasoned veterinary professional — there will be moments where you could benefit from an additional perspective on a case. The Virtual Laboratory provides additional virtual support through a network of board-certified pathologists and specialist clinical consultants to confer with, when required.

Artificial Intelligence

Then, of course, there is the increasing adoption of AI – at a global level and across a multitude of sectors, including within veterinary care. With poor psychological health reported in one-third of Australian vets,7 in part influenced by workload and demands of the practice, the incorporation of technological resources such as AI can help staff increase efficiency and reduce sources of pressure.

The industry has long used shallow learning AI for tasks such as equipment that assesses x-rays, ultrasound scans, blood analysers and other diagnostic testing devices. Systems that utilise shallow learning AI are a remarkable support in this context, but they are reliant on the manual entry of a predefined set of data represented by specific features. This leads to limitations in the system's ability to incorporate new, unseen data.

As the technology continues to rapidly evolve, we are able to integrate deep learning AI and large language models at numerous points in the workflow, from notetaking and scheduling through to AI diagnostic tools. These deep neural networks can automatically discover important patterns in raw data, meaning these systems can identify complex representations – without the need for explicit feature engineering. The result is that it can be exposed to tens of thousands of images of a multitude of 'objects of interest', such as cells, bacteria, yeast, and intestinal

parasite eggs, as well as the likes of crystals in the urine. All of this allows for a comprehensive, accurate identification and robust classification, within minutes9-13 – avoiding the aspects that challenge shallow learning systems.

Bring the expertise in-house

This development has brought new, rapid diagnostic test capabilities in-house, creating less reliance on outsourced pathologists or lab testing. A unique example is Vetscan® Imagyst (Zoetis), which offers multiple applications in one diagnostics platform, including AI Faecal, AI Blood Smear, AI Dermatology, AI Urine Sediment, AI Equine Faecal Egg Count and Digital Cytology. These types of advanced AI-integrated diagnostic analysers expedite the time to diagnosis for a wide array of disease states and help highlight where additional expert analysis or testing may be required.

It would be remiss not to note the hurdles to greater AI adoption within the industry; the top concern has been found to be reliability and accuracy. 14 To drive progress and build trust, it is necessary for established manufacturers to be committed to ethical practices, rigorous testing and maintaining field integrity. Technology is only as good as its training, and the end users of this technology deserve to possess the knowledge of how the resulting data came to be. Zoetis, for example, trained its deep-learning AI (integrated within the Vetscan® Imagyst's application) using thousands of iterations of samples and elements identified by board-certified pathologists and specialist consultants.

Conclusion

Global spending on veterinary services for companion animals continues to rise, with the market estimated to grow significantly. In Australia, owners spent an estimated AUD 4.7 billion in vet visits in 2022, 15 with a forecasted CAGR of 9.7% by 2029. 16 Market growth will, at least in the short term, correlate with an increase in demand and subsequent pressure on veterinary clinics.

To meet demand and provide a more consistent level of service for better patient outcomes, the industry needs to streamline processes – which will also serve the dual purpose of relieving time pressures of stretched veterinary staff, at all levels. Utilising the latest technology allows practice teams to maximise efficiency and streamline clinical workflow while enhancing service value, all vital components of staff wellbeing.

Technological innovations in advanced diagnostics and AI – like those offered under the Virtual Laboratory by Zoetis – present themselves not only as tools for the modern veterinary clinic, but also provide a new and more efficient way of working to those who embrace it. And with the industry showing no signs of slowing down, we're likely to see continued technological developments coming to further support professionals working in today's modern veterinary practice.

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PETRESCUE RELEASES SECOND ANNUAL AUSTRALIAN STATE OF PET ADOPTION

REPORT: A DATA-INFORMED PATH TO A BRIGHTER FUTURE FOR PETS

PetRescue, Australia's leading pet adoption charity, is proud to announce the release of the second annual State of Pet Adoption Report for 2022-2023. This comprehensive report provides invaluable insights into the current landscape of pet adoption in Australia, highlighting key trends, challenges, and findings in the effort to ensure a future where every pet is safe, respected, and loved.

Building on last year's inaugural edition, the 2022-2023 report dives deep into the data collected from rescue groups, shelters, vets, councils, and the animal welfare and animal management community at large. It underscores the critical role of data in identifying the areas of greatest need and benchmarking progression in the sector.

Key Findings of the Report Include:

- **Adoption Trends:** An in-depth look at the adoption rates across different species, regions, identifying hotspots of both high and low adoption activity.
- **Challenges and Opportunities:** An examination of the barriers to pet adoption and the obstacles faced by people working or volunteering in the sector.

Why This Report Matters:

Data-driven insights are crucial for understanding and addressing the complex systemic issues surrounding pet adoption. By collecting and analysing this information, PetRescue can:

- **Identify Areas of Highest Need:** Focus resources on key areas and communities where services and support are most needed.
- **Benchmark Progress:** Track our advancements year over year to ensure we are moving closer to our collective goal to keep pets safe.
- **Inform Policy and Practice:** Provide evidence-based recommendations to policymakers, rescue organisations, and animal welfare advocates.
- **Understand the Impact of Changes:** Reflect on the effects that changes in external factors such as legislation and economic or societal challenges have on the animal welfare sector.

"We truly believe that we can create a future where every pet is safe, respected and loved, and the insights from our State of Pet Adoption Report are instrumental in making that vision a reality," said Patima Tantiprasut, Managing Director and CEO at PetRescue. "This report not only highlights where we need to focus our efforts but also provides an inside look into the hidden world of rescue, providing us with the opportunity to transform into a sector that cares for the wellbeing of all pets, and also people, involved."

Join Us in Creating a Better Future for Pets:

PetRescue invites the community to engage with the findings of this report and contribute to, collaborate on, and help strengthen future ones. Together, we can drive positive change and truly work towards a future where every pet is safe, respected, and loved.

For more information and to read the full State of Pet Adoption Report 2022-2023, please visit https://www.petrescue.com.au/library/articles/the-state-of-pet-adoption-report-2022-2023

About PetRescue:

PetRescue is a national animal welfare charity dedicated to finding loving homes for pets in need. Since its inception, PetRescue has helped connect 882,771 pets with families through its innovative online platform petrescue.com.au and community program and partnerships.

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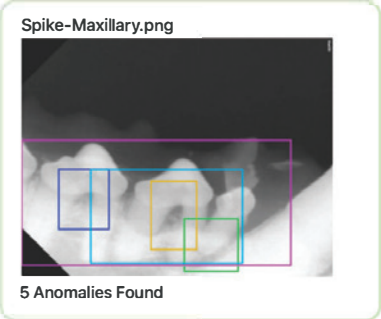

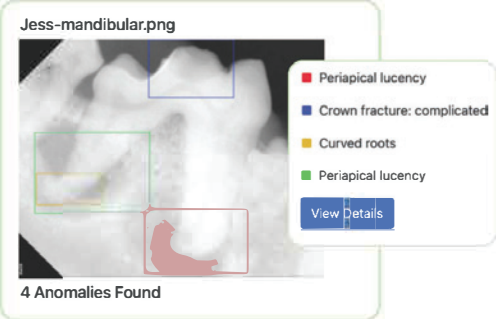

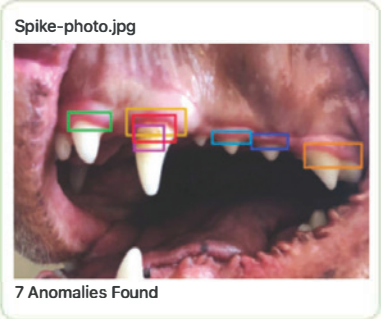

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THE ABCS OF VETERINARY DENTISTRY:

L IS FOR LOCAL ANAESTHESIA

David E Clarke BVSc, DAVDC, FAVD, MANZCVS and Kirsten Hailstone BSc, BVMS, DAVDC
Registered Specialist, Veterinary Dentistry and Oral Surgery

As we continue to journey through the dental alphabet, this issue brings us to the letter L. In this article we delve into the discipline of local anaesthesia; the whys, the wheres and the whats. You could begin by checking your LA IQ and attempt to answer these introductory questions before you work through the manuscript.

1. A nerve possesses a resting potential of.....mV.
2. After depolarisation, repolarisation occurs, and the nerve returns to its original resting state. All this occurs in..... millisecond – depolarisation (.....msec) and repolarisation (.....msec).
3. The pH of the tissues, greatly affect the nerve blocking action of the local anaesthetic solution. Inadequate/adequate (delete incorrect word) anaesthesia results when injecting into an inflamed or infected area. Normal tissue pH is....., whereas the pH of an inflamed area is.....to.....
4. The timing of analgesic administration is important, as anaesthesia does not necessarily equate with analgesia. It has been shown that administration of analgesics before infliction of pain, termed....., greatly reduces the degree of pain the central nervous system registers, and therefore postoperative pain.
5. The dental cartridge is a glass cylinder containing local anaesthetic. In Australia, the cartridge contains .....mLs of solution.
6. Complete the following table by stating the time of onset of action in minutes:

	Lignocaine	Mepivacaine	Bupivacaine
Onset of action			

7. Complete the following table by completing the duration of action in minutes:

	Lignocaine	Mepivacaine	Bupivacaine
Duration of action			

8. The techniques for regional anaesthesia of the maxillary incisor teeth require the.....nerve block and the.....nerve block.
9. An intraoral approach for a mandibular nerve block locates the mandibular foramen on the.....surface of the mandible at a point.....along an imaginary line drawn between the.....tooth and the.....process of the.....

Introduction

Pain evoked during dental procedures in humans has been equated to other painful surgical procedures in humans. The same could be true in dogs, where pain and inflammation during dental procedures follow the same physiological pathways as other painful procedures (Barnett, 1997). Clarke (2004) found that the administration of pre-emptive analgesia had a significant effect on the reduction of pain when compared to when no analgesia was administered in dogs undergoing surgical tooth removal. There are thus several reasons why dental pain in dogs and cats should be seriously considered and nerve blocks performed.

Local anaesthesia definition

Local anaesthesia has been defined as a loss of sensation in a circumscribed area of the body caused by a depression of excitation in nerve endings or in an inhibition of the conduction process of the peripheral nerves (Covino and Vassallo, 1976). An important feature of local anaesthesia is that it produces this loss of sensation without inducing a loss of consciousness. Highly desirable properties in a local anaesthetic used for veterinary dentistry should include:

- They are not irritating to the tissues.
- They do not cause any permanent alteration of nerve structure.
- They are not systemically toxic.
- The onset of action should be short.
- The duration of action must be long enough to complete the procedure.

Pain and the generation of impulses

The discovery in the late 1800s of a group of chemicals with the ability to prevent pain without inducing a loss of consciousness was a major step forward in the dentistry profession. The concept behind the actions of local anaesthetics is simple – they prevent both the generation and conduction of a nerve impulse. Therefore, the source of the impulse is prevented from reaching the brain and is thus not interpreted as pain by the patient.

The function of a nerve is to carry electrical action potentials. Action potentials are transient depolarisations of the membrane and can be initiated by thermal, chemical, mechanical or electrical stimuli. Once an impulse is initiated, its duration and intensity remain steady until it reaches the end of its length. A nerve possesses a resting potential of –70 mV that exist across the nerve membrane, producing a differing concentration of ions on either side of the membrane. The interior is negative relative to the exterior.

A stimulus excites the nerve, which initiates a slow depolarisation within the nerve. At a critical level, an extremely rapid phase of depolarisation occurs termed the 'threshold potential', which results in a reversal of the electrical potential across the nerve membrane and a +40 mV potential exists on the interior of the nerve cell. After depolarisation, repolarisation occurs, and the nerve returns to its original resting state. All this occurs in 1 msec – depolarisation (0.3 msec) and repolarisation (0.7 msec).

Action of local anaesthetics

Local anaesthetics primarily influence the depolarisation phase of the action potential, where they act by binding to specific receptors on the sodium channel. The action of the drug is direct, and once the drug has gained access to the receptor, permeability to sodium ions is decreased or eliminated and nerve conduction is interrupted.

Types of anaesthetics

Local anaesthetics can be classified as either amino esters or amino amides. The most commonly available anaesthetics in veterinary dentistry are the amides (lignocaine, mepivacaine, and bupivacaine) and are relatively resistant to hydrolysis. The pH of the tissues greatly affects the nerve-blocking action. Inadequate anaesthesia results when injecting into an inflamed or infected area. Normal tissue pH is 7.4, whereas the pH of an inflamed area is 5.0 to 6.0. Increasing the alkalinity of the solution speeds up its action. After administration of a local anaesthetic into the soft tissues, molecules of the local anaesthetic transverse the distance from one site to another along the concentration gradient. The local anaesthetic moves towards the nerve, based on concentration gradients. As the local anaesthetic diffuses into the nerve, it becomes diluted by tissue fluids, as well as, being absorbed by capillaries and lymphatics.

The timing of administration of the local anaesthetic – 'Pre-emptive analgesia'

The timing of analgesic administration is important, as general anaesthesia does not necessarily equate with analgesia. It has been shown that administration of analgesics before infliction of pain, termed 'pre-emptive analgesia', greatly reduce the degree of pain the central nervous system registers, and therefore post-operative. The whole concept of 'pre-emptive analgesia' rests on the belief that one is blocking sensory nociceptive information from onward transmission. If nociceptive information is permitted to reach the spinal cord a state of central hypersensitivity or 'wind-up' is induced.

The Armamentarium

The three important components of the local anaesthetic armamentarium are the syringe, the needle and the cartridge (Figure 1). The most common syringe used is the aspirating syringe and represents the standard of care. A needle is attached to the syringe barrel and penetrates the diaphragm of the local anaesthetic cartridge. If the needle tip rests within the lumen of a blood vessel when a negative pressure is applied to the thumb ring on the piston, blood enters the needle lumen and is visible in the cartridge. With most other types of syringes, aspiration must be performed purposefully by the operator.

There are a number of different gauges and length of needle. The most commonly used needles are 27- and 30-gauge. The average length of a short needle is 20mm, which may be used for all local anaesthetic nerves blocks in cats, maxillary blocks in dogs, whereas long needles, 30mm, are preferred in mandibular blocks in dogs.

The dental cartridge is a glass cylinder containing local anaesthetic. In Australia the cartridge contains 2.2mls of solution. The drug within the cartridge is listed by its percent concentration on a plastic label applied to the cartridge.

Figure 1

Types of analgesics

There are several drugs, which are classified as local anaesthetics, but not all are used in dentistry. The most common anaesthetics used for local analgesia in veterinary dentistry are lignocaine, mepivacaine, and bupivacaine. The type of analgesics administered is often determined by either the degree or duration of the pain and the time required for the onset of action. The duration of the drug can be expressed as the time it influences the soft tissues. The duration varies in each patient and follows a normal distribution curve depends on the following factors:

- Individual response to the drug (the 'bell-shaped' curve).
- Accuracy in placement of the drug.
- Status of the tissues at the site of drug deposition (vascularity, pH).
- Anatomical variation.
- Type of injection administered (infiltration, nerve block).

Accuracy in the administration of the injected drug is the second

factor influencing drug action. Accuracy in deposition is a major factor in many nerve blocks in which the soft tissue thickness must be penetrated to access the nerve to be blocked. Deposition of drug close to the nerve provides excellent anaesthesia compared with drug deposited further away.

The status of the tissues into which the drug is placed influences the duration of anaesthetic action. The presence of normal healthy tissue at the site of drug deposition is assumed. Inflammation, infection or pain, usually decrease the depth and duration of anaesthesia. Increased vascularity at the site of drug deposition results in a more rapid absorption of the local anaesthetic and shorter duration.

Finally, the duration of clinical anaesthesia is influenced by the type of injection administered. The recommended minimum volume should be injected. Smaller than recommended volumes decrease the duration of action. Larger than recommended doses do not provide increased duration.

The dose of local anaesthetic drugs is presented in mg/kg. To increase safety, one should always use the minimum drug doses and use the smallest clinically effective dose. Maximum doses are unlikely to be reached in large breed dogs, but it is very easy to overdose the small breed dogs and cats. The maximum calculated drug dose should always be decreased in medically compromised or older patients. Changes in liver function, plasma protein binding, blood volume, and other important physiological functions influence the way local anaesthetics are distributed and biotransformed in the body. The half-life is significantly increased in the presence of decreased liver function or perfusion.

	Lignocaine	Mepivacaine	Bupivacaine
Classification	Amide	Amide	Amide
Metabolism	Liver (microsomal fixed function oxidases)	Liver (microsomal fixed function oxidases)	Liver (hepatic amidases)
Excretion	Kidneys (10% unchanged)	Kidneys (1% - 16% unchanged)	Kidney (16% unchanged)
Vasodilation	Yes	Slight	Significant
pKa	7.9	7.6	8.1
Onset of Action	Rapid (1.5 to 2 minutes)	Rapid (2 to 3 minutes)	Slow (6 to 10 minutes)
Effective dental concentration	2%	3% (without vasoconstrictor) 2% (with vasoconstrictor)	0.5%
Half-life	90 minutes	1.9 hours	2.7 hours
Max recommended dose	4.4 mg/kg	6.6mg/kg	1.3 mg/kg
Maximum dose	1 cartridge per 10kg bodyweight	1 cartridge per 10kg bodyweight	1 cartridge per 10kg bodyweight
Duration of Action) (soft tissue)	5 to 30 minutes	2 to 3 hours	4 to 6 hours

Properties of the commonly used local anaesthetic agents.

Lignocaine, a short acting anaesthetic, is available with and without adrenaline. Plain lignocaine has marked vasodilator effects, which limit the duration of action to only 5-10 minutes. It therefore does not have many clinical applications in veterinary dentistry. The addition of adrenaline produces vasoconstriction and a decreased blood flow leading to less bleeding in the area. The decreased blood perfusion leads to slower absorption into the cardiovascular system and more drug remains at the site and therefore an increased duration, extending to 30 minutes.

Mepivacaine, a medium acting anaesthetic, has a rapid onset of action 1.5 minutes, and a longer duration than lignocaine. It is also available with and without adrenaline. It can be used quite successfully as the plain drug without vasoconstrictor added.

Bupivacaine is available as a 0.5% solution combined with adrenaline. It has a longer onset of action than the others, and a longer duration of soft tissue anaesthesia. For short surgical procedures, bupivacaine can be administered for pain control. For longer surgical procedures, or when long duration post-operative pain control is required, a shorter acting anaesthetic can be given pre-emptively, and then bupivacaine administered at the end of the procedure, just prior to the patient waking up form general anaesthetic. Bupivacaine is not recommended in patients whom the risk for post-operative soft-tissue injury, produced by self-mutilation is increased, such as tongue trauma from chewing after a mandibular nerve block.

The use of vasoconstrictors should be chosen with care. Firstly consider, inadvertent use of excessive volumes of local anaesthetic may result in vasoconstriction of the local area with resultant ischemia. Although uncommon, this should be considered when placing local anaesthetics in soft tissues. Secondary, inadvertent deposition of local anaesthetic with adrenaline whilst the patient is undergoing general anaesthesia maintenance using halothane may result in a large release of catecholamines and potential cardiac complications.

The length of time for which pain control is necessary is a major consideration. A long duration anaesthetic can be chosen when postoperative pain is going to be encountered. When significant postoperative pain is a factor 0.5% buprenorphine (for 4 to 6 hours of soft-tissue anaesthesia). When postoperative anaesthesia may lead to complications, shorter duration anaesthetics should be considered. Thus, 3% mepivacaine is recommended. Anaesthetic solutions containing a vasoconstrictor are recommended when haemostasis is desirable. When contradictions exist to the administration of the selected local anaesthetics, it should not be used, especially when an absolute contra-indication is a known, or a documented reproducible allergy.

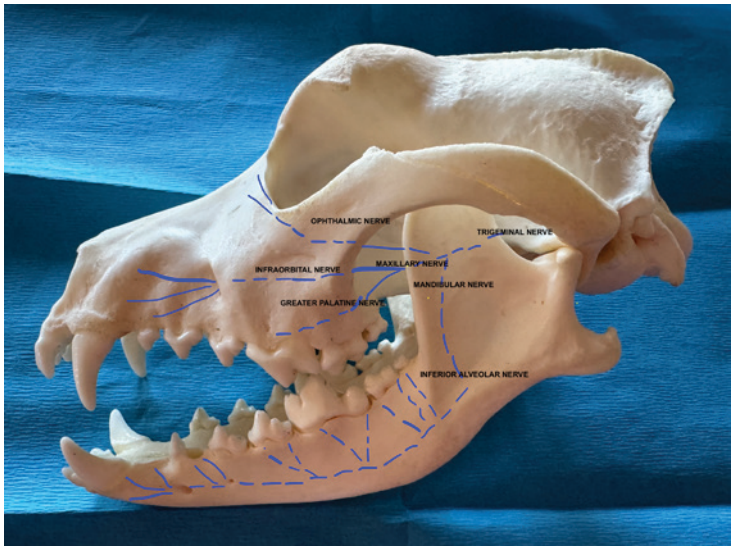
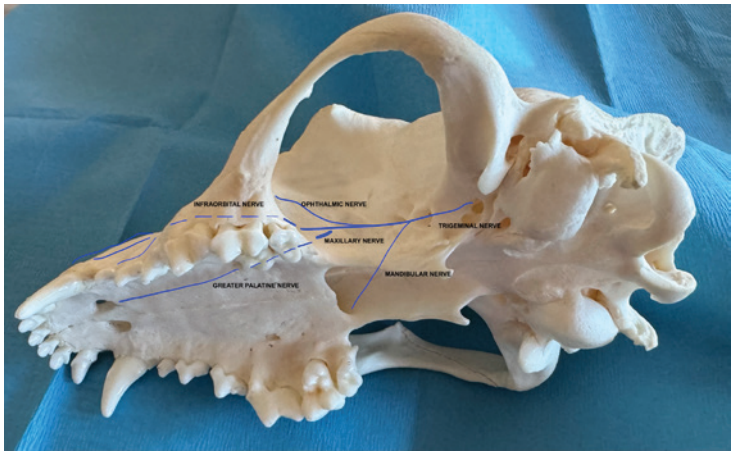


Figure 2



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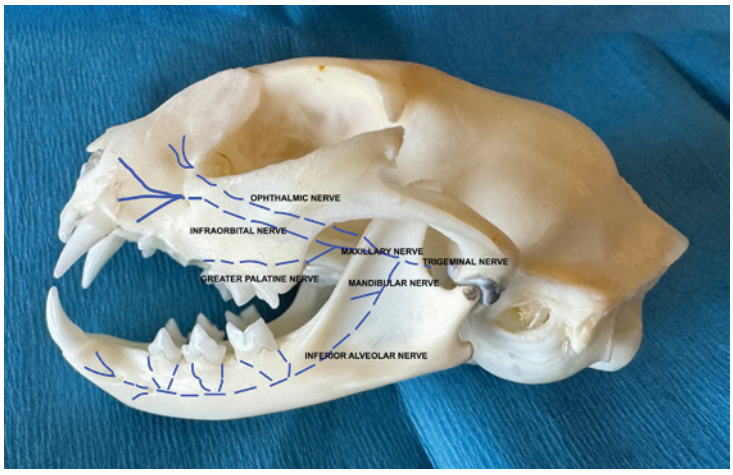

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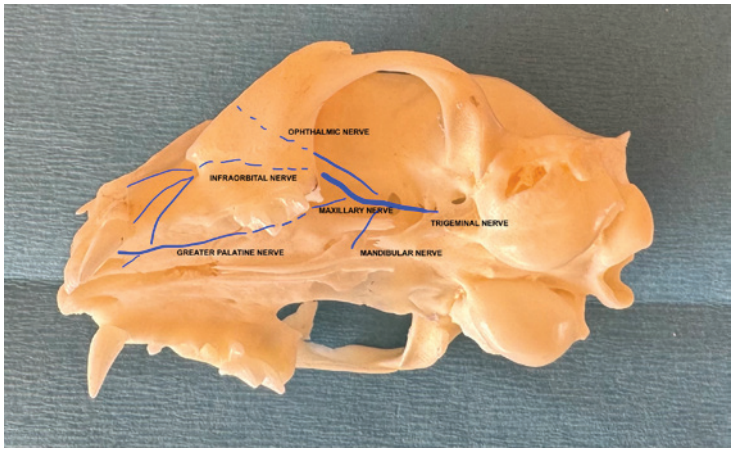

Anatomy for regional anaesthesia

The anatomy of the head, neck and oral cavity should be reviewed (Figures 2-5).

Techniques for local anaesthesia

In this article we will describe the infra-orbital, the greater palatine, the mandibular and mental nerve blocks.

Infraorbital Nerve Block

This technique uses an intraoral approach. Analgesia is provided to the ipsilateral maxillary teeth and palate when placed the full length of the canal. The length of the infraorbital canal varies dramatically between species and breeds, and this must be taken into consideration during the application of the nerve block. Care must be taken in brachycephalic breeds and cats, as the distance from orbit is very close to the distal end of the canal. A 27-gauge short (cat) (Figure 6) or 30-gauge long (dog) (Figure 7) needle is recommended. The lip should be lifted to reveal the teeth and buccal mucosa. The infraorbital foramen is an oval shaped foramen located dorsal to the distal root of the third premolar on the buccal aspect of the maxilla. The needle should be inserted into the canal from the rostral aspect, keeping the needle parallel to the dental arcade. Once inside the canal, the needle is advanced to the depth of the canal, which is approximately at the level of the distal root of the fourth premolar tooth. The syringe should be aspirated to ensure the needle is not in the artery/vein. Slowly deposit 0.1 mLs (cat) and up to 0.5 mLs (dog) over 30 seconds. The needle is withdrawn. Placing a finger over the foramen for 30 seconds will ensure the anaesthetic diffuses caudally. Complications may include a haematoma but this is rare, as it is a relatively simple technique with easy to find landmarks.

Greater palatine nerve block

The greater palatine nerve block is used when manipulation of the palatal soft tissues is manipulated distal to the canine. The greater palatine foramen is located midway between the palatal midline and the palatal border of the teeth, as the level of the anterior border of the maxillary fourth premolar tooth. A 27-gauge short needle is recommended. The needle is inserted, with the bevel towards the bone, through the mucosa slightly anterior to the greater palatine foramen. Advance the needle slowly until bone is gently contacted. The general depth of penetration is 2mm in the cat (Figure 8) and 5mm in the dog (Figure 9). Aspirate. Slowly deposit 0.1 mLs (cat) and up to 0.5mls (dogs) over 30 seconds provides profound hard and soft tissue anaesthesia. You should be able to see the solution under the mucosa. Slowly withdraw the needle.

Inferior alveolar (mandibular) nerve block.

The inferior alveolar nerve block anaesthetises the inferior alveolar branch of the posterior division of the mandibular nerve, the incisive nerve, and the mental nerve. It is used for procedures on multiple teeth in one mandibular quadrant, when buccal soft tissue anaesthesia is necessary, or when lingual soft tissue anaesthesia is necessary. Contra-indications are when infection is present in the area of the injection and in patients that may bite or self-mutilate the tongue after anaesthesia.

An intra-oral approach is used to locate the mandibular foramen on the lingual surface of the mandible at a point halfway along an imaginary line drawn between the last molar tooth and the angular process of the mandible. This point can be found by placing the veterinarian's finger and thumb on the outside of the of the patient's head. By placing


Figure 6

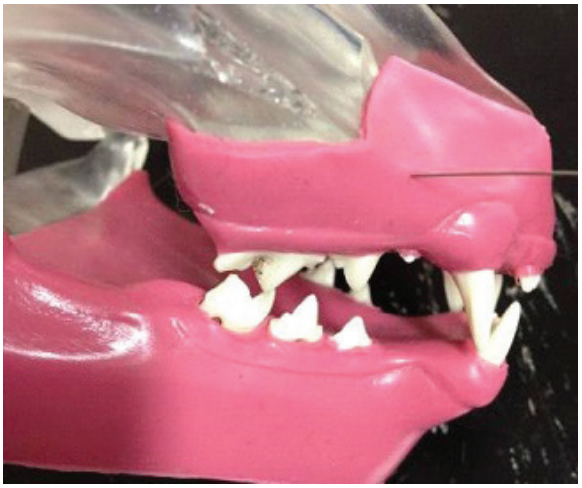
Figure 7


Figure 8


Figure 9

the thumb on the last molar tooth intra-orally and the forefinger on the angular process extra-orally, the mandibular foramen can be estimated to be halfway between these points.

A 27-gauge short needle (cat) and long needle (dog) is recommended. The mouth should be opened wide, and the lip pulled laterally, and the tongue reflected to the opposite side of the mouth. The bevel of the needle is orientated towards the bone. Insert the needle through the mucosa caudal to the last molar tooth towards the angular process (Figure 10, 11). Advance the needle slowly until bone is gently contacted. The needle is advanced along the bone towards the entrance of the foramen until the tip is at the halfway point. The general depth of penetration is approximately 10 mm in the cat, 15 mm in a small dog and 20 mm in a large dog. Before injecting make sure of the depth of needle is adequate. Do not deposit local anaesthetic if bone is not contacted. Aspirate. Slowly deposit 0.1 mLs (cat) and up to 0.5 mLs (dog) over 60 seconds. Slowly withdraw the needle.

Mental nerve block

The mental nerve block anaesthetises the inferior alveolar branches of the mandibular nerve rostral to the second premolar tooth. It is used for procedures on canine and incisor teeth.

An intra-oral approach is used to locate the mental foramen on the buccal surface of the mandible caudal to the lip frenulum ventral to the second premolar tooth. A 30-gauge short needle is recommended. The upper lip is raised, and the lower lip pulled ventrally to expose the frenulum. The bevel of the needle is orientated towards the bone. Insert the needle through the mucosa cranial to the frenulum towards the foramen (Figure 12, 13). Advance the needle slowly until it enters the foramen. The general depth of penetration is 2-3mm in the cat, 5mm in a dog. Aspirate. Slowly deposit 0.1 mLs (cat) and up to 0.5 mLs (dog) over 60 seconds. Slowly withdraw the needle.

Conclusion

With the rise in interest in small animal welfare and the concern with pain prevention by both the pet owner and the companion animal veterinarian, analgesia during dental procedures should be a serious consideration. Local anaesthetic nerve blocks have enabled human dentistry to advance in leaps and bounds. As they have now been proven to work clinically in veterinary dentistry, analgesia should be available to all small animal patients.

A special issue of the Journal of Veterinary Dentistry featuring local anaesthesia will be available in Volume 42 Issue 1, January 2025. To subscribe to the Journal of Veterinary Dentistry, log onto the Foundation for Veterinary Dentistry website: https://veterinarydentistry.org/. A free sample of the Journal, Volume 40 Issue 1, March 2023, can be accessed on the link https://journals.sagepub.com/toc/jovb/40/1

Figure Legends

Figure 1. A self-aspirating dental syringe with cartridge and needle attached.

Figures 2-5. Skulls demonstrating the position of the trigeminal nerve (Cranial nerve V) and its associated branches. Lateral and oblique views of mesocephalic dog and a cat skull.

Figure 6-7. Infraorbital nerve block. Insertion of the needle through the buccal mucosa towards the rostral foramen of the infraorbital canal in a dog patient and a cat model.

Figure 8-9. Greater palatine nerve block. Insertion of the needle through the hard palate mucosa towards the palatine foramen in a dog patient and a cat model.

Figure 10-11. Inferior alveolar (mandibular) nerve block. Insertion of the needle through the mucosa adjacent to the last molar tooth in a dog and cat model.

Figure 12-13. Middle mental nerve block. Insertion of the needle through the mucosa towards the middle mental foramen in a dog and cat model.

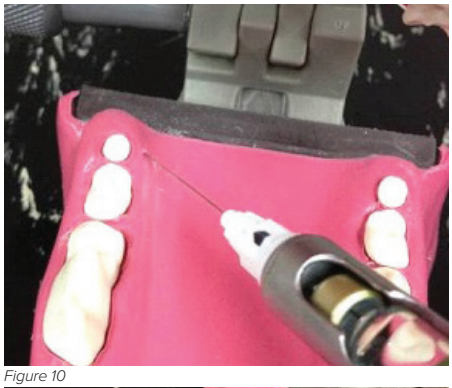

Figure 10

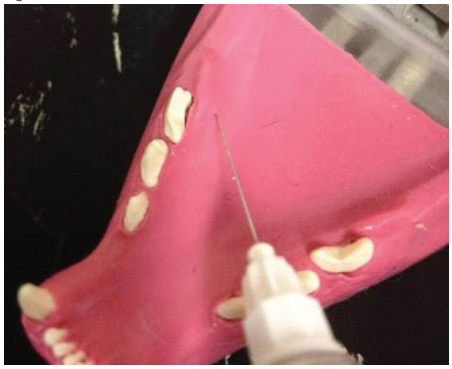

Figure 11

Figure 12

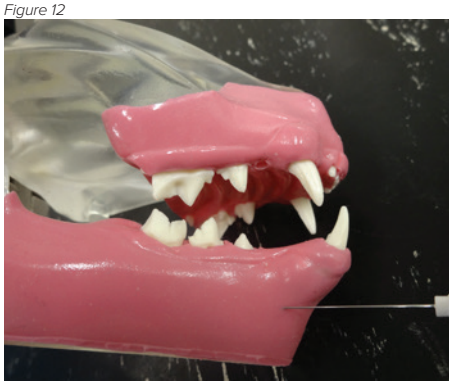

Figure 13

Now you have finished the module. These are the answers

1. A nerve possesses a resting potential of –**70 mV**.
2. After depolarisation, repolarisation occurs, and the nerve returns to its original resting state. All this occurs in 1 millisecond – depolarisation (**0.3 msec)** and repolarisation (**0.7 msec**).
3. The pH of the tissues greatly affects the nerve-blocking action of the anaesthetic solution. Inadequate/adequate anaesthesia results when injecting into an inflamed or infected area. Normal tissue Ph is **7.4**, whereas the pH of an inflamed area is **5 to 6**.
4. The timing of analgesic administration is important, as anaesthesia does not necessarily equate with analgesia. It has been shown that administration of analgesics before infliction of pain, termed **'pre-emptive analgesia'**, greatly reduces the degree of pain the central nervous system registers, and therefore post-operative pain
5. The dental cartridge is a glass cylinder containing local anaesthetic. In the USA, the cartridge contains **1.8mls** of solution, whereas in Australia and the UK it contains 2.2mls.
6. Complete the following table (state the time of onset of action):

	Lignocaine	Mepivacaine	Bupivacaine
Onset of action	Rapid (1.5 to 2 minutes)	Rapid (2 to 3 minutes)	Slow (6 to 10 minutes)

7. Complete the following table (complete in minutes):

	Lignocaine	Mepivacaine	Bupivacaine
Duration of action	5-30 minutes	2-3 hours	4 to 6 hours

8. The techniques for regional anaesthesia of the maxillary incisor teeth require the **anterior superior alveolar** nerve block and the **nasopalatine** nerve block.
9. An intra-oral approach is used to locate the mandibular foramen on the **lingual** surface of the mandible at a point **halfway** along an imaginary line drawn between the **last molar** tooth and the **angular** process of the **mandible**.

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LET SLEEPING DOGS LIE - AN ALARMING NUMBER OF AUSSIES SHARE BED WITH PETS

- **Compare the Market research found that one in two pet owners let their pet cat or dog sleep in bed with them.**
- **Gen Z pet parents are the most likely to let their pooch or cat sleep with them, with over 60% of them stating that their bed is just as much a place for their pet as it is for them.**
- **Millennials are the least likely generation to invite their furry friend onto their covers.**

Most people like a good lie in bed, but according to recent Compare the Market research, so do our pets. The pet insurance comparison site found that close to one in two pet owners (48.7%) let their pets sleep with them, which will undoubtedly cause arguments for couples nationwide.* To add to the pile (in the bed), this year's figures are a significant increase from last year, when Compare the Market found that 41.4% of pet owners sleep with their furry friends.

This year's figures also reveal that every three in five Gen Z cat or dog owners (60.9%) let their pet under the soft doona covers, which should come as no surprise as previous Compare the Market research found this generation was the most likely to say that a pet is or would be as equally important as a child.

And while Millennials may have coined the term 'fur baby,' the survey found that they were the least likely of all generations to let their pooch or kitten snuggle up in bed with them. Just over 42% of Millennial pet owners would still share their side of the bed, which is below the average.

Speaking on wanting the best for our four-legged friends, Compare the Market's Executive General Manager for General Insurance and pet insurance expert Adrian Taylor said that we shouldn't just offer our pets creature comforts for a lavish lifestyle. "It's a 'tail' as old as time and while it's one of the most debatable topics across Aussie households, it appears that half of us really do think pets belong in bed with us," Mr Taylor said. "While some argue that letting your canine or puss sleep in bed causes health issues, disrupted sleep and arguments between partners, others say it makes them feel safe and loved." "Regardless, no matter how we look at it, there are some seriously spoiled animals across Australia! We give them the best food that money can buy and we buy them all the treats and toys we can to ensure that they're entertained, but it's important never to forget their health," Mr Taylor said. "Skipping a general health check-up for your pup may seem non-consequential, but it can have a detrimental effect down the line. Think about these visits the same way you view your yearly GP visit. It's just good sense to have someone check over you to catch any ailments. The same should go for your pet. "Another thing that many people may forget to get for their pet, no matter how much they love them, is pet insurance. We know cats and dogs of all sizes are quite curious and adventurous, so an emergency vet visit is not out of the question for a pet of any age. "These visits could cost

hundreds to thousands of dollars, which can be hard to come by in an instant in the current cost-of-living crisis. “However, if costs for these sorts of emergencies are a concern, then pet insurance may be able to help by covering a part of the overall cost of these treatments, depending on the level of coverage people take out for their four-legged family member. “Pet insurance policies offer many different levels of cover, which is why pet parents need to compare their options and shop around to find the best policies for themselves and their pets. “Furthermore, some policies out there also cover some of the costs associated with routine check-ups or even vaccinations as an optional extra, which is just another reason not to skip out on their pet’s annual check-up.” Adrian Taylor’s top tips for people considering pet insurance:

1. Be sure to read the Product Disclosure Statement (PDS) to understand the limits of the cover you are looking to buy. There may be a difference in the levels of reimbursement depending on the level of cover you’re looking at as well as between brands. A variety of products cover between 70% and 90% of vet bills. However, some products cover less and others cover more. For most claims, you will also need to contribute to the policy excess.
2. Insure your pet when they are young. Your pet insurance premiums will be lower than if you were to insure your pet at a later stage, as the older they are, the more likely they are to have pre-existing conditions that could drive up the cost to be covered.
3. When reviewing your pet insurance options, also consider if there are any types of extras that you would like your policy to include. Depending on your level of cover, you may be able to add on extras such as dental cover, routine care or even behavioural training, though this may increase the premiums that you will need to pay.

**Compare the Market surveyed 1,010 Australia adults aged 18 and over in April 2024*

% OF PET OWNERS WHO LET THEIR PET SLEEP WITH THEM

GENERATION	%
Gen Z	60.9%
Millennials	42.4%
Gen X	47.9%
Baby Boomers	49.1%
Australian average	48.7%

ZOO AND WILDLIFE ANAESTHESIA: RISKS FOR PATIENT AND OPERATOR

NIGEL DOUGHERTY EVALUATES THE WIDER ASPECTS OF PROVISION FOR THIS PRACTICE.

Nigel Dougherty BA BVSc MVSc MANZCVS

How sure are we that we adequately support a tiger's kidneys each time the tiger in question is placed under prolonged general anaesthesia?

What about the same considerations in giraffes – particularly with the extremely high renal interstitial hydrostatic pressures that they maintain? What is the optimal way to support rhino ventilation under anaesthesia? Are we confident about our intuition and monitoring in these regards?

Pharmacodynamic studies involving or comparing particular immobilisation regimens in the peer-reviewed zoological literature are commonplace. Much less such attention, however, seems to have been given to critically evaluating the wider aspects of anaesthesia provision and to evaluating the full extents of patient physiological homeostasis – particularly under more prolonged anaesthesia in everyday zoo and wildlife veterinary practice.

Yet to identify ways to enhance safety using existing drugs and technologies (novel ones of which, after all, are intermittent in their emergence), both the immobilisation regimens used and the risk factors associated with the means of anaesthetic maintenance must be considered together for better mechanistic understanding of whether (and if so, how and why) disturbances to physiological homeostasis occur under anaesthesia. This assessment process is particularly relevant to compromised patients, for whom effects of pre-existing morbidities may be greatly exacerbated by anaesthesia (Trim et al, 2014).

Even with these empirical contributions from the extensive pharmacodynamics studies that have been undertaken on immobilisation regimens, important knowledge gaps remain that limit evidence-based choices in the immobilisation and maintenance anaesthesia practices used in zoological medicine (Ozeki and Caulkett, 2014).

Thankfully, these pharmacodynamic studies are largely predicated on evaluation of the effect of different regimens on the cardiovascular and respiratory system, but often, a lack of more specific monitoring and a variety of

The use of total or supplementary intravenous anaesthesia with propofol may reduce dependence on inhalational anaesthetics, reducing adverse effects. Image: Nigel Dougherty.

interpretative issues may influence how effective these measures are for properly evaluating really fundamental processes, such as tissue perfusion and lung function (Noori and Seri, 2008; Hubbell and Muir, 2009).

It may also be particularly difficult to directly compare regimens, given the challenges associated with making valid comparisons about anaesthetic depth when involving different pharmacological regimen (Whelan and Flecknell, 1992; Musizza and Ribaric, 2010; Trim et al, 2014).

Rarely, too, have pharmacodynamics studies in zoological species been undertaken concomitantly with pharmacokinetic studies (Hunter, 2010; Hernandez, 2014), making it difficult to refine protocols on the basis of abilities to relate physiological effects to the bio-distribution of drugs used in different approaches.

The restricted physiological focus of these pharmacodynamic studies also raises uncertainty about the range of other effects on the animals' physiological homeostasis these regimens may be inducing, including the potential for subclinical injury of potential long-term health significance. I often think about things like kidneys and allometric issues that come into play in all sorts of guises (for sheer size increases risks), but other potentially pertinent issues persist, such as risks of aspiration pneumonia or other oesophageal reflux injuries that might equally be considered.

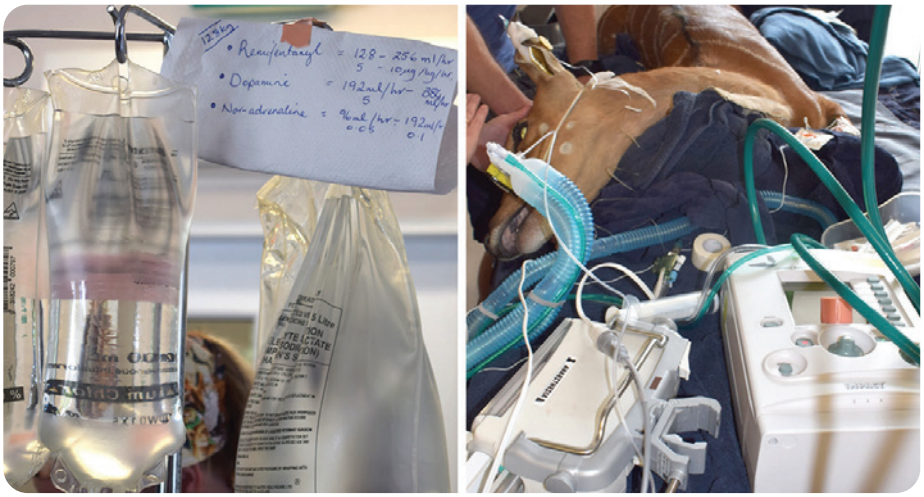
Perhaps I'm just overly concerned for nothing. But what if I'm not? With justifiably limited recourse to controlled clinical trials in a zoological context, far more opportunistic means are required to assess safety pertaining both to the regimens used and to the subsequent delivery of anaesthesia, and this obviously makes the task of evidence-based assessment much more of a challenge.

Refinements to anaesthetic regimens

Possible refinements to anaesthetic regimens and implementation of the way anaesthesia is maintained are as many and as varied as the informed imagination can conjure up.

The most pertinent that I can think of may include dosage adjustments and trialling of alternate drug combinations for more balanced anaesthesia and, above all, for reduction of anaesthetic drug maintenance requirements.

This particularly includes better regional anaesthesia and the much wider consideration of specific "minimum alveolar concentration (MAC) sparing drugs", the latter concept of which could also embrace greater exploration of total or supplementary intravenous anaesthesia (TIVA; SIVA) to reduce dependence on inhalational anaesthetics for maintenance.



Left: vasopressors are a useful adjunct for support of blood pressure, but do we have a complete enough understanding of their haemodynamic effects in different species to be satisfied that blood flow is preserved to organs such as the kidneys? Right: an arterial pO2 level of 706mmHg under 100% oxygen was achieved for this nyala receiving mechanical ventilation while being maintained under propofol anaesthesia, likely attained through absolute optimisation of ventilation-perfusion matching. Images: Nigel Dougherty.

We all know how nasty these inhalational anaesthetics are in obtunding things, causing problems such as venodilation and reduced baroreceptor responsiveness.

Continuous rate infusions of phenylpiperidine opioid derivatives (remifentanil in particular comes to mind) have been shown to have strong MAC-sparing effects in humans (Lang et al, 1996), while the nonspecific plasma and tissue esterase metabolism, anti-nociceptive and non-cumulative effects of remifentanil make it a potentially very useful adjunct to zoo anaesthesia – particularly (but far from exclusively) when involving painful procedures.

Other refinements to the delivery of anaesthesia itself may include, for instance, far more critical evaluation of the anaesthetic depth at which patients are maintained, the optimal manner and timing of alpha-2 adrenergic agonist reversal, the more informed use of vasoactive drugs based on a better understanding of their haemodynamic effects in different species (Mama, 2019) and, last (but far from least), the optimisation of different forms of ventilation support and inspired oxygen fractions provided to different patients.

Even simple things such as patient positioning or applying ways to reduce laryngeal stimulation at intubation time need properly thinking about, because their impact may be potentially very significant. In larger animals and in prey and flighty species, considerations that range from pre-anaesthetic behavioural conditioning to the strategic use of dantrolene may assist in mitigating risks of precipitation of capture myopathies. Ample scope is always available to keep exploring and refining best practice.

Hypotension: how low is too low?

I find it interesting that the best way to characterise hypotension is still debated even in human medicine (Salmasi et al, 2017), albeit with much of the debate happening across the contexts of different states of illness.

Important guidelines have nevertheless been established from studies of cardiac and renal injury associated with it in humans and in some domestic animals. While acknowledging that, many of these guidelines may be more applicable to critical patients undergoing higher risk procedures in humans (Meersch et al, 2017).

Trim et al did state in 2014 that hypotension involving a mean arterial pressure (MAP) of less than 55mmHg is considered to be potentially life threatening in the veterinary context (although, the context itself was not specified). Elevated risk of acute kidney injury has indeed been associated in retrospective human studies with MAP less than 60mmHg for more than 20 minutes and MAP less than 55mmHg for more than 10 minutes (Meersch et al, 2017). Salmasi et al (2017) even concluded that in human operative cases, associations exist between myocardial and renal injuries and sustained MAP falling under 65mmHg, without any important interaction with preoperative blood pressure.

It is really not known which minimum acceptable MAP ranges may apply to different species of large zoo mammals under anaesthesia. Furthermore, given the critical importance of age as a risk factor for the development of perioperative hypotension in human anaesthesia (Cheung et al, 2015), could it be possible that different guidelines should apply to aged or geriatric individuals? Older animals, for instance, are more likely than their younger counterparts to present with pre-anaesthetic hypertension and other

pathologies associated with degenerative renal disease (Longley, 2012). Such already volume-contracted patients may be far more susceptible to the vasodilatory effects of anaesthetics (Lawson and Hutton, 2012; Barak et al, 2015), rendering them more sensitive to hypotensive influences.

Irrespective of the appropriate guidelines associated with its classification, the presence and prevalence of relative hypotension that may be apparent in zoo animal and wildlife anaesthesia requires more critical scrutiny of the circumstances leading to these states. This situation of hypotension would be particularly concerning when concurrent heart rates (as a key component of augmenting cardiac output) fall below those expected from extrapolations based on allometric scaling of heart rate for bodyweight (Sedgwick, 1991).

Besides the significant difficulties associated with re-establishing blood flow following microcirculatory collapse (Moore et al, 2015), the dominant contribution made by venous vasodilation to the anaesthesia-driven condition of relative hypovolaemia is another important reason for concerted efforts to pre-empt and avoid hypotension. In human anaesthesia, venous vasodilation may be relatively unresponsive to the use of vasopressors (Noel-Morgan and Muir, 2018), and this may potentially be equally relevant to zoo animal anaesthesia.

What do we really know about the differential effects of different vasopressors on blood flow to different organs with different physiological properties and different capabilities of autoregulation under anaesthesia? A need exists perhaps to investigate practical means of augmenting haemodynamic measures to improve the characterisation of hypo-perfusion in the zoo anaesthesia context.

It could be suggested, for example, that particularly in more vulnerable patients, future safety-oriented research could focus on the strategic or serial measurement of parameters such as arterio-venous carbon dioxide gradients, as these may provide clinically useful means to gauge the adequacy of perfusion and to augment the combined monitoring of the various haemodynamic measures that are currently used.

Hypertension: how high, and for how long?

More hypertensive blood pressures may also not necessarily translate into normal perfusion – particularly when alpha-2 agonists are responsible for the higher blood pressure in the earlier phase of their pharmacokinetic actions.

Although the effects of medetomidine on renal arterial blood flow in dogs have been shown to be much less pronounced than in other abdominal organs (Miño et al, 2008), variations in its effects on renal blood flow and glomerular filtration rate have been found in different studies. These variations may reflect the different drug regimens used, with the dosage and route of administration of medetomidine influencing its biphasic effects on blood pressure (Saleh et al, 2005).

Furthermore, glomerular blood flow may not equate with distal renal parenchymal flow – particularly as the effects of alpha-2 agonist vasoconstriction in the kidneys are mediated primarily through efferent arterioles (Kushiro-Banker et al, 2013). As such, it is possible that increases in glomerular blood flow and glomerular filtration rates in states of alpha-2 agonist induced hypertension may be associated with concomitant reductions in renal medullary blood flow.

Perhaps I'm concerned about prolonged alpha-2 agonist hypertension without having justifiable cause to be – but do we have good systems of risk assessment?

Ventilation issues

While recognising the critical value of mechanical means to support ventilation, the haemodynamic impact of different methods of positive pressure ventilation may be potentially significant, further reducing cardiac output if hypovolaemic conditions are precipitated by anaesthesia and not duly recognised (Poor, 2018).

This balance is particularly challenging to attain in larger patients; for instance, rhinoceroses normally hypo-ventilate under anaesthesia, and ventilation-perfusion mismatches are often associated with the difficulties in supplying the required tidal volumes without simultaneously prolonging pulmonary vascular compression.

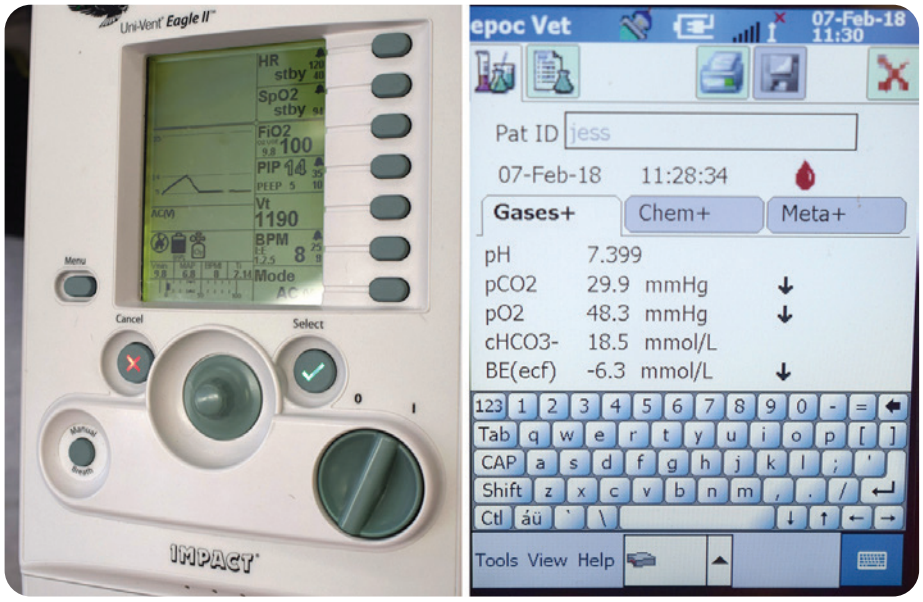
Further research comparing different approaches to mechanical ventilation – especially in larger mammal species – is strongly warranted in a zoological context, particularly in terms of optimising the trade-off between the benefits of these techniques and the risks of unwanted consequences associated with their application.

Inspired oxygen fractions also need much more detailed investigation for determination of more optimum delivery – particularly given the tendency for high inspired oxygen fractions to induce clinically relevant absorption atelectasis.

Depth of anaesthesia: be gentle with that anaesthetic throttle

As a personal observation, for practical reasons, there often appears to be a relatively intermittent nature and limited breadth of monitoring records for many of the combined measures usually used to refine estimation of anaesthetic planes in zoological medicine (that is, in comparison with domestic animals or humans). Yet, mitigation of the risks to patients associated with the development of deeper anaesthetic states rests in large part with the ability to be really confident with the accuracy of depth of anaesthesia estimation.

The ability to provide more standardised measures of depth would also assist with comparing different approaches to anaesthetic management. However, as alluded to already, realisation of these



***Left**: the exact manner of mechanical ventilation may influence ventilation-perfusion matching and wider cardiovascular parameters. **Right**: sophisticated point of care systems, such as the EPOC machine (pictured), provide invaluable information pertaining to blood gases, acid-base status, key electrolytes such as Na, K, Cl and ionised Ca, as well as important biochemical parameters such as lactate and creatinine. This provides excellent real-time monitoring information – especially when drawn directly from catheterised arteries. Images: Nigel Dougherty.*

The time taken to establish invasive arterial blood pressure monitoring is very likely to be justified for prolonged anaesthesias, for the real-time monitoring information provided. Image: Nigel Dougherty.

latter objectives is actually challenging because of the different physiological and autonomic responses of different species to the same drugs, the different depths at which these responses may be manifest in different species3 (Whelan and Flecknell, 1992), and because of the unique way that different drugs alter cardinal signs both in a particular species and among conspecific individuals (Taylor and Clarke, 2007; Hubbell and Muir, 2009).

To address these issues in the zoological anaesthesia context, measures that relate plasma concentrations of anaesthetic drugs to pharmacodynamic effects will have important research value. Certain measures of electro-encephalographic activity may, with much further research, offer some clinical potential (Hatt and Jurado, 2012), but they are currently unlikely to serve any immediate day-to-day practical value.

Assessment of anaesthetic depth in zoo mammals depends on frequently measuring and recording of the various somatic and autonomic measures that are standard practice, while simultaneously relating these to injectable drug dosing history and end-tidal anaesthetic concentrations.

During the course of researching the subject, I have found it interesting to read that some autonomic measures, such as heart rate and blood pressure monitoring, are considered by some authors to provide an insensitive and unreliable indicator of anaesthetic depth.

In human anaesthesia, for example, haemodynamic measures have been found to provide a poor indicator of the hypnotic-anaesthetic status of the patient (Struys et al, 2002). In the veterinary context, cardiopulmonary effects are determined by the combination of pre-anaesthetic and anaesthetic agents used, and their dose rates, making heart rates and blood pressure unreliable guides to depth of anaesthesia (Popilskis et al, 2008; Trim et al, 2014).

Haskins (2015) also cautions that autonomic parameters may not change until after the anaesthesia level suddenly becomes too light, and in piglets, for example, changes in heart rate and blood pressure were not considered as a good measure of depth of anaesthesia when evaluated immediately after application of a noxious stimulus (Jaber et al, 2015). Similarly, in horses, heart rate and arterial blood pressure were considered by Trim in 1998 to provide an unreliable guide to the depth of anaesthesia.

For the anaesthesia of dangerous zoo animals, the context of depth measurement is slightly different to human and even to many other veterinary contexts. With an inclination to maintain patients at relatively greater anaesthetic depths for reasons of human safety (Hatt and Jurado, 2012), the onus of monitoring in dangerous animals may lean more towards assessing for impending responsiveness, rather than on mitigating risks of emerging awareness (latterly of which is only a very real concern in human anaesthesia).

At these greater anaesthetic depths, the accurate, real-time and trending information provided by invasive arterial blood pressure monitoring may, for example, offer more usefulness as a means to monitor, respond to and re-evaluate changes in anaesthetic depth. This is particularly the case when such measures are interpreted in the clinical context of the haemodynamic status of the patient, and when they are related to likely levels of nociception or other forms of stimulation, such as patient repositioning.

Typically, the lighter the anaesthetic plane, the higher the sympathetic activity (Ozeki and Caulkett, 2014), and with the inclination to make large changes to anaesthetic drug delivery in response to perceived lightening of anaesthetic planes in these dangerous animals, such real-time, trend information may also reduce tendencies towards over-reactive responses by the anaesthetist, contributing to overall management of anaesthesia at less physiologically challenging depths.

Since physical signs such as movement and protective reflex responses also tend to become more depressed and less reliable during prolonged anaesthetic procedures (Hubbell and Muir, 2009), the time taken to establish invasive blood pressure monitoring could become justifiable from an anaesthetic depth monitoring point of view when such circumstances are expected.

During emergence from general anaesthesia in humans, responsiveness to noxious stimuli precedes awareness (Ghoneim, 2000) and return of brainstem function and associated reflexes, which involve breathing, heart rate, blood pressure and return of muscle tone, respectively, follow an approximate caudal-cranial progression from the medulla through the pons to the midbrain (Reshef et al, 2019).

'For the anaesthesia of dangerous zoo animals, the context of depth measurement is slightly different to human and even to many other veterinary contexts. With an inclination to maintain patients at relatively greater anaesthetic depths for reasons of human safety

(Hatt and Jurado, 2012)

Similar sequential events probably apply equally to every species in the zoological context, and provided that these various brainstem-mediated reflexes are all carefully monitored in integrated fashion, subtle lightening of anaesthetic depth may be achievable, and zoo animals and free-ranging wildlife should not suddenly awaken from general anaesthesia to the point of posing immediate risk to personnel. Therefore, good scope probably exists for judicious reduction of anaesthetic depth over much of the course of anaesthetic interventions involving these animals.

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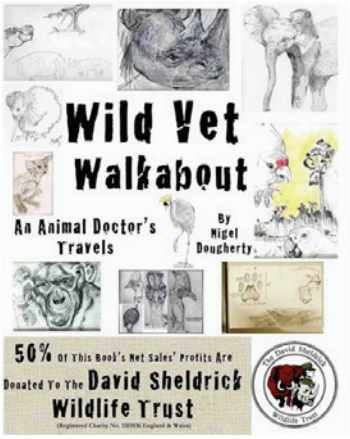
Author Biography

Nigel Dougherty is a Kenya citizen. He is the author of *WILD VET WALKABOUT* - an illustrated veterinary travelogue available from Amazon.



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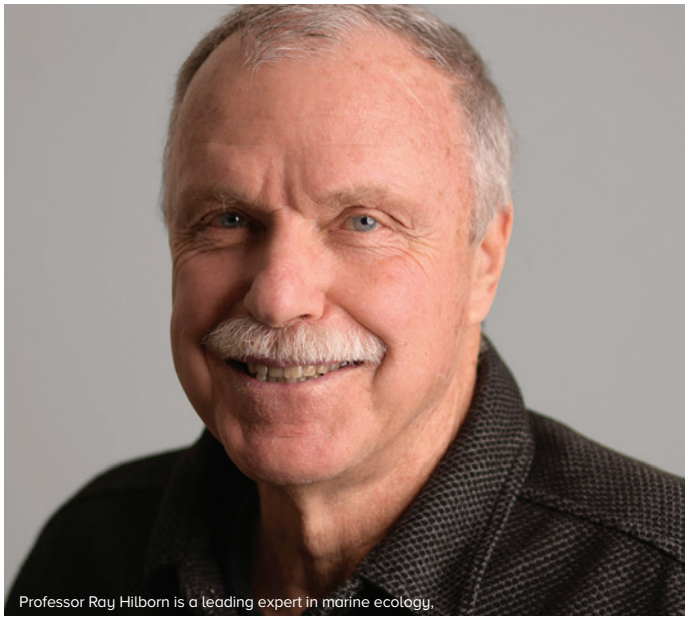
OCEANS FOR EVERYONE

An Esperance community association, Oceans For Everyone Association, is raising strong objections to the proposed South Coast Marine Park, denouncing it as a political manoeuvre lacking scientific justification. This proposal, part of a promise to deliver 5 million hectares of protected marine areas in five years, fails to consider the environmental, economic, and social impacts on our local communities and industries.
Key Points of Contention:

1. Lack of Scientific Basis: The placement and size of the proposed marine park and its designated zones are not grounded in scientific evidence. The boundaries of sanctuary and other zones have been placed either arbitrarily or on the slightest justification. Even senior representatives like Peter Sharp from the Department of Biodiversity, Conservation, and Attractions (DBCA) have admitted that the park's location is flexible, merely fulfilling a political promise.
2. Existing Protections and Management: Currently, 48% of Australian waters are already designated as Commonwealth Marine Parks. Vulnerable species and habitats including in the Recherche Archipelago are already protected by existing conservation plans and other laws. Additionally, the Department of Primary Industries and Regional Development (DPIRD) effectively manages the sustainability of fisheries and habitats. Indigenous communities' right to continue their cultural practices are already recognised without needing additional special zones in marine parks, which often become tools to promote other political, social or economic agendas rather than genuine environmental protection.
3. Economic Impact on Local Fisheries: Our commercial fisheries are models of sustainability, operating on such a small scale that further restrictions are illogical. There are only 12 commercial fishers, on average, operating between Bremer Bay and the South Australian border at any one time. The proposed marine park plan threatens the viability of already sustainable fisheries, and unfairly restricts the whole community's ability to access this public amenity for a range of socially and practically beneficial reasons.
4. Ineffectiveness of Marine Parks: Professor Ray Hilborn, a renowned fisheries scientist, emphasises that Marine Protected Areas (MPAs) are often ineffective. "When someone proposes establishing MPAs the first question to ask is what is the objective, how would you measure success and what alternative actions would achieve the same or better results," says Hilborn. He notes that MPAs can be beneficial for tourism, particularly for snorkeling on reefs, but vast networks of MPAs are unnecessary for attracting tourists.

Hilborn continues, "Most MPA advocates say they want to 'protect' the marine ecosystem, but in practice the only threat MPAs protect the ocean from is fishing. They do not protect from global warming, ocean acidification, sea level rise, coastal development, runoff of sediments and pollutants from the land, invasive species, or shipping." He suggests that if there is a problem with overfishing, the best solution is to reduce fishing effort directly rather than displacing it through MPAs.


Professor Ray Hilborn is a leading expert in marine ecology.

About Professor Ray Hilborn

Professor Ray Hilborn is a leading expert in marine ecology, resource management, and fisheries sustainability. With extensive research in ecology, statistics, and modeling, his work aims to identify the best management practices for sustainable fisheries. Hilborn\'s accolades include the 2016 International Fisheries Science Prize, the 2010 election to the American Academy of Arts and Sciences, and the 2006 Volvo Environmental Prize. His published works and advisory roles underscore his commitment to evidence-based conservation practices. He has extensively analysed global fisheries data and emphasised the need for objective, scientifically grounded approaches to marine management.

Lessons from Other Regions

Hilborn points to California as a cautionary example: “California has established a network of over 100 MPAs, and a recent 10-year evaluation showed that it had not increased biodiversity or climate resilience, and there is no evidence that overall fish abundance increased. Certainly, in some MPAs fish abundance was higher, but the fishing effort had simply moved, and the analysis of regional abundance indicated no net benefit. The 10-year review found that there were two keys to increasing tourism: nearby parking and allowing some harvest.” Similarly, New South Wales evaluated threats to its marine ecosystems and found that fishing was not among the top ten threats. The primary threats were coastal development, terrestrial impacts, and climate change. MPAs do not address these issues. Hilborn’s advice is clear: “Don’t repeat the mistakes made in California. Identify the threats to your marine ecosystem and apply the appropriate tools. MPAs may be the best tool in some places, but if you have a good fisheries management system, it is the way to solve fisheries problems.”

Control and Profit Motives

Marine parks can lead to restrictive access without public consultation, as seen with the closure of Horizontal Falls. Moreover, indigenous corporations managing these parks may enter into deals with commercial operators, including multinationals, as observed in the Buccaneer Marine Park, where a fish farm expansion is being considered. This contradicts the parks’ supposed conservation goals.

Influence of International Lobby Groups

The process surrounding the proposed South Coast Marine Park has been significantly influenced by the US-based eco-lobby group Pew Trusts. Pew\'s involvement raises serious concerns about the transparency and integrity of the decision-making process. Recently, Pew placed a full-page colour advertisement in The West Australian advocating for maximum sanctuary areas in the proposed marine park. Despite the maps and details of the proposal not being publicly released, Pew appears to have had early access to this information, raising questions about their influence and the exclusion of local voices. The Environment Minister has downplayed Pew’s involvement, yet Pew was appointed to chair the environmental advisory group for the marine parks, sidelining local stakeholders. Moreover, during the public consultation process, proforma letters from overseas Pew members are given equal weighting to handwritten submissions from local residents, further skewing the process in favor of Pew’s agenda. Pew’s involvement is not based on science or local needs but on a \"feel-good\" ideology that often disregards factual evidence and community impact. Oceans For Everyone Association urges the government to prioritise local input and scientifically backed data over the interests of international lobby groups.

Community Opposition

The majority of residents in the affected areas oppose the plans for the South Coast Marine Park. Oceans For Everyone Association has thousands of letters of opposition to the proposed South Coast Marine Park from concerned locals and others who would be affected by the proposed South Coast Marine Park. The current proposal disregards the voices of those who will be most impacted, threatening their way of life and economic stability. We urge the Cook government to reconsider this plan and to base any future decisions on properly engaged consultation with the whole community, robust scientific evidence and genuine environmental needs, rather than abstract political promises.

Conclusion

Oceans For Everyone Association stands united against the South Coast Marine Park proposal. We call for transparent, science-based decision-making processes that genuinely protect and preserve our marine ecosystems, including the value to the culture and heritage of Aboriginal people, without unjustifiably compromising local livelihoods and sustainable practices. It is crucial to consider alternative conservation methods that address real threats and support both the environment and the communities that depend on it.

REVOLUTIONISING CAT HEALTH AND LONGEVITY

The groundbreaking Lovebites cat range are designed by Aussie vets and nutritionists specifically for reducing stress/ anxiety and improving dental health. Dr Tony Gestier, veterinarian and founder of Vetafarm, emphasises the importance of our pets' evolutionary patterns and behaviours.

“When striving to enhance the health of our domesticated cats, we must consider their wild counterparts, who typically live shorter lives and are less susceptible to age-related illnesses and diseases that our pet cats experience” he says.

“Aging is unavoidable, but with modern approaches, growing old should not be a barrier to a fulfilling life for our feline companions. Through our innovative approach to feline health, we can extend the vitality and longevity of pet cats far beyond their wild cousins.”

Cat Dental Health: A Major Concern

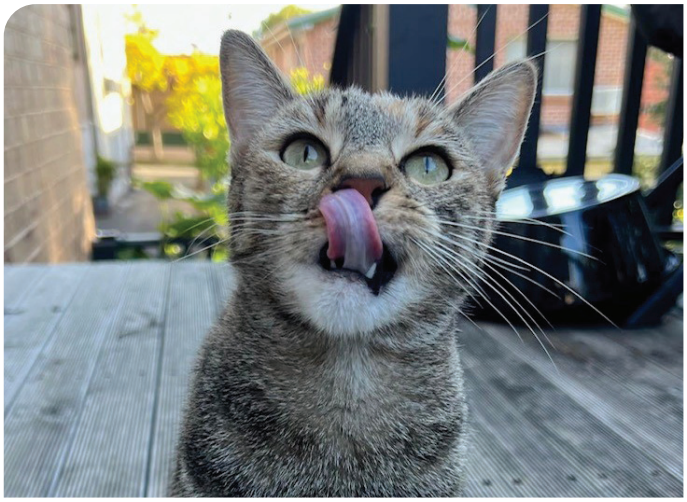
Studies show between 50 and 90% of cats older than four years of age suffer from some form of dental disease*.

“As cats age, their teeth become prone to dental diseases that can have serious repercussions throughout their body,” explains Dr Tony.

Tartar formation commonly occurs in cats due to consuming wet food and kibble over their entire life span, with no mechanical friction to the teeth that a wild cat might experience from eating whole prey. If tartar is allowed to persist for years, the bacteria present can lead to liver and kidney problems and invade the bloodstream, causing life-threatening septicaemia, adds Dr Tony.

Introducing Lovebites DentaShield for Cats

Lovebites DentaShield for Cats is a game-changing dual-action chew designed to support optimal tooth and gum health in cats. DentaShield features Norwegian Brown Kelp to inhibit bacteria growth and slow down plaque formation. In addition, SHMP (Sodium hexametaphosphate) works in your cat's saliva to bind with calcium and prevent the conversion of plaque into dreaded tartar.



“This is an excellent way to care for their teeth, as it does not need to rub against the teeth to provide results” says Dr Tony.

Cat Stress and Anxiety: Explained

Stress and anxiety are common in pet cats, caused by factors such as changes in their environment, introduction of new pets, loud noises or medical issues. Signs of stress may include inappropriate elimination, aggression, excessive grooming, hiding and decreased appetite.

A Game-Changing Solution for Cat Stress

Lovebites B-Calm for Cats is a non-drowsy, non-sedative supplement specifically formulated to support the management of stress and anxiety in cats.

This innovative product contains L-Tryptophan, an amino acid that converts to serotonin in the brain, assisting in the reduction of anxiety and stress. Additionally, Thiamine (also known as Vitamin B1) promotes healthy brain function, further aiding in anxiety relief.

“It is essential to consult with a veterinarian before using B-Calm in conjunction with prescription anxiety medication, as not all symptoms of stress and anxiety are related to serotonin production” says Dr Tony.

Real Results from Real Cats

Nearly two-decade-old rescue cats Zorro and Stripey were adopted a year ago with health conditions that require ongoing medical care. The feline siblings have struggled with dental disease in the past and require regular veterinary checkups and dental care in preventing oral diseases. They also get very anxious travelling to the vet.

“They kick off a car trip to the vet with a solid few minutes of dramatic miaowing, as if auditioning for a feline opera,” says owner Candice Drew, who is also a veterinary nurse.

“Stripey and Zorro bring so much joy to my life. Their health and

Stripey & Zorro - Photo by Candice Drew

Stripey living his best life - Photo by Candice Drew

wellbeing directly contribute to the happiness in our home. I want to give them the best care possible."

As part of a healthy senior diet, Stripey and Zorro are on a daily delight of Vetafarm's Lovebites DentaShield and B-Calm for Cats and have much to purr about.

"A recent visit to the vet for a dental check showed that their gums are healthy and their breath smells good," says Candice. "With regards to the B-Calm, I'm always a cynic with confirmation bias and placebo effect on pet owners, but I have to admit I noticed a positive change in both cats. In their recent vet visit, there was no audible verbal protest from the back seat!"

Candice has also noticed the cats playing more, more interaction with her from Stripey and increased chattiness from Zorro. "They do seem like happier cats, even though they were far from being stressed/ unhappy to begin with. I always feel better about the 'little extras' when I know they're healthy as well as tasty," she says.

Evolving Care for Feline Friends

Caring for our feline friends has evolved significantly over the past 10,000 years, transforming cats from wild, lone predators to cherished companions living in our homes. While their biological makeup remains largely unchanged, the impact of domestication on cats' overall health and well-being cannot be overlooked.

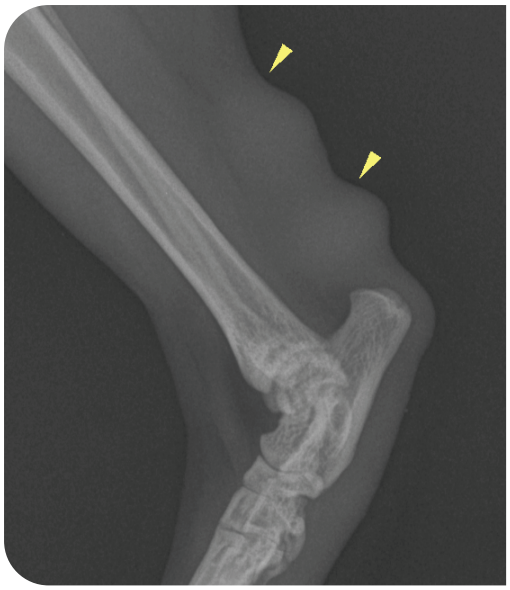
With over 30 years of experience creating unique and novel animal health products, Vetafarm also continues its support of animal welfare by contributing a range of Lovebites functional chews and meal toppers to charities such as Dunroamin Pets in NSW & VIC, North East Animal Sanctuary in Tasmania and The Rescue Collective (national).

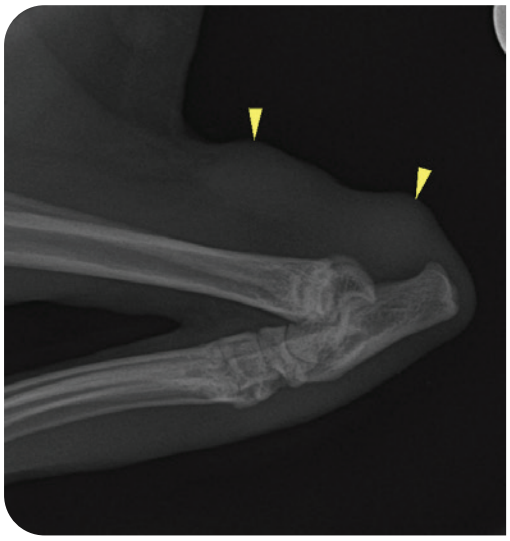
"A recent visit to the vet for a dental check showed that their gums are healthy and their breath smells good,... I'm always a cynic with confirmation bias and placebo effect on pet owners, but I have to admit I noticed a positive change in both cats.

Pet owner, Candice Drew

IT'S YOUR CASE - 3.5YO MN DOMESTIC SHORTHAIR WHO HAS HAD A LEFT PELVIC LIMB LAMENESS FOR 7.5 WEEKS

Species: Feline
Breed: Domestic Shorthair (DSH)
Sex: Male Neutered
Age: 3.5 years





Clinical History:

He has a left pelvic limb lameness of 7.5 weeks duration. He presented with wound proximal and caudal to the tarsus; it was treated with metacam and cefovecin (convenia) injection. He continued to receive metacam until re-check 1 week ago. A lump is palpable on calcaneal tendon and he is still lame despite continued metacam. He has a plantigrade stance and possible contracture of muscles/tendon.

Anatomic regions: Stifle, Tarsus & Pelvis

Details of study and technical comments:

Radiographs of the Stifle, Tarsus/foot, Pelvis/hips : ML and VD/CrCD/DP projections.

Diagnostic interpretation:

PELVIS AND STIFLES:

The pelvis and coxofemoral joints are unremarkable. The stifle joints are within normal variations.

TARSI:

There is a marked soft tissue thickening in the region of the left calcaneal tendon, showing a wavy/bulbous appearance caudally (yellow arrowheads). There is loss of distinction of the left calcaneal bursa. There is no evidence of bony fissure/fracture. The right tarsus is unremarkable.

A hyperflexed mediolateral projection of the left tarsus is provided. The tissue of the calcanean tendon does not alter in shape. There is no comparable view of the right tarsus.

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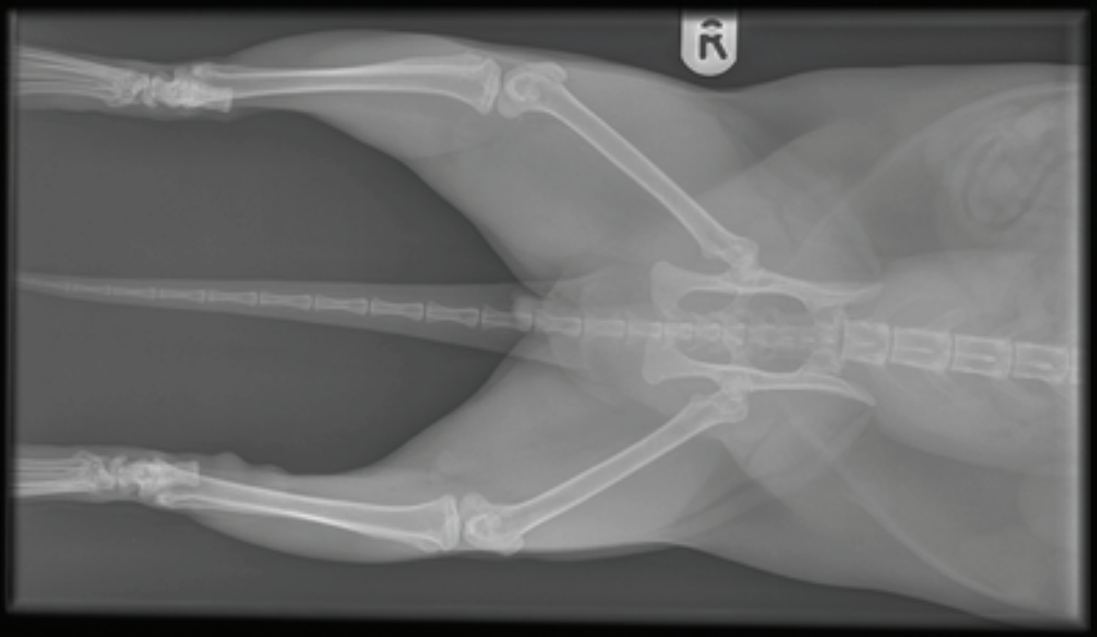

Conclusions:

- Radiographic findings suggestive of calcanean (Achille's) tendon injury such as complete rupture and adjacent soft tissue swelling/bursitis.

Additional comments:

The radiographic study is consistent with pathology of the calcanean tendon thickening; the degree of damage (contusion / tear / rupture) cannot be specified. The gold standard and least invasive diagnostic modality to confirm the suspicion and follow-up the patient during the healing process is a high-resolution musculoskeletal ultrasound.

Literature:

Lin, M., Glass, E. N., & Kent, M. (2020). Utility of MRI for Evaluation of a Common Calcaneal Tendon Rupture in a Dog: Case Report. *Frontiers in veterinary science, 7*.

Lamb, C. R., & Duvernois, A. (2005). Ultrasonographic anatomy of the normal canine calcaneal tendon. *Veterinary Radiology & Ultrasound, 46*(4), 326-330.

Kramer, M., Gerwing, M., Michele, U., Schimke, E., & Kindler, S. (2001). Ultrasonographic examination of injuries to the Achilles tendon in dogs and cats. *Journal of Small Animal Practice, 42*(11), 531-535.

EASY AND FAST "CAT URINE TEST KIT" FOR EARLY DETECTION OF KIDNEY DISEASE, GALLSTONES, AND CYSTITIS

RESEARCHERS FROM CHULA FACULTY OF SCIENCE INVENTED AN EASY-TO-USE "CAT URINE TEST KIT" TO SCREEN FOR THE RISK OF KIDNEY DISEASE, GALLSTONES, AND CYSTITIS IN CATS. THE TEST KIT PROVIDES FAST AND ACCURATE RESULTS, SO CATS CAN BE TREATED PROMPTLY.

All cat lovers want to see their beloved kitties happy and healthy. But cats, like humans, face various illnesses, especially the most common among cats today including kidney disease, gallstones, and bladder infection (cystitis).

If the owners have time and can notice their pets' changed behavior, they can bring them in for early treatment. Unfortunately, many rarely have time to observe their cats' behavior and by the time they realize something is wrong, their cats are already very sick and require treatment that can cause pain, suffering, and piled-up medical bills.

The distress of the cats and their owners was the starting point of the "Cat Urine Test Kit", an innovation for the health and quality of life of beloved pets, and their owners invented by Dr. Lunjakorn Amornkitbamrung, a Postdoctoral Researcher, C2F, Department of Chemistry, Faculty of Science, Chulalongkorn University, and Managing Director of Product at Wealthy Moggie Innovation Co., Ltd., in cooperation with Associate Professor Dr. Kanet Wongravee, Department of Chemistry, Faculty of Science, Chulalongkorn University, with a research grant from the National Research Council of Thailand under a pilot project entitled "Thai Inventors, World Inventors".

"We hope that the cat urine test kit will be one of the tools to enable the owners to monitor the health of their cat regularly. And if the risk of kidney disease, gallstones, or cystitis is detected, it can be treated by a veterinarian promptly," Dr. Lunjakorn said.

The cat urine kit is a research paper that has passed the precision test and won the Gold Prize from the Seoul International Invention Fair 2022 Republic of Korea, and the Gold Medal from the Kaohsiung International Invention & Design Expo 2023 in Taiwan area. It is now available for owners to take control of their beloved cat's health.

Indicators of kidney disease risk in cats

According to Dr. Lunjakorn, many domestic cats have a high tendency to develop kidney disease, gallstones, and cystitis, mainly due to their eating habits, name:

1. **Low water intake**
2. **Improper diet, especially from owners who treat cats with human food and various cat treats that are high in protein and sodium causes the kidneys to work harder.**

Dr. Lunjakorn Amornkitbamrung, a C2F postdoctoral researcher (Left), and Associate Professor Dr. Kanet Wongrawee (center), Department of Chemistry, Faculty of Science, Chulalongkorn University

How would cat owners know that their beloved cat is about to start developing kidney disease, gallstones, or bladder infection?

"Because cats can't talk about their illness, owners need to regularly pay attention to their pet behavior," says Dr. Lunjakorn on cat's changing behavior, for example:

1. **Loss of appetite, less food consumption**
2. **Listlessness**
3. **Some cats may drink more water than usual.**
4. **More frequent urination than usual or not at all**
5. **Dark or bloody urine**
6. **Weight loss**

According to Dr. Lunjakorn, if any of these symptoms are found, the cat should be taken to a veterinarian for a thorough diagnosis and immediate treatment.

"For cats that are diagnosed with diseases at an early stage, the veterinarian will prescribe antibiotics and gallstone breakers. The cost of treatment is about a thousand baht.

However, for those cats whose owners do not notice the abnormality of the cat until their symptoms become very serious and have a risk of kidney failure, the vet will need to perform surgery to remove the stones and/or dialysis at the same time. The cost of this treatment will be about ten thousand baht or more," Dr. Lunjakorn stressed the importance of observing the cat's behavior not only for the quality of the pet's life but also for the owner's financial health as well.

Dr. Lunjakorn shared that veterinarians currently have a way to diagnose cats suffering from kidney disease or cystitis by reading a color band that shows the results of the analysis of compounds in the cat's urine whether it has blood in it. The cat urine sampling process comes in two methods:

1. **By inserting a needle into the cat's bladder to draw out the urine.**
2. **By inserting a catheter to draw out urine from the cat's genitalia.**

"These methods of diagnosis are accurate because the samples are taken directly from the bladder and the cat's genitalia, but the procedures can be quite painful. Our research team wanted to solve this problem, so we invented a cat urine test kit to reduce the pain in the diagnostic procedure and from the kidney disease and cystitis symptoms."

A cat urine test is a preliminary screening kit for feline hematuria that can indicate a level 3 (> 2500 RBC/μL) risk of developing urinary tract diseases such as kidney disease, gallstones, cystitis, etc. (There are 3 levels of risk, with level 3 indicating a clear morbidity).

The cat urine test kit is ATK-like, and easy to use. The test kit consists of a kit for collecting cat urine samples from any type of cat litter. Otherwise, the owner can take a sample of cat urine from the point where the cat leaves urine on the floor or wall which has an even higher urine concentration.

Check the cat for kidney disease risks, painless and easy in 3 steps

Dr. Lunjakorn explained the easy use of the cat urine test kit in 3 steps:

1. **Scoop** the cat litter in the area of the cat's urine (preferably the part soaked with urine) and mix it with the solution.
2. **Drip** the solution onto the test strip
3. **Wait** for 5-10 minutes to read the results. The colors shown on the test kit can be translated as follows:

- Both C and T bands go green means positive (there is the presence of blood cells in urine).
- C comes up green and T comes up yellow means Negative. Everything is normal, no blood was detected in the urine.
- Both the C and T lines turn yellow or only the T line turns green means the result is invalid or unreadable.

This test is 100% accurate, equivalent to a lab test in a veterinary hospital because it uses the same sensors that veterinarians use to diagnose cats and dogs, and it doesn't hurt them during the testing."

Watch a video clip demonstrating the use of a "Basic screening kit for feline hematuria" at https://youtu.be/xE26pNhX2no

Cat urine test kit – A must-have for cat owners, easy to use, fast, and accurate, owners can use cat urine kits to routinely check their pet's risk of diseases.

"Cats of all breeds, ages, and genders are at risk of kidney disease, gallstones, and cystitis, so cat owners can use this kit to examine cats in their homes once a month, or more often if they find that cats are starting to behave abnormally. This is for the peace of mind of their owners and the physical comfort of cats who don't have to risk being seriously ill from preventable and curable diseases with their owners' attention."

Future Development of Cat Health Test Kits

However, Dr. Lunjakorn added that the current cat urine test kit still has some weaknesses that require further development.

"The test is performed on the urine in the cat litter causing the sample to be diluted of the blood in the urine, therefore the test will detect the presence of blood when the cat is in stage 3. So, if the result is positive, the cat owner must immediately take the cat to the veterinarian," Dr. Lunjakorn said, revealing plans to improve the test kit's sensitivity for detecting small amounts or very diluted blood in the urine.

In addition, Dr. Lunjakorn mentioned the plan to develop a test kit to check for the risk of diabetes in cats by examining the sugar in the urine.

For cat parents and animal lovers interested in preventive testing for kidney disease, gallstones, and cystitis in your pets, you can buy the cat urine test kit (about 130 baht) at pet shops and the Hide and Seek Cat Litter Facebook page

Source : Chulalongkorn University

Winston after his lucky escape

PET CHOKING PREVENTION
SHINING LIGHT ON HOUSEHOLD DANGERS

Pet Insurance Australia takes the opportunity to raise awareness about the often-overlooked dangers that can lead to pets choking. From seemingly harmless household items like balls and rubber bands to treats and chews, many pet parents are unaware of these items' risks to their furry companions.

"Sadly, many pet owners don't realise that common items can pose a serious risk of choking for their pets," says Nadia Crighton, Spokesperson for Pet Insurance Australia. "Educating ourselves about what constitutes safe toys, treats, and household items can significantly prevent choking incidents."Dogs are not only masters at masking their pain, they are also experts at eating things they shouldn't. "It is no surprise to seasoned dog owners that dogs can get into all sorts of things they shouldn't," Crighton says. "Quick action and watching for behavioural changes can be key to preventing any disastrous outcomes when it comes to choking."

Training: Pet training can also play a pivotal role in prevention. Teaching your dog the 'leave it' command and discouraging chewing on dangerous items from puppyhood can help prevent future incidents.

"Preventing pet choking incidents starts with understanding potential risks and taking proactive measures to keep pets safe," Crighton says. "It is not uncommon to hear of our pets ingesting all sorts of items, from socks and rocks to bones and corn cobs, and many times these items can get lodged in the throat and cause distress and damage."

The experience of pet owner Cherie O'Brien highlights the urgency of choking prevention when her beloved dog Winston faced a terrifying ordeal when a bone lodged in his throat."Winston. He is doing really well after his incident. The difficult part about his situation was that he was hungry but couldn't tell us he couldn't swallow. It was only when he looked so miserable after a few days that we realised he had an obstruction.

"He ate a bone, and quite a large chunk became caught in his throat. He struggled to drink enough and couldn't ingest. The scary part was not knowing what was wrong."Luckily for Winston, help was on hand.

"Our local vet did an X-ray and tried to remove the bone by going through his mouth. This failed, so we rushed him up to the Gold Coast for surgery."

Sadly, even after removal, Winston was not out of the woods.

"When he was still not recovering, they went back in and discovered a perforation down his throat. After a second surgery, we brought him home with a stomach tube and a liquid diet. He now eats as well as before, only with smaller kibble and definitely no bones! His brother Wilfred, who lives with my daughter, has also been out on a no-bone diet as they both tend to eat very quickly!"

Winston's case underscores the unpredictable nature of choking incidents and the critical importance of swift action and informed decision-making.

"It is imperative that if people suspect their pet has ingested something that could pose a problem, to seek professional help," Crighton says. "Also, be vigilant. If you notice any sudden behavioural changes, a quick veterinary check-up is important, as this can save your pet's life, as illustrated in the case of Winston and his caring owners. "

About Pet Insurance Australia: Pet Insurance Australia is a leading provider of insurance solutions for pet owners. It is committed to promoting responsible pet ownership and safeguarding the health of animals nationwide.

For your pet's safety, Pet Insurance Australia suggests the following:

Choose the Right Size: To prevent accidental swallowing, ensure toys and treats are larger than your pet's windpipe. This is particularly important with balls.

Remove Broken Toys: removing damaged toys is also essential to prevent choking.

Know Your Pet's Habits: Take extra precautions if your pet tends to swallow things whole.

Never Leave Unattended: Always supervise your pet with treats, chews and bones. Also remove bones once your pet has finished.

Consider Who Resides in the Household: Different pets and people have different needs – cue the children's toys. It's essential to be mindful of items that may be hazardous to any pet.

IMPROVING DENTAL HOMECARE COMPLIANCE USING THE PETOSAN 'STARTER PACK' FROM K9 GUMS

Dr David E Clarke Dipl. AVDC
Registered Specialist, Veterinary Dentistry and Oral Surgery
www.vdec.com.au

I am regularly asked, 'What % of your clients brush their pet's teeth?' But the question should be 'What % of your clients regularly perform a Homecare protocol?' and the answer should be 'All of them.'

Every pet attending your clinic requires a dental Homecare program and it needs 4 key ingredients:

1. client education,
2. staff training,
3. a dedicated client and
4. a willing pet.

Owners should try to keep their pet's teeth clean by implementing a Homecare protocol that works for them. Client education and the Homecare protocol should start early in life to obtain the best results. Pets respond to a quiet calm approach with a product that is suited to their needs and temperament. As with all training methods, start early and slowly, MAKE IT FUN, and use lots of positive reinforcement and praise.

There are many products on the market for plaque and calculus control but nothing like the Petosan 'STARTER pack', which contains a microfibre fingercloth and a 20gm tube of chicken flavoured toothpaste that physically disrupts plaque accumulation.

Toothbrushing using a PETOSAN fingercloth and paste

Several studies show that periodontal disease can be prevented with daily brushing, whether by toothbrush or fingerbrush.

However, most owners do not sustain the dedication or motivation to brush daily, so every other day may be more realistic. Most studies reflect a 30-40% compliance rate amongst the best clients, whilst 1-2% is much more realistic in a general practice.

The Petosan range solves this problem, with the 'STARTER pack', ideal for starting brushing, and ensures a higher compliance % compared to traditional methods. The advantages, when used correctly and consistently, include effectiveness and affordability.

The disadvantage of compliance can often be overcome by slow and calm introduction as well as the use of chicken flavoured toothpaste, which increase the acceptability and palatability to the pet.

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