VET nuus•news

April 2026

The Monthly Magazine of the SOUTH AFRICAN VETERINARY ASSOCIATION
Die Maandblad van die SUID-AFRIKAANSE VETERINÊRE VERENIGING

WORLD VETERINARY DAY — APRIL 25, 2026



THEME

Pet First Aid

CPD

On-farm measures to control *Campylobacter* in poultry

SAVA
South African Veterinary Association
Suid-Afrikaanse Veterinêre Vereniging

Access to CPD Articles:

CPD CONTINUING PROFESSIONAL DEVELOPMENT

https://www.sava.co.za/vetnews-2026/



Dagboek • Diary

Ongoing / Online 2026

SAVETCON: Webinars
Info: Corné Engelbrecht, SAVETCON, 071 587 2950,
corne@savetcon.co.za / https://app.livestorm.co/svtsos

SAVA Johannesburg Branch CPD Events
Monthly - please visit the website for more info.
Venue: Johannesburg Country Club
Info: Vetlink - https://savaevents.co.za/

CPD Course: Introduction to Animal Welfare Science
Online - self paced.
Info: https://scientificveterinaryconsulting.com/courses/animal-welfare-online-short-course/

CPD Course: Animal Research Ethics
Online - self paced.
Info: https://scientificveterinaryconsulting.com/courses/essence-of-the-sans-10386-2021-online-short-course/

April 2026

SAVA Oranje Vaal Congress
17 - 18 April
Venue: Khaya Ibhubezi, Parys
Info: conference@savetcon.co.za

May 2026

Beyond Basics: Mastering the Cardio-respiratory Patient: A Structured Clinical Approach
11 - 12 May
Venue: Premier Hotel, Midrand, Gauteng
Info: https://vetlink.co.za/beyond-basics/

Eastern Cape and Karoo Branch of SAVA Congress
15 – 16 May
Venue: To be confirmed
Info: Vetlink on conferences@vetlink.co.za

KwaZulu-Natal Branch of the SAVA Congress
30 – 31 May
Venue: To be confirmed
Info: Vetlink on conferences@vetlink.co.za

NOTE

13th Biennial SAVA & Para-Veterinary Congress
24 - 26 March 2027
Venue: Emperor's Palace Convention Centre
Info: corne@savetcon.co.za

June 2026

13th Int Crustacean Society Mid-Year Meeting
01-04 June
Venue: STIAS – Stellenbosch
Info: https://tcs2026.com/

NVCG Bush Break
06-07 June
Venue: Skukuza, Kruger National Park
Info: Vetlink:
https://vetlink.co.za/nvcg-bush-break-2026/

RuVASA Congress 2026
08 - 10 June
Venue: Champagne Sports Resort, Drakensberg, KZN
Info: https://vetlink.co.za/ruvasa-congress-2026/

July 2026

56th Annual SASAS Congress
07 - 09 July
Venue: Lagoon Beach Hotel, Cape Town
Info: https://www.sasascongress.co.za/

SAVA Eastern Free State Congress
10-11 July
Venue: TBC, Clarens
Info: conference@savetcon.co.za

Integrative Veterinary Medicine Conference
31 July - 02 August
Venue: Protea Hotel, Stellenbosch
Info: conference@savetcon.co.za

Western Cape Branch of the SAVA Congress
31 July – 01 August
Venue: To be confirmed
Info: Vetlink on conferences@vetlink.co.za

August 2026

Hill's Nurses Hybrid Weekend
01-02 August
Venue: Cradle Moon, Muldersdrift
Info: corne@savetcon.co.za

23rd Annual SASVEPM Congress
19 - 21 August
Venue: Sun City Resort, Rustenburg, North West
Info: https://sasvepm.org/23rd-annual-sasvepm-congress/

54th Annual PARSA Conference
31 August – 02 September
Venue: Klein-Kariba, Bela-Bela
Info: corne@savetcon.co.za

VET nuus•news

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CPD CONTINUING PROFESSIONAL DEVELOPMENT

« Click on the image to access Vetnews CPD articles

VetNuus is die amptelike publikasie van die Suid Afrikaanse Veterinêre Vereeniging (SAVV). Alle regte word voorbehou. Geen deel van hierdie publikasie mag aangehaal, gedupliseer, versprei of aan die publiek beskikbaar gestel word in enige vorm sonder die uitdruklike skriftelike toestemming van die SAVV nie.Hierdie publikasie is uitsluitelik bedoel vir veearts en veearts verwante professionele persone soos deur die Suid Afriaanse Veterinêre Raad erken word. Wyl alles moontlik gedoen word om om die akkuraatheid van die inhoud te verseker, aanvaar nie die redaksie, SAVV of enige van die personeel, lede, werknemers of agente enige regsaanspreeklikheid vir enige verlies, skade of bevooroordeeldheid, hetsy direk of indirek, wat mag spruit uit enige stelling, feit, opinie, advertensie of aanbeveling hierin gepubliseer. Enige advertensie of verwysing na n spesifieke produk is toevallig en word nie noodwending onderskryf of aanbeveel deur die SAVV nie.

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Dear members,

Moving forward together

In this issue of Vetnews, I share the report presented to FEDCO for the information of members. It provides a high-level overview of progress since the previous Federal Council meeting. SAVA continues to operate in a challenging environment shaped by the ongoing Foot-and-Mouth Disease epizootic, financial pressures, and uncertainty within the profession. Despite this, meaningful progress has been made, and the Association is moving from a period of instability toward recovery and renewal. Concerns regarding the availability of phenobarbital have also been noted, and SAVA is engaging stakeholders on this and related matters.

SAVA has continued with organisational restructuring aimed at improving affordability and aligning with operational realities we faced at the time. Over the past six months, SAVA has also relocated offices, welcomed a new tenant, had retrenchments and conducted policy reviews and staff realignment. The interim General Manager is settling in her new position, and her contract has been extended.

As per the AGM resolution, the board revisited the changes to the MOI that were rejected and initiated a review of the agreements with affiliate members. A strategic session was held on 20 February 2026, during which the board reviewed the SAVA Vision and mission, and we trust that these will resonate with all the members. FEDCO is considering the changes, and following this, they will be shared with the wider membership base.

There is an urgent need to review the SAVA-CVC relationship for various reasons, including the role of SAVA and subsidiary accountability. The SAVA Board held a preliminary meeting with SAVA-CVC, and the outcome was that the financial director and Robelli accountants would meet with the leadership of SAVA CVC, and Dr Didi Klassen would play a liaison role with SAVA-CVC.

We have also welcomed new board members who have infused the board with renewed energy. We sadly said goodbye to quite a few board members, including the immediate past president, the Financial and Legal Director and other representatives. Their service has been commendable, and I thank them for it. Dr Jana Prinsloo has also resigned from the Board of Directors, leaving a vacancy. This vacancy will be filled in due course.

Financial recovery has remained a central priority throughout the reporting period. SAVA has continued to stabilise its position through strict budgetary control, resource mobilisation efforts and continued closer financial oversight. The annual financial statements were prepared, audited and approved at the AGM.

The new tenant lease at VetHouse has created a more stable monthly income stream, and oversight of SAVA and SAVETCON finances has improved. We, however, are still to receive the final tranche payment from the HWSETA and continue to engage them on the payment.

SAVETCON has downsized, and we have requested Robelli Accountants to assist in developing systems for better financial oversight of SAVETCON. We have recommended the appointment of Dr Melvyn Greenberg to the SAVETCON Board of Directors due to his extensive knowledge and experience in this area. We do not doubt that this will bring additional capacity in reshaping SAVETCON and making it financially viable.

Membership remains one of SAVA's most important strategic priorities. Since the previous Federal Council meeting, the Association has recorded new members, reinstatements, new CCS veterinarians and cadet members, but it has also experienced resignations and temporary suspensions. These trends underline the need to actively recruit and retain existing members by ensuring that SAVA remains relevant, inclusive and responsive to the realities facing veterinarians within the various spheres of the profession. The new vision and mission statements are therefore timely and should guide the strengthening of SAVA's value proposition.

One of the most significant developments during this reporting period has been the restoration of the functioning of the South African Veterinary Council. The SAVC Council was appointed for the new term and has already commenced induction and strategic planning. The SAVA representative on the SAVC, Dr Leon De Bruyn, has been appointed to the SAVC Executive and has been very active in providing clarity to members on SAVC matters.

Current engagement with SAVC also continues to address practice-related issues previously raised by the Federal Council, including laypersons performing veterinary procedures. The criminal justice system challenges remain an impediment to swift action in these cases.

A matter threatening to challenge the ability to compound and dispense medication by veterinarians has been brought to the attention of the SAVA board. The board is taking legal advice on how to proceed.

Animal health and welfare matters continue to require strong and balanced leadership from SAVA. A draft statement in line with the outcomes of the member poll has been prepared on the live export of animals by sea for slaughter at the destination. The statement has been served at the Board Meeting and is currently under review by FEDCO.

The Animal Ethics and Welfare Committee has also noted concern regarding the welfare impacts of the ongoing FMD crisis and continues to work



with various forums to address these. The Federal Council has also considered the strategic value, composition and affordability of activating a dedicated Veterinarian - led Animal Health Forum and approved this in principle.

One of the breed societies is challenging previous gains through the SAVC edict that banned tail docking and other similar cosmetic procedures, in a court action. FEDCO has reconfirmed the SAVA position on this matter, and a statement reinforcing support for the ban will be furnished to the NSPCA. Members are urged to educate clients on the detrimental nature of these procedures.

The profession's future depends on the strength of its development pipeline and the well-being of its members. The Education Committee continues to engage on developments relating to additional veterinary schools and has maintained a constructive but cautious position pending greater clarity in this area. The EDUCOM chairperson has been invited to participate in various governance meetings for the UFS initiative, and he has also responded to media enquiries with regard to the Fort Hare initiative. Progress has also been made on wellness and support initiatives; however, the association needs to urgently rethink its mentorship initiatives and how it supports vets in practice.

The Young Members Group remains in revival mode, and a successful campaign was run during the oathtaking ceremony, where all new graduates were furnished with SAVA materials and databases created for further engagement.

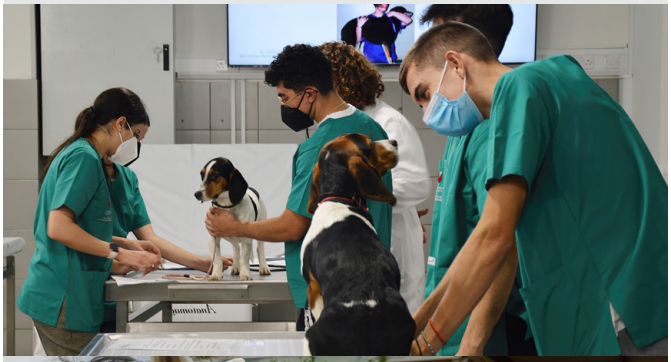
Despite limited staff capacity, SAVA's communications work has remained active.

The Association has achieved strong media exposure during the reporting period, with public-facing activities including World Rabies Day and Foot-and-Mouth Disease awareness. Work is underway on a refreshed marketing strategy, website improvements and the possible development of a SAVA YouTube channel. V-TECH has continued with its sponsorship of the marketing consultant, and this consultancy will extend to the SAVETCON rebranding exercise. We thank Dr Oosthuyse and team for their continued support.

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From the President.... <<< 2

These efforts remain important not only for visibility but also for strengthening SAVA's role as a trusted veterinary voice in the public domain.

SAVA has, during this period, engaged the various pet insurance companies on their advertising strategies and negative content in positioning their insurance products on the market. The engagements were well received, and essentially, the companies affirmed that:

1. They are willing to work with SAVA as a trusted partner in the pet care continuum
2. All are willing to run joint advertising/social responsibility campaigns
3. Two are willing to look at their advertising to ensure a more wholesome approach
4. One is currently running a wellness programme for veterinarians and is willing to partner with SAVA on this and other programmes.
5. Two are willing to run sustainable information and client education initiatives with SAVA.
6. Two are willing to support SAVA CPD events.

The companies have been requested to submit their proposals to the SAVA Board for consideration.

Preparations are now shifting toward the 2027 Congress. The President and the President-elect will join the Congress organising committee to ensure continuity. The proposed theme, "Innovation, Integration, Impact: Shaping the Future of Veterinary Medicine," is well aligned with the direction SAVA seeks to pursue. JSAVA also continues to perform an important strategic role as an accessible and credible open-access scientific platform. Let us continue to support it.

SAVA continues to maintain an active international presence. The Association remains engaged in broader regional and global veterinary conversations, including World Veterinary Association structures and other international liaison platforms such as IVOC. These engagements are important in ensuring that South African veterinary perspectives remain visible and influential, while also allowing SAVA to benchmark itself against wider professional developments. The president will attend the IVOC meeting and the WVA Congress in Japan from 19 April to the 24th April 2026. This participation has been made possible through the sponsorship of VTECH. We once again thank VTECH for this sponsorship. Key issues that emanate from these interactions remain corporate ownership of veterinary practices, alignment with VPPs in practice, workforce skills evaluations and consumer attitudes to veterinary service costing and pricing.

SAVA presented at the WVA/FAO VPP webinar. This follows on a workshop where areas of collaboration were identified between SAVA and the South African Association for Animal Health Technicians, a presentation by the WVA at the SAVA strategic Board Meeting and various engagements with SAAAHT on a way forward. These engagements are proving fruitful, and currently, an MoU is under consideration on how this relationship can be governed.

In conclusion, the period since September 2025 has been one of hard work, difficult adjustments and encouraging progress. SAVA has not yet resolved all of its challenges, but it has made tangible strides forward. The next phase must build on this progress by deepening member trust and value and sharpening SAVA's strategic direction, ensuring that SAVA remains a credible and inclusive forward-looking home for the veterinary profession in South Africa.

Dr. Ziyanda Majokweni – Qwalela
SAVA President

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Editor's notes / Redakteurs notas

The topics I chose for this month have really bit me in the bum, but I managed to get some very old, new, domestic and foreign articles together for a variety of topics to catch up on. After the pot poisoning articles of last month, this month's Pet First Aid is quite applicable. Some food for thought by Dr Paul van der Merwe, followed by a guide courtesy of the Humane Animal Society. Let us empower our first responders (animal owners) with some good, solid advice and training. It can save a life.

Heartworm (Dirofilaria immitis) is not commonly found in South Africa, but sporadic cases are diagnosed, often in coastal or high mosquito areas. It is transmitted by mosquitoes and poses a risk, especially for animals travelling, though it is not endemic in the same manner as in some neighbouring countries. Maybe consider it when diagnosing something off the chart, as climate change also changes the pattern of occurrence.

I have heard of Lyme disease in South Africa in people who have not travelled to endemic areas. The two cases I am aware of are both people who frequent outdoor life and are likely to be bitten by ticks. Is it just misdiagnosed Rickettsia, or is it really possible under humans (and therefore animals)? I found a very, very old article on the subject in a child who was diagnosed with both Lyme disease as well as tick bite fever.

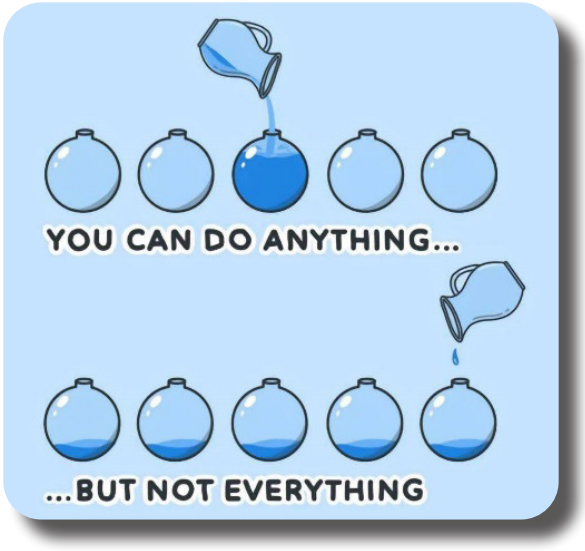
The last topic of interest is World Veterinary Day, which is celebrated on the 25th of April. We hope that you all do something fun to commemorate you, the veterinarian.

I would like some feedback. How do veterinarians feel about the "Veterinary bills are so expensive" campaign? Do you think it is fair? Personally, I take offence. I think it is bitterly unfair to use this slogan as a fear-mongering tactic to get people to take out pet insurance. I firmly believe that Pet insurance is a great vehicle for people to care better for their pets. But to base it on a hate campaign against veterinarians is the wrong route to follow. The insurance company claims it supports animals in a different advertisement, but does not bring the two ends together. Please share your feelings on this topic with me.

With April, we are deep into autumn, and I hope that you are dazzled by the vivid autumn colours. What else is leaving people a little light-headed is the war in the Middle East. How will it influence veterinary services except for the fuel price? I realise the fuel price has its tentacles very deep in the economy, but are there other resources that will escalate in price? We hope that the influence of it will be slight and that it will be over quickly.

I hope that everybody who celebrates Easter will have a blessed time. Please drive safely and responsibly. We meet up again in May.

Andriette



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CONFIRMED SPEAKERS



Prof. Francois Deacon
University of the Free State



Dr Izak Venter
Digital Veterinary Ophthalmology Services



Dr Shaun Morris
Octavoscene



Dr Ryan Walton
BVSc PgCertSAS
Bryanston Veterinary Hospital
Surgical Resident



Dr Jarred Morris
Octavoscene



Dr Vossie Vorster
Vetdiagnostix



Dr Bronwen Martin
MSD Animal Health

Registration Fees

Full Congress		
SAVA Members		R2,850.00
Non-members		R3,650.00
Veterinary Nurse/ Technician/ Retired Veterinarian		R2,050.00
Students		R2,050.00
Day Attendance	**17 April**	**18 April**
SAVA Members	R1,100.00	R1,750.00
Non-members	R1,300.00	R2,350.00
Veterinary Nurse/ Technician/ Retired Veterinarian	R900.00	R1,150.00
Students	R900.00	R1,150.00
Accompanying Persons	**17 April**	**18 April**
Full Congress		R1,500.00
Day Attendance	R850.00	R1,000.00
Social Function		
Social Dinner attendance (all)		R550.00

Sponsorship Packages

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** Inclusive of all meals, dinner & full congress attendance.*

Programme

Friday, 17 April 2026

12:00	Registration & Arrival refreshments
13:00	Welcome and introduction
13:05	Cutting edge Research on giraffes
14:05	Hemorrhagic tendencies in cattle with emphasis on neonatal calves
14:45	Sponsor Showcase
15:00	Afternoon refreshments
15:30	Wound Management in Small Animals
16:10	The corneal ulcer is not healing, what now?
16:50	Review on Cruciate Disease
17:30	Close of Day 1
18:15	Congress Dinner

Saturday, 18 April 2026

08:35	Rumen hypoplasia in South African feedlot lambs
09:30	Profitability takes GUTS
10:15	Mid-morning refreshments
10:45	Branch AGM
11:45	Ocular ultrasound
12:30	FMD Update
13:15	Sponsor Showcase
13:30	Lunch
14:30	Canine mast cell tumors - an update on diagnosis, histology and prognosis
15:15	Bovine respiratory disease with focus on pre-weaning calf immunology, metaphylaxis and therapeutic options
16:00	Close of congress

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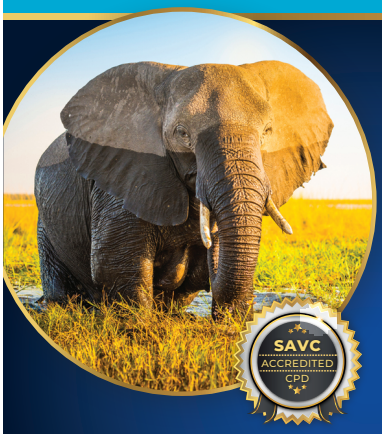
ActivBiome+ Digestion is a proprietary blend of prebiotics, shown to rapidly nourish the gut microbiome to support digestive health and well-being.

SCIENCE DOES MORE

1. Fritsch, D.A., et al. Food with Novel Fibre Blend Improves Clinical Outcomes and Changes Gastrointestinal Microbiome Metabolism in Dogs (in a 2 Month Study). J Vet Intern Med. 2019;33(5):2513. PD7093.

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Introduction to Animal Welfare Science



A look at how animals' ability to feel shapes our responsibility to promote their wellbeing — and explores evolving societal perceptions of animal welfare and consciousness.

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Presented by
DR BERT MOHR
VETERINARY SPECIALIST, PHD



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"The South African Veterinary Association aims to serve its members and to further the status and image of the veterinarian. We are committed to upholding the highest professional and scientific standards by utilising the professional knowledge, skill and resources of our members, to foster close ties with the community and thus promote the health and welfare of animals and mankind".

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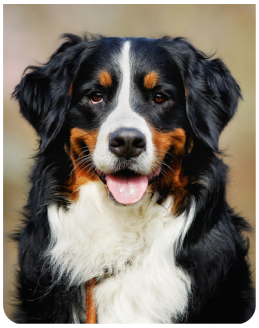


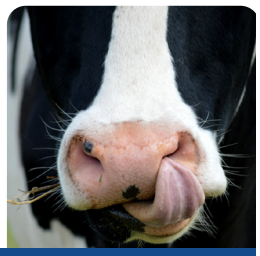
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Educating Pet Owners in First Aid for Their Pets: An Imperative for Animal Welfare and Clinical Outcomes

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Abstract

Timeous pet owner-administered first aid is a critical determinant of positive outcomes in veterinary emergencies. Despite this, most owners lack the knowledge, confidence, and preparedness to act decisively and effectively. This paper positions pet first aid education as an essential extension of preventive veterinary care and animal welfare. It argues for a structured, scalable, and behaviour-focused approach, integrating education and practical skills training with accessible delivery mechanisms. The adoption of such programmes will improve clinical outcomes, reduce animal suffering, and strengthen the veterinary profession's public health mandate.

Introduction

Veterinary emergencies often do not occur in controlled clinical environments. They occur at home, on farms, and in transit—often with delayed access to professional care. In these circumstances, the pet owner becomes the first responder.

Pet first aid must therefore be understood not as optional knowledge, but as **a necessary capability**. It provides the critical bridge between the onset of an emergency and veterinary intervention. Where appropriate action is taken early, outcomes improve. Where it is not, deterioration is often rapid and avoidable.

Despite this, education in pet first aid remains fragmented, inconsistent, and largely reactive. This represents a missed opportunity for the profession, an opportunity that can positively improve the services delivered by veterinary facilities and the profession's public image.

Why Pet First Aid Education Matters

Timeous Critical Intervention is of critical importance to ensure positive outcomes, often referred to as the Platinum 10 minutes or the Golden Hour. Many veterinary emergencies, such as haemorrhage, heatstroke, poisoning, and gastric dilatation-volvulus, are highly time-sensitive. Early stabilisation materially affects survival and recovery (Fossum, 2018). In the South African context, where access to veterinary services may be delayed by distance or resource constraints, this becomes even more relevant. A significant proportion of emergencies arises from preventable causes such as trauma, toxin exposure and environmental stress.

Education and practical skills training can address both **prevention and response**, reducing severity at presentation (AVMA, 2020). Failure to administer timeous first aid may result in unnecessary suffering. Pet ownership carries an implicit duty of care. First aid education operationalises that duty (RSPCA, 2021).

Veterinary experience consistently shows that animals receiving basic first aid present more stable, require less intensive intervention and have improved prognoses (Fossum, 2018).

What Pet Owners Need to Know (and Nothing More)

Education must be **focused, practical, and usable under stress**. Overloading owners with theory is counterproductive. Owners must be able to recognise emergencies and be able to determine when immediate action is needed, such as for respiratory distress, uncontrolled bleeding, collapse or unconsciousness, seizures and severe pain.

They must be empowered to take immediate core actions such as airway maintenance, basic CPR and bleeding control. These can be effectively taught to non-professionals (American Red Cross, 2015).

They should be able to manage common scenarios such as heatstroke (controlled cooling and urgent referral), poisoning (do no harm and seek guidance immediately), seizures (protect, observe, and timeous referral) and trauma (immobilise and transport) (Fossum, 2018; Overall, 2013).

They need to be educated and trained in safe handling. Injured animals pose a risk that they need to understand. They must be able to apply the principles of basic restraint and safe transport, taking their personal s safety in consideration (BSAVA, 2016).

The problem with current educational approaches is that they are reliant on ad hoc advice, passive information (pamphlets, websites) and one-off webinars. These approaches may create awareness, but do not change behaviour. Webinars are useful for scale, but ineffective for skill acquisition without reinforcement (Cook et al., 2010).

What actually works is blended learning with digital content for reach, combined with practical sessions for skills. Skills must be practised. Confidence follows competence (Kolb, 1984). Skills decay quickly without repetition. Microlearning improves retention (Hug, 2005). The objective should not be only knowledge; it is **action under pressure**, simplifying decisions and reinforcing confidence by providing clear protocols (Michie et al., 2011).

The Role of the Veterinary Profession

Veterinarians must extend their role beyond treatment to **capability-building**. They need to incorporate first aid into routine consultations, providing structured guidance to clients. Veterinary organisations/ bodies, such as the SA Veterinary Association and SA Veterinary Council, should develop standardised curricula for first aid courses, accredit programmes and ensure consistency and quality in presentation.

The veterinary profession must actively promote responsible pet ownership and preparedness as the norm.

However, low owner engagement might be a serious barrier as owners act after a crisis, not before. Education and training, therefore, need to be incentivised and normalised.

Educational opportunities need to be affordable, within easy reach and make provision for language diversity. This can be achieved by modular, low-cost, multi-platform delivery.

Open online sources are often inconsistent and incorrect. This can only be corrected by veterinary-endorsed (SAVA and SAVC) standardised resources (AVMA, 2020).

However, partial knowledge can be dangerous and detrimental to the clinical outcomes of the animal. During education and practical skills development, emphasis must be placed on limits and mandatory veterinary follow-up.

A scalable programme should be structured from basic to more advanced knowledge and skills, modular with short, focused units, a blend of online and practical training, delivered through veterinary practices, an activity which could be seen as part of the Veterinary-Client-Patient-Relationship, and be certifiable and recognisable to drive uptake.

If achieved, pet first aid education and practical skills training will contribute to improved clinical outcomes, animal welfare, reduced emergency severity, strengthened human–animal bonds, and enhanced public health outcomes. It aligns with broader health system principles recognising early intervention and community capacity (WHO, 1948).

Recommendations

It is therefore recommended that we, as veterinary professionals, adopt client-based pet first aid education as a professional priority; that the SAVA and SAVC develop and accredited standardised education and evidence-based curricula, practical skills training curricula; that blended delivery models be developed; that integrated training be implemented into routine veterinary interactions; that public awareness at scale be promoted; that accessibility and affordability are ensured; and that outcomes are continuously measured and the education modules be refined continuously.

Conclusion

Pet first aid education is not an adjunct to veterinary care; it should be an extension of it.

The current model, reliant on passive information and sporadic engagement, is insufficient. A shift toward structured, behaviour-focused education is required.

By equipping pet owners to act effectively in emergencies, the veterinary profession will reduce avoidable suffering, improve clinical outcomes and strengthen its public health role.

The opportunity is clear. The next step is implementation.

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First aid tips for pet parents

(courtesy Animal Humane Society)



Emergencies happen to us all – including our beloved pets. Are you prepared in case you find yourself needing to perform first aid on your pet?

April is Pet First Aid Awareness Month, and we're sharing some important first aid tips you can use when an emergency arises.

Any medical emergency should always involve a trip to the vet, but a crucial first step is making sure you're prepared **before** an emergency occurs. Having a first aid kit for pets in your home and knowing your nearest **emergency vet clinic** can be critical in times of crisis.



Do you know the basic signs of a pet emergency?

You should always contact your vet if you think your pet is experiencing a medical emergency, but these are a few possible signs to be aware of:

- **Breathing or airway issues** like labored breathing or panting, specifically when they're not active.
- **Bleeding** from wounds or orifices that doesn't stop after a few minutes. **Note:** This excludes female animals who are in heat.
- **The color of their gums** could indicate a medical emergency. Pink and moist is normal. White or pale pink is a sign of bleeding or shock. Gray or purple can be from a lack of oxygen. If the gums are tacky (your finger sticks to them), they may be dehydrated.
- **Straining to urinate** (especially in male cats) can be a sign of urinary blockage.
- **Intestinal blockages or stomach torsions** could show as vomiting soon after eating/drinking, abdominal pain or distension, or an animal being weak or unable to stand.

Five first aid tips from an Animal Humane Society Vet

Learn the Heimlich manoeuvre for your pet.

If an animal is choking, there's a version of the **Heimlich manoeuvre** that can be performed on it. Instructions may vary based on your animal's size or species, so we recommend learning instructions for your specific pet before an emergency could arise.

Create a temporary bandage for a bleeding animal.

If an animal is bleeding from a wound, place a temporary bandage using a clean towel or piece of clothing. White athletic tape can be used with a bandage, but do not use duct tape – the strong adhesive can injure your pet's skin or tear out hair.

If an animal is having a seizure, don't try to open their mouth.

If an animal is having a seizure, keep close to them but don't try to open their mouth for the risk of injury. Most seizures will last less than a few minutes. The animal will then have a period of time where they may act disoriented and stumble when walking, which can last up to 2 hours.

It's OK to monitor them at home if they come out of a seizure, as most occur infrequently. But if an animal continues to relapse into a seizure within a few hours or is experiencing a seizure for more than 10 to 20 minutes, this may be an emergency. Animals may require injectable medications, diagnostics, and hospitalisation for constant seizures.

Know when to seek immediate veterinary attention.

If an animal is straining to urinate or having difficulty breathing, there is no first aid that can be done at home, and pet parents need to seek immediate veterinary attention.

Make your own pet first aid kit.

Here are some important over-the-counter items to include in your first aid kit at home!

*	**Adhesive bandaging, non-stick pads, and gauze**
*	**A bottle of sterile saline (contact solution)**
*	**White athletic tape**
*	**A thermometer - a temperature over 40 may be an emergency for a cat or dog. Their normal temperature is between 36.5 and 39 degrees.**
*	**Disposable latex gloves**
*	**Antibiotic ointment**
*	**Towels**
*	**A flashlight**
*	**The phone number, clinic name, and address of your local emergency Veterinary clinics**
*	**If your dog flails or bites when they get excited, a dog muzzle may also be beneficial. Train your dog to get into the muzzle before an emergency arises. Never use a muzzle if a dog is having difficulty breathing or is vomiting.**

Antibodies against tick-borne pathogens in domestic dogs in Norway: *Borrelia burgdorferi* sensu lato, tick-borne encephalitis virus, and *Anaplasma phagocytophilum*

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Background

Ticks are globally recognised as important vectors of disease, capable of transmitting a broad spectrum of viral, bacterial, and protozoan pathogens to vertebrate hosts [1]. In Europe, *Ixodes ricinus* serves as the primary vector of tick-borne pathogens affecting both humans and animals [2, 3]. In Norway, this tick species is predominantly distributed along the coastal regions, ranging from Østfold county in the southeast up to Brønnøysund in Nordland County in the north [4-6]. Tick infestation in dogs has been well documented across Europe [3]. Although nymphal ticks are more abundant than adult ticks in the environment [7], studies indicate that the ticks removed from dogs are predominantly adults, most likely because the small size of juvenile tick stages allows them to remain undetected in the dogs' fur [8]. This indicates that dogs are at a high risk of acquiring tick-borne infections. However, as canine tick-borne infections are not notifiable in Norway, the number of infected or clinically affected dogs remains unknown.

Clinically relevant infections reported in dogs include those caused by viral agents such as tick-borne encephalitis virus (TBEV) and louping ill virus; bacterial pathogens within the *Borreliae, Ehrlichiae/Anaplasmae*, and *Rickettsiae* families; and protozoan parasites such as *Babesia* spp., all of which contribute to the overall disease burden in endemic areas [9]. Among the most well-known tick-borne pathogens affecting canines in northern Europe are *Borrelia burgdorferi* sensu lato (s. l.), TBEV, and *Anaplasma phagocytophilum* [3, 10-12].

Lyme borreliosis (LB), caused by *B. burgdorferi* s. l., is the most frequent tick-borne human disease in Europe, with an increasing impact on public health [13]. In Norway, the number of reported cases of systemic LB has doubled over the past decade, from 323 cases in 2014 to 643 cases in 2024 [14]. Although *B. burgdorferi* s. l. infects a variety of wild and domestic animals, the clinical outcomes vary depending on the animal species [3]. In dogs, infections are often mild and self-limiting, and the majority of seropositive individuals remain asymptomatic [12]. When clinical signs do occur, they may include intermittent lameness, joint pain, fever, and lymphadenopathy, and they can appear several months after tick exposure [12, 15, 16].

Tick-borne encephalitis (TBE) is an emerging zoonotic disease in Europe, posing a growing threat to both animal and human health. Although TBEV infection in dogs is primarily subclinical, clinical cases tend to be acute, severe, and frequently fatal [17]. Reported clinical signs include fever, behavioural changes, motor deficits, and multifocal neurological dysfunction [10, 17, 18]. Furthermore, it has been reported that the clinical presentations were consistent with inflammatory central nervous system disorders such as meningitis, meningoencephalitis, and meningomyelitis [10]. These findings underscore the significance of acknowledging the neurological effects of TBE infections in dogs.

Tick-borne fever, caused by *A. phagocytophilum*, is regarded as the most prevalent tick-borne disease in domestic animals in Europe [19], and canine cases are reported worldwide [11]. *A. phagocytophilum* is an intracellular bacterium that primarily infects neutrophil granulocytes [20]. Although infection is common in endemic areas, the majority of dogs exposed to *A. phagocytophilum* appear to remain clinically healthy, as evidenced by widespread seropositivity despite a lack of documented clinical illness [11].

In dogs that develop clinical signs, infection is typically self-limiting and characterised by non-specific symptoms such as lethargy and fever, usually emerging after an incubation period of 1-2 weeks [21]. The most consistent laboratory finding is thrombocytopenia, which

is observed in approximately 90% of affected dogs [21]. Hence, tick-borne fever infection may present as an acute febrile illness with low platelet counts [11, 22]. *A. phagocytophilum* evades host immune responses by impairing neutrophil function, which can predispose infected dogs to coinfection with other tick-borne pathogens, potentially complicating diagnosis and exacerbating clinical signs [23, 24].

Dogs are considered suitable hosts for ticks due to their behaviour and physical characteristics, and it has been suggested that dogs may even contribute to sustaining local tick populations, particularly in urban areas where alternative host animals are sparse [8]. Their exploration of nature increases their likelihood of exposure to questing ticks, and frequent movement through vegetation, such as tall grass and underbrush, places them at an ideal height for tick attachment. Additionally, their dense fur can make it difficult to spot attached ticks, providing sufficient time for pathogen transmission from the tick to the dog. Given their risk of tickborne infections and the following development of detectable antibody responses, dogs can serve as valuable sentinel animals [25, 26]. Because dogs often accompany their owners during outdoor activities, their tick exposure may also mirror that of humans, making them particularly useful for assessing human exposure risk [25, 26]. Hence, monitoring canine exposure may contribute important epidemiological data relevant to veterinary and public health. The present study aimed to estimate the seroprevalence of IgG antibodies against *B. burgdorferi* s. l., TBEV, and *A. phagocytophilum* in domestic dogs residing in Norway, and to assess their potential role as sentinel species for tick-borne pathogen surveillance at the northernmost limit of *I. ricinus*' geographical range.

Methods

Sample collection

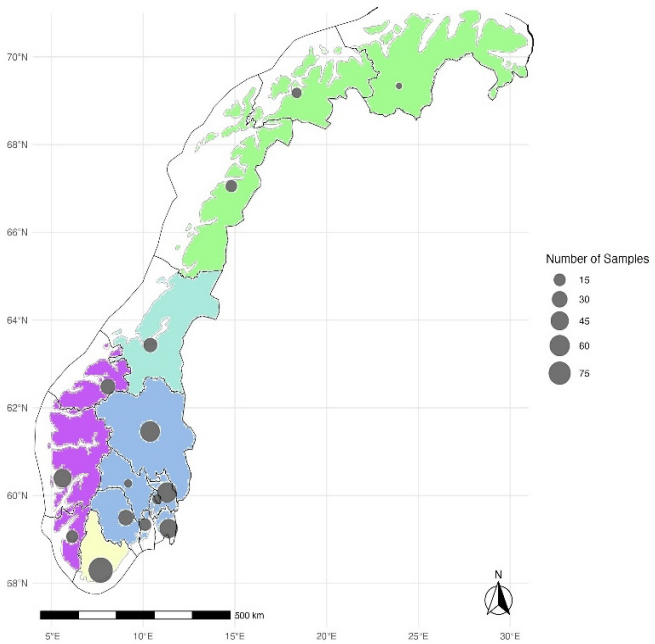


Figure 1: Blood samples were collected from dogs across Norway. The number of included animals at each location is represented by dot size, while the different colours represent the five regions: Eastern (blue), Southern (yellow), Western (purple), Central (turquoise), and Northern Norway (green).

Blood samples from dogs were collected across 15 counties representing all five regions of Norway: Eastern, Southern, Western, Central, and Northern (Figure 1). Sampling was conducted from June 2016 to October 2023 using a non-systematic recruitment strategy. The study population comprised dogs of various ages, breeds, and both sexes, including neutered individuals. All dogs were already scheduled for veterinary consultations unrelated to tick-borne diseases during the study period, and additional blood samples were collected for research purposes, with oral consent from the dog owners. This was documented by the attending veterinarian in the medical record/journal. In addition, residual canine sera from clinical samples donated by dog owners were also obtained through the Central Laboratory at the Norwegian University of Life Sciences. In all cases, ethical approval for animal experiments was not required, as all dogs were already undergoing routine blood sampling as part of their veterinary visit. The blood samples were collected by veterinarians or veterinary nurses and allowed to clot at room temperature for 30 minutes before centrifugation at 2000 x g for 15 minutes. The serum was removed, aliquoted in microtubes, pseudonymized, stored at -20 ˚C, and transported to the University of Agder for further analyses.

Detection of antibodies in dog sera by immunoblot

Sera were analysed by the EUROLINE Tick-Borne Profile 1 Dog (IgG) kit (EUROIMMUN Medizinische Labordiagnostika AG, 23560 Lübeck, Germany), according to the manufacturer's instructions. The immunoblot assay targets IgG-antibodies against B. burgdorferi s. l. (VIsE and OspC (p25)), TBEV (gpE), and A. phagocytophilum (MSP-2). According to the manufacturer, due to the high quality of the antigen substrate, no cross-reactivity between B. burgdorferi s. l. and other species are expected. However, cross-reactions between A. phagocytophilum and Anaplasma platys, Ehrlichia spp., and Rickettsia spp. have been reported. Furthermore, cross-reactivity between TBEV and other flaviviruses cannot be excluded; however, the use of recombinant antigens significantly reduces the probability of such occurrences. According to the manufacturer, the sensitivity/specificity of the test was as follows: 100%/100% for antibodies against B. burgdorferi s. l., 93%/91% for TBEV and 100%/91% for A. phagocytophilum. Results were automatically evaluated and classified as positive, negative, or borderline by the EUROLineScan program. Borderline results were interpreted as negative.

Calculation of human Lyme borreliosis and tick-borne encephalitis incidence

The number of registered cases of human Lyme borreliosis and tick-borne encephalitis (TBE) was obtained from the Norwegian Surveillance System for Communicable Diseases (MSIS) [14, 27]. The annual number of reported Lyme borreliosis cases in each region (county) was extracted for 2024, and incidence was calculated as the number of cases per 100,000 inhabitants per year. Population data for the corresponding year were retrieved from Statistics Norway [28].

Statistics

Statistical analyses were performed with STATA/SE 17.0 (STATA Corp LLC., College Station, TX, USA, 2021). The Pearson Chi-square test was used to assess differences in seroprevalence across regions. Logistic regression analyses were conducted to assess whether observed regional differences in seroprevalence persisted after adjusting for potential confounders such as age, sex, and breed.

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The correlation between canine *Borrelia* seroprevalence and reported human Lyme borreliosis incidence, as well as between canine TBEV seroprevalence and reported human TBE cases, respectively, across regions was assessed using linear regression analysis. The Clopper-Pearson exact method was used to calculate proportions of 95% confidence intervals (CI). A significance level of $P<0.05$ was considered statistically significant.

Spatial visualization

The distribution of collected samples was mapped by R (version 2023.09.1+494) [29] with the ggplot2 (version 3.5.1) [30] and sf (version 1.0–20) [31] packages. Municipality boundaries were obtained from the rnaturalearth package, and sample locations were aggregated based on unique spatial coordinates.

Results

Demographic characteristics

A total of 433 dogs from across Norway were included in the study. The age of the dogs ranged from six weeks to 16 years; 26 puppies (0–1 year), 27 young dogs (1–2 years), 156 adults (2–8 years), 164 seniors (>8 years), and 60 unreported. Further, the distribution between sexes was 184 females, 164 males, and 85 unreported. The dogs represented a diverse range of breeds, with 106 distinct breeds identified (Additional file 1). The most common breeds, aside from mixed breeds (n=82), were Border Collie (n=17), followed by English Setter (n=12), Golden Retriever (n=11), Gordon Setter (n=10), and Irish Wolfhound (n=10).

Seroprevalence of tick-borne pathogens in dogs

In total, 38% (165/433) of the dogs were seropositive for IgG antibodies against one or more tick-borne pathogens (*B. burgdorferi* s. l., TBEV, and/or *A. phagocytophilum)*, with regional seroprevalences ranging from 22% (6/27) in Northern Norway to 52% (48/93) in Southern Norway. Among the seropositive dogs, 73% showed evidence of exposure to a single pathogen, while 22% were seropositive for two pathogens, and 4% for three pathogens (Additional file 2). The seroprevalence of individual pathogens was 20% (CI: 16-24) for *B. burgdorferi* s. l., 19% (CI: 16-23) for TBEV, and 11% (CI: 8-14) for *A. phagocytophilum*. A detailed overview of seroprevalence across all 15 counties is provided in Table 1.

Regions (n)	County (n)	Total Bbsl % (n) (CI)	Total TBEV % (n) (CI)	Total Ap % (n) (CI)
		18 (38) (13-24)	20 (41) (14-26)	2 (5) (1-6)
Eastern Norway (208)	Innlandet(54)	7 (4)	17 (9)	0
	Akershus(53)	19 (10)	19 (10)	2 (1)
	Buskerud(6)	50 (3)	17 (1)	17 (1)
	Oslo(8)	13 (1)	38 (3)	0
	Østfold(46)	9 (4)	20 (9)	2(1)
	Vestfold(15)	27 (4)	13 (2)	0
Southern Norway (93)	Telemark (26)	46 (12)	27 (7)	8 (2)
		25 (23) (16-35)	28 (26) (19-38)	22 (20) (14-31)
	Agder (93)	25 (23)	28 (26)	22 (20)
		20 (17) (12-30)	11(9) (5-19)	23 (19) (14-30)
Western Norway(84)	Rogaland (15)	20 (3)	13 (2)	33 (5)
	Vestland (43)	16 (7)	12 (5)	23 (10)
	Møre & Romsdal (26)	27 (7)	8 (2)	15 (4)
Central Norway (21)		19 (4) (5-42)	24 (5) (8-47)	14 (3) (3-36)
	Trøndelag (21)	19 (4)	24 (5)	14 (3)
		11 (3) (2-29)	11 (3) (2-29)	0 (0-13)
Northern Norway (27)	Nordland (13)	15 (2)	0	0
	Troms (9)	11(1)	22 (2)	0
	Finnmark (5)	0	20 (1)	0
Total (n = 433)		20 (85) (16-24)	19 (84) (16-23)	11 (47) (8-14)

Table 1: Seroprevalence of IgG antibodies against tick-borne pathogens in dogs residing in Norway.
Table 1 legends: Regional seroprevalence against Borrelia burgdorferi sensu lato (Bbsl), tick-borne encephalitis virus (TBEV), and Anaplasma phagocytophilum (Ap) in dogs residing in Norway.

When comparing across regions, no statistically significant differences in the seroprevalence of *B. burgdorferi* s. l. were detected (P=0.180), although the rates varied from 11% (CI: 2-29) in Northern Norway, to 18%

(CI: 13-24) in Eastern Norway, 19% (CI: 5-42) in Central Norway, 20% (CI 12-30) in Western Norway, and 25% (CI: 16-35) in Southern Norway (Figure 2). In contrast, statistically significant regional differences in seroprevalence were observed for TBEV (P=0.043). The highest seroprevalence was found in Southern Norway (28%, CI: 19-38), followed by Central (24%, CI: 8-47) and Eastern Norway (20%, CI: 14-26), whereas the lowest was seen in Northern (11%, CI: 2-29) and Western Norway (11%, CI: 5-19). Similarly, a highly significant regional difference was detected for *A. phagocytophilum* (P=0.0001), with the highest seroprevalence observed in Western (23%, CI: 14-30), Southern (22%, CI: 14-31), and Central Norway (14%, CI: 3-36), compared to a markedly lower seroprevalence in Eastern Norway (2%, CI: 1-6) and no positive samples detected in Northern Norway (0%, CI: 0-13). These statistically significant regional differences for TBEV and *A. phagocytophilum* persisted after adjusting for age, sex, and breed, indicating robust geographical variation in exposure.

Seroprevalence by age, sex, and breed is presented in Table 2. A significant difference was observed between age groups when analysing for IgG antibodies against *A. phagocytophilum* (P=0.003), with the highest seroprevalence detected among senior dogs (17%, 27/164), followed by adults (6%, 10/156), puppies (4%, 1/26), and young dogs (0%, 0/27). In contrast, no significant differences were detected between age groups for antibodies against *B. burgdorferi* s. l. and TBEV. For the most represented breeds and between sexes, there were no significant differences for any of the tick-borne pathogens. However, it should be noted that none of the 17 Border Collie samples tested positive for IgG antibodies against *B. burgdorferi* s. l.

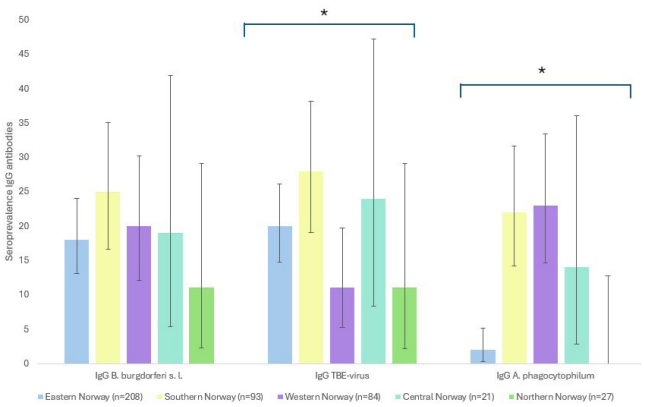


Figure 2: Seroprevalence of IgG antibodies against B. burgdorferi s. l., TBEV, and A. phagocytophilum in dogs residing in regions across Norway. Asterisks (*) denote statistically significant overall variation across regions. Error bars represent 95% confidence intervals.

Correlation between canine seroprevalence and human Lyme borreliosis incidence and tick-borne encephalitis

Regions with high canine *B. burgdorferi* s. l. Seroprevalence corresponds to the reported high human Lyme borreliosis incidence (R^2=0.739; Table 3).

This suggests that approximately 74% of the variation in human incidence could be explained by regional differences in canine seroprevalence. In contrast, no correlation was observed between canine seroprevalence of TBEV and human TBE incidence.

All TBE infections reported were restricted to Southern and Eastern Norway.

Variable	Category	Number of dogs (n=433)	Bbsl	TBEV	Ap
			%(n)	% (n)	% (n)
	Puppy (0-1 year)	26	23 (6)	12 (3)	4 (1)
	Young (1-2 years)	27	26 (7)	15 (4)	0 (0)
Age	Adult (2-8 years)	156	21 (32)	22 (32)	6 (10)
	Senior (>8)	164	18 (30)	19 (31)	17 (27)
	n/a[1]	60	17 (10)	23 (14)	15 (9)
	Border Collie	17	0 (0)	24 (4)	6 (1)
	English Setter	12	17 (2)	33 (4)	8 (1)
	Golden Retriever	11	18(2)	27 (3)	18 (2)
Breed	Gordon Setter	10	30 (3)	50 (5)	10 (1)
	Irish Wolfhound	10	30 (3)	0 (0)	0 (0)
	Mixed breed	82	23 (19)	23 (19)	11 (9)
	Other[2], n/a[1]	291	19 (56)	17 (49)	11 (33)
	Female	184	15 (28)	21 (39)	9 (16)
Sex	Male	164	20 (33)	17 (28)	11 (18)
	n/a[1]	85	26 (22)	19 (16)	13 (11)

Table 2 title: Seroprevalence against tick-borne pathogens by age, sex, and breed in the sampled dog population.
Table 2 legends: Seroprevalence against Borrelia burgdorferi sensu lato (Bbsl), tick-borne encephalitis virus (TBEV), and Anaplasma phagocytophilum (Ap) by age, sex, and breed in the sampled dog population. 1n/a: not available; 2Other: Breeds with fewer than 10 dogs.

	Seroprevalence in dogs (2016-2023) (%)		Human incidence (2024) (per 100,000 inhabitants	
Region	**Bbsl**	**TBEV**	**LB**	**TBE**
Eastern Norway	18.2	19.7	6.5	1.0
Southern Norway	24.7	27.9	27.2	5.9
Western Norway	20.2	10.7	23.3	0
Central Norway	19.0	23.8	7.5	0
Northern Norway	11.1	11.1	1.0	0

Table 3 title: Canine seroprevalence and human Lyme borreliosis and tick-borne encephalitis incidence in Norway.
Table 3 legends: Canine seroprevalence of Borrelia burgdorferi sensu lato (Bbsl) and tick-borne encephalitis virus (TBEV), in addition to human incidence (cases per 100,000 inhabitants) of Lyme borreliosis (LB) and tick-borne encephalitis (TBE) in the five regions of Norway.

Discussion

In total, 38% of the dogs in the present study had antibodies against one or more of the pathogens investigated. IgG antibodies against tick-borne pathogens were detected in dogs from all regions in Norway, including northern regions where few established populations of I. ricinus have been confirmed [32]. I. ricinus is the predominant tick species in Norway [5, 6, 32] and is therefore the most likely source of pathogen exposure. However, exposure to other tick species cannot be excluded, nor can the possibility that some dogs acquired infection outside their county of residence, as travel history was not available for the included dogs. Furthermore, it has been demonstrated that infected dams may transfer maternal antibodies against B. burgdorferi s. l. to their pups [33], and vertical transmission of TBEV is suspected [34]. Hence, we cannot exclude the possibility that IgG-positive puppies acquired maternally derived antibodies or were infected vertically, rather than through tick exposure.

Seroprevalence of IgG antibodies against tick-borne pathogens

The overall seroprevalence of IgG antibodies against *B. burgdorferi* s. l. was 20%, ranging from 11 to 25%, depending on geographic region. Although no statistically significant differences between regions were seen, the highest seroprevalence was observed in Southern Norway, consistent with high tick population densities as well as previous reports of high prevalence of *B. burgdorferi* s. l. in questing ticks in this region [7]. This aligns with findings reported nearly three decades earlier from the same region, where the seroprevalence of *B. burgdorferi* s. l. in dogs, was 14% and 27%, respectively [35, 36]. In contrast, our data indicate a different trend in Northern Norway: A previous report published in 2012 found a canine seroprevalence of only 1.7% (2/120) in the northern region [37], whereas the present study found a higher seroprevalence of 11% (3/27). Although this may suggest a rise in exposure in northern regions, the small sample size in our study warrants cautious interpretation. Notably, the canine seroprevalence of *B. burgdorferi* s. l. in Nordic countries seems highly variable; 2.9% in Finland [38], 3.9% in Sweden [39], 16.1% in Denmark [40], and 20% in Norway. Also, a recent multicentre study reported an overall canine seroprevalence of 2.4% in Europe, but local results here also ranged widely, from 0 to 13.3% [41]. The seroprevalence is likely influenced by several factors, such as regional variation of tick abundance, environmental conditions affecting tick activity, intensity of local pathogen transmission, and levels of tick exposure in the sampled canine population. In addition, differences in test performance may influence seroprevalence estimates.

When seroprevalence is interpreted in the context of the immunoassay's reported sensitivity and specificity (both 100%), the positive results in our study likely represent true previous exposure to *B. burgdorferi* s. l.

In the present study, the overall seroprevalence of IgG antibodies against TBEV was 19%, and seropositive dogs were seen in all regions. Regional seroprevalence ranged from 11% in Northern Norway to 28% in Southern Norway. The prevalence of TBEV in questing ticks collected in Norway is also highly variable, depending on region, ranging from 0 to 20.6% [6, 42]. Although several factors may influence the risk of infection, the varying endemicity of TBEV in different regions may partly explain the marked regional differences in seroprevalence observed in this study. Widely varying seroprevalence of TBEV in dogs is also seen across Europe, ranging from 0 to 40% depending on geographic location, endemicity, and study design [3, 44-47]. Previously, a study conducted in southern Norway found that 16% of dogs were seropositive [48].

The higher seroprevalence in the present study may partly be explained by differences in assay methodology, but could also reflect a true increase in tick abundance or infected ticks. Supporting this notion, there has been a general increase in reported human TBE cases in Norway over the past two decades [14]. The current study included a limited sample size from Central and Northern Norway, warranting cautious interpretation of the results. Furthermore, cross-reaction with other flaviviruses cannot be excluded [43], and positive TBEV results should be interpreted with caution. Nevertheless, our findings indicate that dogs are at risk of acquiring tick-borne viral infection, and TBE should be considered among the differential diagnoses in dogs with neurological symptoms.

The overall seroprevalence of IgG antibodies against *A. phagocytophilum* in dogs in the present study was 11%, with regional variations ranging from 0 to 23%. These findings fall within previously reported seroprevalence rates across Europe, which range from 0 to 43.3% [21, 38, 41, 49-52]. As for *B. burgdorferi* s. l. and TBEV, the wide variability may be caused by several factors. In Norway, the prevalence of *A. phagocytophilum* in questing ticks has also been shown to vary greatly between sites, from 0 to 17.5% [53-57], and may partly explain the regional differences in canine seroprevalence. Again, due to the limited sample size, the estimated seroprevalences in Northern and Central Norway should be interpreted with caution. Also, cross-reaction cannot be excluded, and *Neoerlichia mikurensis* is previously suggested to be the most likely agent cross-reacting with A. phagocytophilum in Norway [43].

Co-infection with tick-borne pathogens is assumed to increase disease severity; however, the clinical consequences of such co-infections remain poorly understood [58]. In the present study, antibodies against two or three pathogens were detected in 10% (44/433) of the included dogs, but due to the persistence of antibodies after prior pathogen exposure [16, 45, 59], we cannot determine whether these dogs were concurrently infected or whether the observed serological patterns reflect sequential exposures, nor can we assess any associated impact on the dogs' health.

Breed-related risk factors

Breed-related risk factors such as activity level, primary use (e.g. hunting dog vs. companion dog), outdoor environment, coat characteristics, grooming practices, and the use of tick ectoparasiticides may influence the risk of tick bites and pathogen transmission. In addition to behavioural and environmental factors, differences in host-derived volatile organic compounds may influence host-seeking behaviour in ticks [60]. Recent evidence suggests that such volatiles can affect tick attraction and potentially vector competence, although breed-specific differences in dogs remain unexplored. In Norway, there are approximately 590,000 dogs, present in about 18% of all households [61]. In our study, Border Collie, Golden Retriever, and Setter breeds were most represented. These breeds rank among the most popular in Norway, based on annual registrations reported by the Norwegian Kennel Club and a national data registry [61, 62]. In contrast, the Irish Wolfhound is rare, with fewer than 200 members in the breed-specific Norwegian Kennel Club [62]. Border Collie, Setter breeds, and often Golden Retrievers are frequently used in outdoor activities such as herding, hunting, or companionship, making them prone to tick exposure. The long and dense coat of some breeds, such as the Golden Retriever, may also facilitate prolonged tick attachment. The Border Collies were clearly exposed to ticks as they showed seroprevalence of antibodies against TBEV and *A. phagocytophilum,* yet none of the Border Collies was positive for antibodies against *B. burgdorferi* s. l. Half of the Gordon Setters were seropositive for antibodies against TBEV, and the Irish Wolfhounds were negative for antibodies against TBEV and *A. phagocytophilum* but had a relatively high seroprevalence of *B. burgdorferi* s. l. These findings could not be linked to the geographical distribution of the dogs, and none of the breed-related risk factors commonly referred to seems plausible. The sample sizes in these cohorts are very small, and the findings could be due to chance. However, previous studies have also reported breed predispositions [63, 64]. Several studies have confirmed a particularly high seroprevalence of *B. burgdorferi* s. l. in Bernese Mountain dogs, but not against other tick-borne diseases in the same region [64]. There were seven Bernese Mountain dogs in this study, of which one tested positive for *B. burgdorferi* s. l. Further studies with larger breed-specific cohorts are warranted to explore potential breed-related risk factors.

Dogs as sentinel animals for human Lyme borreliosis and tick-borne encephalitis

Seropositivity does not necessarily indicate active infection but may reflect prior or subclinical exposure. While it is important to consider the clinical relevance of these infections for canine health, dogs may also serve as valuable sentinels for the surveillance of tick-borne pathogens. In the present study, we observed a positive association between canine *Borrelia* seroprevalence and human incidence of LB [14, 28]. These findings are consistent with previous work demonstrating a quantitative relationship between *B. burgdorferi* exposure in domestic dogs and human LB incidence, supporting the potential use of canine seroprevalence as a proxy for human risk of LB [65]. In contrast, the canine seroprevalence of TBEV did not correlate with the incidence of human TBE cases; however, the dogs still serve as valuable sentinels for vector and pathogen distribution surveys. Interestingly, there have been no reported human TBE cases from Western Norway [14, 27], despite 11% of the dogs from this region testing positive for antibodies against TBEV. These findings are supported by evidence of TBEV in questing ticks (0 to 20%) [42] and a seroprevalence of 10% in horses from the same region [43]. The reason for the lack of human cases in this region is so far unknown, but could be due to multiple intrinsic and extrinsic factors of host and vectors or variants of the pathogens causing asymptomatic infections [42, 66]. This geographic discrepancy between canine seroprevalence and lack of reported human cases highlights the potential value of dogs as sentinel species in surveillance efforts, as canine serology may serve as an early indicator of TBEV circulation in areas where clinical cases have yet to be detected.

Limitations of this study

The non-systematic sampling approach may have affected the representativeness of the results. For instance, clinics or dog owners with a particular interest in tick-borne diseases may have been more likely to participate. To mitigate this potential bias, we aimed to include samples from areas outside *I. ricinus*' geographical range where interest in ticks and tick-borne infections tends to be lower, and participation was less likely to be driven by heightened concern about ticks.

A larger and more systematically sampled study is needed to further investigate regional differences and to evaluate potential changes in seroprevalence between years and over time. Nevertheless, the dataset represents the most geographically comprehensive survey of canine exposure to tick-borne pathogens conducted in Norway to date, and the detection of pathogen exposure outside the established range of *I. ricinus* underscores the importance of broad-scale surveillance efforts.

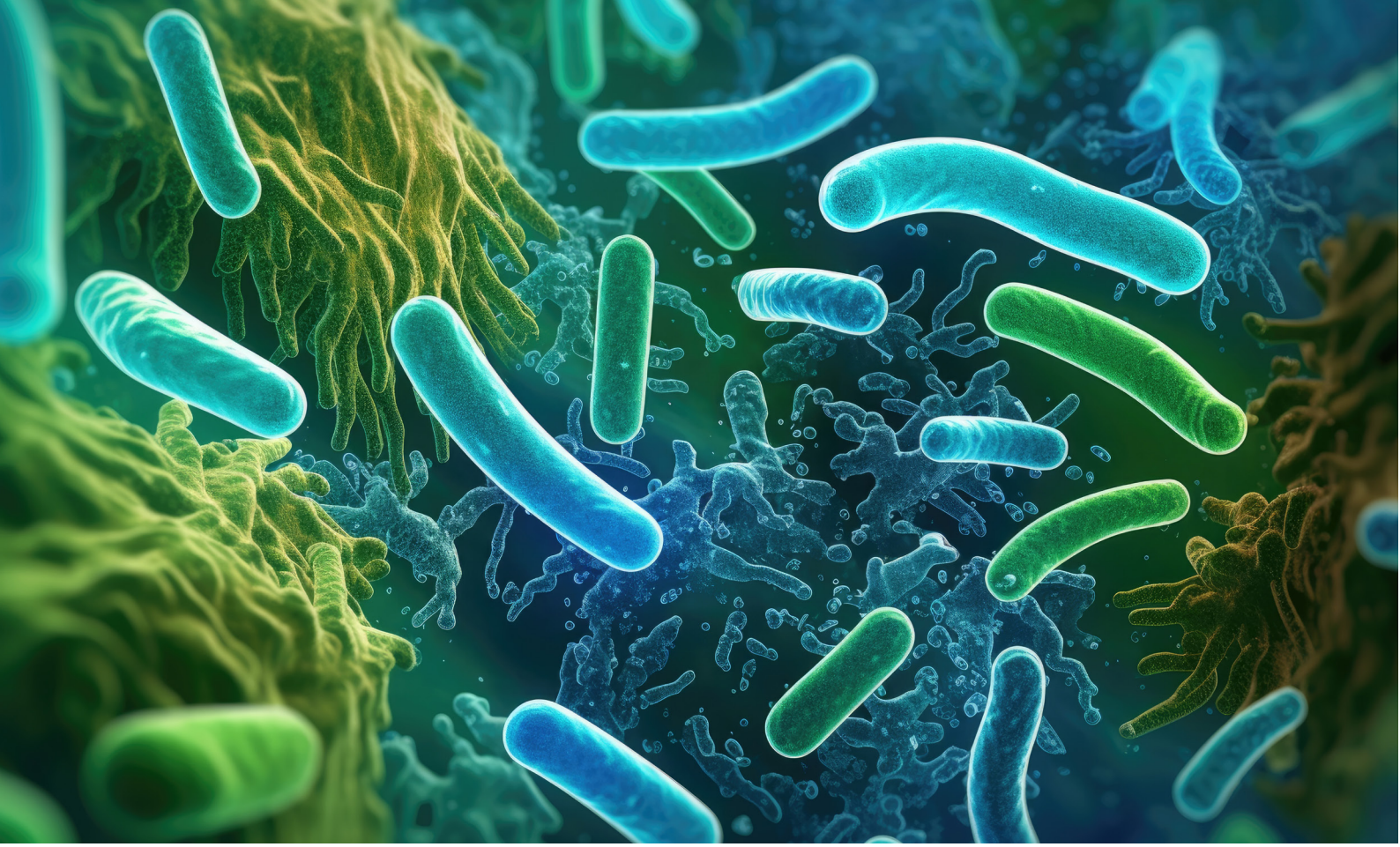
Conclusions

This study demonstrates that domestic dogs throughout Norway are exposed to ticks and tick-borne infections, with 38% of the sampled population seropositive for one or more of the pathogens *B. burgdorferi* s. l., TBEV, and *A. phagocytophilum*. IgG antibodies were detected across all age groups, both sexes, and a broad range of breeds.

Given their close contact with humans and their high likelihood of tick exposure, dogs represent a valuable sentinel species for monitoring the distribution and circulation of tick-borne pathogens, and for human LB.

Continued surveillance, increased public awareness, and the implementation of preventive measures, such as the use of tick ectoparasiticides in consultation with a veterinarian, along with regular tick checks, are recommended to reduce the risk of pathogen transmission and exposure for both dogs and their owner.

References available on request



Co-infection of Borrelia burgdorferi sensu lato and Rickettsia species in ticks and in an erythema migrans patient

Ellen Tijsse-Klasen[1]*, Hein Sprong[1] and Nenad Pandak[2]

2013 Article on humans

Abstract

Background:

Lyme borreliosis is the most prevalent tick-borne disease in Europe. Ixodes ricinus also carries other pathogenic bacteria, but corresponding human diseases are rarely reported. Here, we compared the exposure to Rickettsia helvetica and Rickettsia monacensis with that to Lyme borreliosis spirochetes. We assumed that their exposure corresponds to their infection rate in questing I. ricinus.

Findings:

Three Rickettsia species were detected in ticks with a total prevalence of 7.9%, of which the majority was R. helvetica (78%) and R. monacensis (21%). From the same geographic area, skin biopsies of erythema migrans patients were investigated for possible co-infections with Rickettsia spp. Forty-seven out of 67 skin biopsies were PCR positive for Borrelia burgdorferi s.l., and one sample was positive for R. monacensis. The Borrelia genospecies from the R. monacensis-positive patient was identified as Borrelia afzelii. The patient did not show any symptoms associated with rickettsiosis.

Conclusions:

Co-infections of I. ricinus with Rickettsia spp. and B. burgdorferi s.l. were as high as expected from the individual prevalence of both pathogens. The co-infection rate in erythema migrans patients corresponded well with tick infection rates. To our knowledge, this is the first reported co-infection of B. afzelii and R. monacensis.

Findings

Erythema migrans (EM) is an early sign of Lyme disease, which is caused by Borrelia burgdorferi sensu lato (s.l.) spirochetes that are transmitted by ticks. A typical EM is characterised by a bull's-eye look with an expanding red ring of active infection and inner clearing, but other presentations of EM can be found as well [1]. As a first sign of Lyme disease, it usually occurs at the site of the tick bite and is associated with tick attachment duration of more than 24 hours [2]. These premises make EM likely sites of co-infection with other tick-borne pathogens that can be transmitted alongside B. burgdorferi s.l. Rickettsia spp. are, next to B. burgdorferi s.l., the most common potential pathogens found in Ixodes ricinus, the main vector of Lyme disease in Europe [3-6]. Some Rickettsia species are well-established pathogens, while the pathogenic potential of others has not been fully elucidated [7]. Invasion and potentially infecting tissue at the tick-bite site is the first step tick-borne bacteria have to make to cause disease. We investigated the co-infection rates of ticks with these two pathogens and co-infections in EM patients from Croatia. Part of the data from this study has been published in a separate manuscript dealing with focus on the genetic variation of Borrelia genotypes [8]. For this purpose I. ricinus and EM skin biopsies were tested with a B. burgdorferi s.l. duplex qPCR and a conventional Rickettsia spp. PCR. DNA from vegetation ticks and skin biopsies of EM patients was extracted and tested for the presence of B. burgdorferi s.l. DNA [8]. Samples were tested for Rickettsia by conventional PCR on the 16S rRNA gene, and PCR-positive samples were sequenced and analysed as described [4,9]. Positive and negative controls were run with each tested batch. Positive control for the Rickettsia spp. PCR was a Rickettsia africae positive patient sample [10]. Rickettsia africae is not found in I. ricinus and can be differentiated from rickettsial species in I. ricinus based on the 16S rRNA gene.

Prevalence of Borrelia burgdorferi s.l. and Rickettsia spp. in Croatian ticks and EM skin biopsies of 1432 I. ricinus tested for Borrelia, 254 (17.7%) were positive. Of 1273 I. ricinus tested for Rickettsia spp. 101 (7.9%) were positive [8]. Of these, 79 (78%) were identified as Rickettsia helvetica (100% homology to L36212), 21 (21%) as Rickettsia monacensis (100% homology to [GenBank: DQ100164]) and one (1%) as Rickettsia raoultii (100% homology to [GenBank: DQ365809]). Of 67 EM skin samples, 47 were B. burgdorferi s.l. Positive (70%) and one (1.5%) were Rickettsia sp. positive. The latter sample was also positive for B. afzelii, and the rickettsial species was identified as R. monacensis (100% homology to [GenBank: DQ365809]).

Case description

The R. monacensis positive patient was an eight-year-old girl living in an urban environment. Six days prior to the hospital visit the patients mother had noticed a red annular rash on her daughter's face. The rash expanded throughout the following day and during the hospital visit three EM lesions were noticed: around the left eye (7×14 cm), at the anterior side of the right thigh (9×12 cm) and on the right gluteus (11×17 cm). The skin biopsy was taken from the gluteal EM. The patient complained about itching but no other symptoms were reported or noted during the visit. Neither the patient nor her mother recollected any tick bites. After the diagnosis of Lyme borreliosis presenting as multiple EMs following dissemination of the infection, treatment with azithromycin (10 mg/kg) was initiated. The antibiotic was administered twice on the first treatment day and once daily until day five. The EMs started to fade during the second treatment day and had disappeared by day four. Serology later confirmed the diagnosis of Lyme borreliosis but did not show a seroconversion towards spotted fever group Rickettsia (data not shown). Throughout the disease course, no symptoms indicating a rickettsial co-infection were noticed. At checkups two weeks and two months after the initial visit, the skin was clear and the patient was fully recovered.

Discussion

Derived from the Borrelia spp. and Rickettsia spp. infection rates in ticks of 17.7% and 7.9%, respectively, a theoretical co-infection rate of 1.4% was calculated (infection rate of Borrelia spp. x infection rate of Rickettsia spp. The measured co-infection rate in the 1273 I. ricinus that were tested for both bacteria was 1.4%. The theoretical and actual co-infection rates in ticks were also calculated for the combinations of the commonest Borrelia genospecies (Borrelia garinii and B. afzelii), and Rickettsia species (R. helvetica and R. monacensis) and theoretical and actual co-infection rates for these combinations were also nearly identical (data not shown). The detection of R. raoultii in I. ricinus is surprising as this rickettsial species is associated with Dermacentor spp. The R. raoultii prevalence in this study was only 0.08%, and the detection of this DNA might be attributed to a recent infected blood meal or a contamination of the tick sample with material from Dermacentor marginatus ticks, which had been collected simultaneously.

The measured co-infection rate of 1.4% in ticks indicates that this percentage of EM patients has also been exposed to Rickettsia spp. In our study population of 67 EM cases, this would translate to one patient (calculated: 0.94 patients). Indeed, one skin sample was found to be Rickettsia spp. positive. Although the study population is limited, this indicates that transmission of Rickettsia spp. can occur alongside Borrelia spp. If the tick carries a double infection. The current study population was too small to draw a definite conclusion on the virulence and pathogenicity differences of different rickettsial species found in I. ricinus. However, as R. helvetica was almost four times more common in ticks than R. monacensis, by chance, R. helvetica would have been more likely to cause co-infections in EM. Both R. helvetica and R. monacensis are thought to be pathogenic, but the full clinical picture or the virulence is not known for either of these two species [11,12]. In the current case, the patient did not seem to suffer any symptoms associated with a Rickettsia spp. infection. The erythematous lesions were attributed to the B. burgdorferi s.l. infection, and the patient recovered completely after a five-day course of antibiotics. Average incubation time in children with multiple EM has been reported to lie between 10 and 25 days [13,14]. The rickettsial bacteria in the skin lesions have thus survived in the skin for a similarly long period without being eliminated by the patient's immune system. Future case reports and epidemiological studies would be necessary to evaluate the clinical spectra and virulence of R. helvetica and R. monacenis.

Conclusions

In conclusion, the co-infection rates in EM patients with Rickettsia spp. were as high as predicted by tick co-infection rates. All symptoms of the patient with R. monacensis coinfection can be explained by the B. afzelii infection, and the virulence of this rickettsial agent remains unclear.

Nevertheless, this study highlights the importance of considering co-infections when treating Lyme borreliosis.

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Bush Break

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Preliminary Programme

ıy 1: 06 June 2026

8:30	**Coffee/Tea & Exhibitors**	**Gates Open 6am**
9:30	Anorexic cats, Hepatic lipidosis and tube feeding	Dr Dave Miller
10:15	**Coffee/Tea & Exhibitors**	
10:45	FIP	Dr Rowena Watson
11:30	FeLV and FIV - With newer info on forms of FeLV and which are fatal and which can be co incidental.	Dr Rowena Watson
12:15	**Lunch & Exhibitors**	
13:15	Feline diabetes – Control with insulin and glucose curves [the old school]	Dr Dave Miller
14:00	Hyperthyroidism	Dr Dave Miller
14:45	**Coffee/Tea & Exhibitors**	
15:00	Feline Diabetes – Using oral therapy NOT injectable [SGLT2 inhibitors] and Freestyle Libre monitoring [the future]	Dr Rowena Watson

Day 2: 07 June 2026

8:30	**Coffee/Tea & Exhibitors**	**Gates Open 6am**
9:00	IBD vs Small cell lymphoma – diagnostics and management	Dr Rowena Watson
9:45	Update on feline Babesia	Dr Aletta Mulder
10:30	**Tea & Exhibitors**	
11:00	Constipation Vs Megacolon - Management	Dr Rowena Watson
11:45	The Vomiting Cat	Dr Rowena Watson
12:30	**Lunch**	
13:30	Feline Asthma	Dr Dave Miller
14:15	Feline Allergic Reaction patterns – how cats present with Allergy and the basics of management	Dr Dave Miller

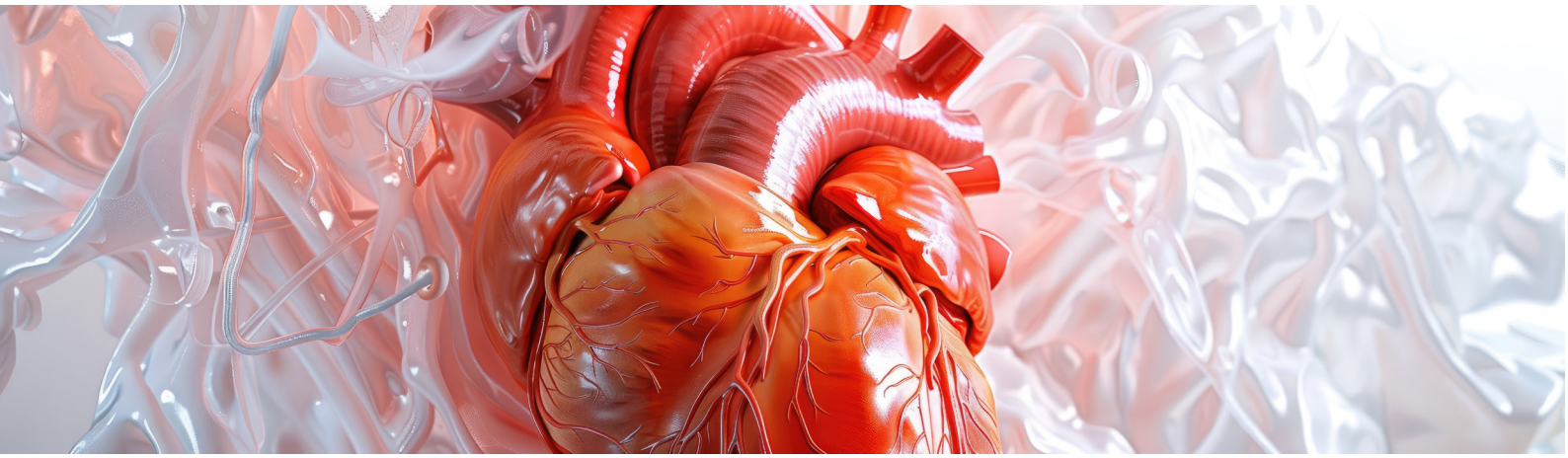
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Heartworm incidence climbs despite preventive efforts

Veterinary groups emphasise the need for more communication with clients

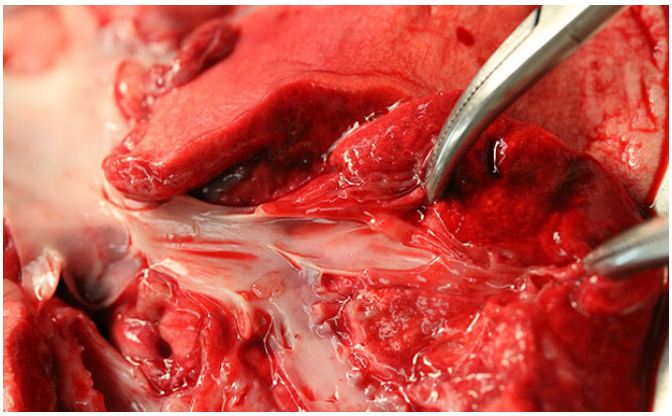
By Malinda Larkin
Published on October 08, 2024



Heartworm infection rates across the U.S. have steadily increased for nearly two decades despite the greater availability and efficacy of preventatives.

Every three years, the American Heartworm Society (AHS) conducts a survey that looks at reporting clinics and the total dog population. And each time, the number of dogs that have tested positive for heartworm goes up by well over 50,000, says Dr Doug Carithers, a parasitology expert and board member of the AHS for over 18 years.

In 2001, the number of heartworm-positive dogs was estimated at 800,000. Twenty years later, that estimate has reached well over 1.2 million.



Normal pulmonary artery

Normal pulmonary artery (Photos courtesy of Dr Steve Jones)

"It's very disheartening, especially since this disease is preventable", said Dr Carithers, who is a long-time AHS board member and employee of Boehringer Ingelheim.

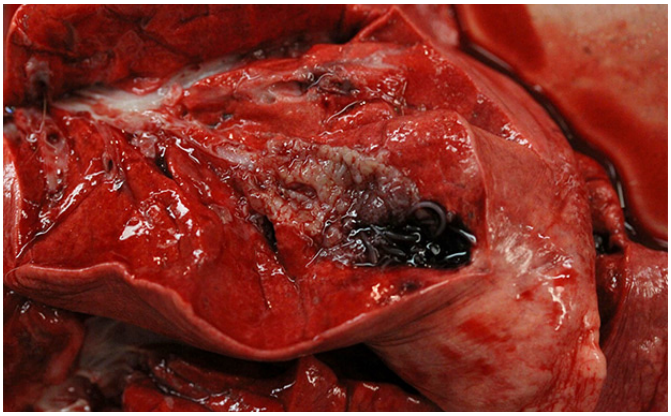
The disease is found in all 50 states, though its geographic distribution seems to be changing, as it spreads to regions where it was once considered rare. Expansion of the territories of heartworm-positive wild canids, low owner compliance with heartworm preventives, relocation of microfilaremic dogs to other states, and an increasing frequency of weather conditions conducive to mosquito proliferation, driven in part by climate change, are all likely contributing to its spread.

"As a profession, we have to work together to help veterinary practitioners create urgency about this," Dr Carithers said. "We have to educate our colleagues that the spread of heartworm is a highly efficient process."

Understanding the spread

Recent research indicates that what was once thought to be a random process is not random at all. A study published in 2013 by Dr Tanja McKay, a professor at Arkansas State University, and others, found that mosquitoes are 10 times more likely to find and feed on infected dogs, wolves, or coyotes than noninfected canids.

Similarly, a 2023 study published in the Brazilian Journal of Veterinary Medicine showed that heartworm-positive dogs are the richest source of infection for mosquitoes, increasing the risk of transmission. Often, the disease will result in necrosis of pulmonary tissue before an animal tests positive for heartworm. At 153 days, the animal could be exhaling volatile organic compounds (VOCs) from the necrotic tissue, attracting mosquitoes, and thus increasing the likelihood of transmission as mosquitoes feed on other animals.



Pulmonary Artery on Day 153 after heartworm infection

Pulmonary Artery on Day 153 after heartworm infection. The antigen test would not yet be positive.

"To make matters worse, wild canids tend to forage in anthropic areas where they can interact with mosquito-vectors that have fed on microfilaremic dogs and already harbour the third larval stage of heartworm. Once microfilaremic, these wild canids become a source of infection to sylvatic mosquito vectors all over their living area, spreading the parasite in the wild," the Brazilian authors wrote. Dr Carithers recounted a time when he noticed an increase in the prevalence of dogs in Montana testing positive for heartworm. In 2006, area veterinarians saw one case per clinic, which rose to five per clinic in 2009.

He asked a local practitioner about it, and he said it was because Yellowstone National Park had reintroduced wolves into the park. "If one is positive, they will pack up together, mosquitoes feed on them, and then come back to regular spots to bed down, and other packs get infected," Dr Carithers said. "The biggest issues occur when there's a higher density population of pets, mosquitoes, and a high population of infected dogs, such as in Southern cities."

Microenvironments and weather

Climatic conditions can also profoundly affect opportunities for mosquitoes to transmit heartworm disease.

In 2008-09, the Southeast experienced a severe drought. One would expect the number of heartworm cases to go down, but they just became localised around bodies of water, Dr Carithers said. Maps from 2010 showed one Texas county, which previously had high incidences of heartworm, having zero heartworm-positive dogs among seven clinics.

Yet, the next county over had 10 clinics report over 100 positive dogs per clinic. When he followed up with them, they told him the former county was high and dry, and the latter had numerous lakes.

Hurricanes or other major storms can also cause heartworm outbreaks because of the increased water in an area. In California, some areas have seen increased heartworm incidence because tree hole mosquitoes will lay eggs in underground urns at cemeteries that accumulate water.



Grey wolf (Canis lupus) portrait

>>>26

Heartworm incidence climbs.... <<< 25

Wild canids, such as the grey wolf, tend to forage in areas where they can interact with mosquito vectors that have fed on microfilaremic dogs. Once infected with heartworm disease, the wolves can be a rich source of infection for mosquitoes, increasing the risk of transmission to other dogs, wolves, and coyotes.

"Mosquitos can lay eggs in a water source the size of a thimble. If it's in the shade, the water will last until the larvae develop. There's great potential out there," Dr Carithers said.

Heartworm transmission does decrease in colder months, but the presence of microenvironments in urban areas suggests that the risk of heartworm transmission never reaches zero.

"Urban sprawl has led to the formation of 'heat islands' as buildings and parking lots retain heat during the day, creating microenvironments with potential to support the development of heartworm larvae in mosquito vectors during colder months, thereby lengthening the transmission season," according to the AHS's Canine Heartworm Guidelines.

In the Northeast, heartworm incidence is somewhat influenced by the frequent transport of animals from the South, where heartworm is endemic. These animals are put up for adoption after being spayed or neutered.

"The problem in these cases is when the dogs are taken into any shelter, that's when they are tested (for heartworm). They might be infected at that point, but if they are prepatent, the results will come back negative. If you don't follow up on the test, and the infection matures, then that dog is infecting mosquitoes in the new neighbourhood," Dr Carithers said. "This is how we end up with heartworms in previously nonendemic areas, like we have seen in Massachusetts near a large adoption centre. So, veterinarians should always be vigilant, even if they feel they are in a low-endemic area."

Treatment and prevention

The biggest issue, according to Dr Carithers, is that heartworm disease can't be treated.

"No, you can't treat heartworm disease," he said. "You can get rid of the heartworm, but not the disease. The pathology, even from a single worm that dies in a single lung field, is still present years later. … Worms cause pathology that lasts forever."

Further, results from a study published this January in Frontiers showed that 6,138 patients treated for heartworm infection were found to have significantly elevated risks of right and left heart failure or cardiomyopathy compared with over 4 million patients who never had a positive heartworm test.

Yet, one study estimates only a third of dogs in the U.S. received a single dose or more of heartworm preventive in 2023, while 67% didn't.

That's an increase from 64% in 2009, when there were only five heartworm preventives on the market. Now, at least 20 different heartworm preventive options are available, and all products are nearly 100% effective in preventing heartworms when used year-round and administered as directed.

To help address misconceptions and misinformation about this deadly and preventable disease, professional veterinary and animal health advocacy organisations have teamed up, including the AVMA, AHS, and Boehringer Ingelheim, to launch the #ProtectMoreDogs initiative—a program with digital resources for veterinarians and pet owners.

Pet owners are often told to get heartworm preventive, but there's a lack of follow-up, Dr Carithers says.

"There's a disconnect between the exam room and the front desk. How much do you remember (as a patient) after stepping out of the exam room with a doctor? They ask you questions you don't want to answer and give you lots of info, and you have to keep track of that. I can understand easily how that would be lost in translation," he said.

"We need to get vets to prescribe instead of recommend products before the client walks out of the clinic door. Or have products in the exam room and take them to the front desk." V





Evaluation of a Cardiopulmonary Resuscitation Video Decision Aid for Pet Owners

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ABSTRACT

Objective: To evaluate the impact of a Cardiopulmonary Resuscitation Video Decision Aid (CPR-VDA) on pet owners' resuscitation preferences, decisional confidence, conflict, and knowledge of CPR.

Design: Prospective, interventional survey study with data collected from January to March 2024. Owners of pets presenting through the Emergency Department completed a preintervention questionnaire. They then viewed a 7-min CPR-VDA and completed a postintervention questionnaire. Changes between pre- and postintervention scores were analysed using the Wilcoxon signed rank tests.

Measurements and Main Results: The preintervention questionnaire assessed pet owner demographics, resuscitation preferences, decisional confidence and conflict, and prior knowledge about CPR. The postintervention questionnaire reassessed resuscitation preferences, decisional confidence and conflict, and CPR knowledge, with additional questions evaluating owners' perceptions of the CPR-VDA. Preintervention, 56 of 78 (72%) participants expressed a preference for "resuscitation" of their pet, five of 78 (6%) opted for "do not attempt resuscitation," and 17 of 78 (22%) were "not sure." Most participants (56/78 [72%]) did not change their resuscitation preference following the intervention. Participants felt more confident in their decision after watching the CPR-VDA ($p < 0.001$). There was no difference in how conflicted they felt making this decision (median score on a rating scale of 1–5 was 2.25 preintervention and 2.42 postintervention; $p = 0.192$). Their knowledge of CPR improved (median correct answers increasing from 5.5/9 to 9/9; $p < 0.001$). Most participants rated the video "good" or "excellent" (72/78 [92%]), found the video helpful (62/78 [79%]), and were likely to recommend it to other pet owners (72/78 [92%]).

Conclusions: The use of a CPR-VDA improved pet owners' knowledge of CPR and increased their confidence in decision-making.

The CPR-VDA was well received by pet owners and may be a useful tool to facilitate discussions regarding this topic.

Introduction

Decision aids are written or audiovisual tools that provide evidence-based information about treatment options, benefits, risks, and outcomes, and encourage active participation from the patient to help communicate their preferences with healthcare providers [1]. They are often used in human medicine and can make it easier for patients and healthcare professionals to discuss treatment options [2]. People exposed to decision aids felt more knowledgeable, had a better match between values and choices, and showed a reduction in indecision and regret that leads to decisional conflict [2]. Compared with verbal description, video decision aids have been shown to reduce uncertainty in decision-making and increase preferences for more comfort-focused medical care [3].

Cardiopulmonary resuscitation (CPR) can be a difficult and sensitive subject for discussion with pet owners. The reasons for this are likely multifactorial, with a recent survey in the United Kingdom showing that veterinary professionals face several challenges when discussing CPR with pet owners, including fear of causing upset, lack of time, and unrealistic owner expectations [4]. Previous studies have demonstrated a lack of pet owner knowledge of CPR procedures, alongside unrealistic perceptions of outcomes. Pet owners have been shown to overestimate survival to discharge rates between 39% and 45% following CPR [5, 6]. In contrast, actual survival to discharge rates reported in a recent study were 7% and 19% for dogs and cats, respectively [7]. Owners' unrealistic perceptions may contribute to the challenging nature of these discussions. Nevertheless, pet owners would like to be better educated in CPR and have prognosis, possible complications, and costs explained to them in order to make an informed decision on their pet's resuscitation status [4–6].

In human health care, these issues are mitigated by providing written or video-based information on CPR prior to or outside of the consultation [8]. After watching a short video on CPR, people felt better informed about their own resuscitation choices and were more likely to discuss their CPR preferences with their healthcare providers and receive medical care that was aligned with their stated wishes [9]. Interestingly, patients with more accurate perceptions of CPR survival rates were more likely to refuse CPR for themselves [10]. While this has not been explored in veterinary medicine, it seems reasonable to extrapolate that an improved understanding of CPR procedures and outcomes may impact owner resuscitation preferences for their pet and, at a minimum, that provision of accurate information is important when obtaining informed consent for CPR or do-not-resuscitate orders in small animals.

This study aimed to evaluate the impact of a cardiopulmonary resuscitation video decision aid (CPR-VDA) on pet owners' resuscitation preferences, decisional confidence and conflict, and knowledge of CPR. We hypothesised that pet owner knowledge and confidence would increase when the CPR- VDA was used, that decisional conflict would decrease, and that more pet owners would opt for "do-not-resuscitate" status after watching the CPR-VDA.

Materials and Methods

Study Design and Inclusion Criteria

Owners of pets presenting through the Emergency Department of a private referral hospital were enrolled between January 1 and March 1, 2024. Exclusion criteria were owners of pets presenting to

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other departments and owners whose pet was deemed by the attending clinician to be at immediate risk of cardiopulmonary arrest. Additionally, pet owners were excluded if a study investigator was not available at that time to enrol them in the study, or if the only study investigator available was also the primary clin- ician for their pet. Participation in the study was entirely voluntary, and pet owners were given an information sheet and consent form to read and sign prior to participation.

Ethical approval was granted prior to data collection by the Royal College of Veterinary Surgeons (RCVS) Ethical Review Panel (reference 2023–095).

Study participants were asked to complete a short questionnaire, watch the CPR-VDA (intervention), and then complete another short questionnaire. Questionnaires were completed via an online survey tool[1] using a handheld tablet (provided as Supporting Information). The preintervention questionnaire contained single-answer, multiple-choice, Likert-scale, and free- text questions relating to participants' demographics (n = 4 questions), resuscitation preferences (n = 1), how confident participants felt about their resuscitation preference (n = 1), how conflicted they felt in taking this decision (n = 1), and prior knowledge about CPR (n = 9).

The postintervention questionnaire repeated the questions relating to resuscitation preferences, decisional confidence and conflict, and knowledge about CPR, alongside additional questions regarding the owners' perceptions of the CPR-VDA (n = 7), with an opportunity to leave free-text comments about the video or survey.

Correct answers to knowledge assessment questions were each given a score of 1 for a possible total of nine correct answers. Decisional confidence and conflict were assessed using 5-point Likert scales.

The 7-min CPR-VDA demonstrated CPR being performed on a canine mannequin and described CPR interventions, including intubation, chest compressions, and drug administration, alongside alternative options such as euthanasia. The interventions shown followed the Reassessment Campaign on Veterinary Resuscitation (RECOVER) guidelines current at the time of data collection [11]. Survival statistics for both human and veterinary CPR were conveyed via pictographs [12–14].

The CPR-VDA underwent a systematic development process as recommended by the International Patient Decision Aids Standards (IPDAS) and was assessed for accuracy by a Diplomate of the American College of Veterinary Emergency and Critical Care and a RECOVER Certified ALS Rescuer. Information was provided in plain language with both audio and video to aid pet owners' understanding.

During study design, the survey and video were piloted with pet owners. The survey and video were found to be clear and easy to understand, and based on this pilot, a completion time of approximately 15 min was estimated for study completion (including watching the video and answering both questionnaires).

Pet owner enrollment was carried out during patient triage by one of the study investigators. Study participation took place in a private space (consultation room), and patient triage was performed in a separate room (Emergency Room) to minimise distractions. The study investigator was not involved with the triage or treatment of the owner's pet. When two owners presented with one pet, both were given the option of participating separately. Following enrollment, the study investigator opened the preintervention questionnaire on the tablet to get participants started and then left the consultation room to offer the participant privacy while completing the study and to reduce social desirability bias by the presence of the investigator [15].

Participants were given clear verbal and written instructions to watch the video before completing the postintervention questionnaire. In addition, after completion of the preintervention questionnaire, a message was displayed on the tablet requesting owners to watch the video and press "next" after watching it to access the postintervention questionnaire. The study investigator remained nearby the outside the consultation room to answer any questions during study completion.

After study participation, the pet's primary clinician proceeded with a consultation as normal, including separate confirmation of the owner's CPR preference for their pet to ensure that the final decision reflected clinical information specific to their pet. Asking pet owners for a resuscitation status is standard practice for all patients admitted by the Emergency & Critical Care Service at the authors' hospital.

Sample Size

The chosen sample size was influenced by Cohen's [16] concept of a medium effect size, but without knowledge of the level of pre–post correlation in responses. Defaulting to a two-sample test (rather than a paired test) and allowing for a 15% uplift in sample size to accommodate nonparametric testing suggested a minimum sample size of 74 paired responses at a significance level of 5% and a power of 80%.

Data Analysis

Responses were downloaded using a commercial spreadsheet software program[2] for analysis. Pet owner demographics are reported as median (range) for continuous and ordinal data, and as frequency and percentages for binary and categorical data. Key aspects of demographics were compared to initial CPR choice, change in CPR choice, and pre-knowledge of CPR using rank correlation for ordinal–ordinal comparisons or using Kruskal– Wallis tests adjusted for ties for ordinal–categorical comparisons.

Changes between pre- and postintervention responses were analysed by Wilcoxon signed rank tests for ordinal data. Analysis was undertaken in a statistical software program[3] . Significance was considered as $p < 0.05$.

Quantitative content analysis was performed on free-text data. Free-text responses were reviewed by one author and assigned to predefined categories (Table 1). The most common responses were reported, and individual comments that were representative of general comments under that category were chosen for quotation in the manuscript.

Results

Ninety-nine pet owners were approached for study inclusion. Nineteen (19/99 [19%]) declined participation, with the most common reasons being "too upset"(6/19 [32%]) or "stressed"(5/19 [26%]). Other reasons included being "overwhelmed" (2/19 [10%]) or busy completing other paperwork (1/19 [5%]). Another five of 19 [26%] participants gave no reason. One was excluded as their pet was deemed to be at imminent risk of cardiac arrest (1/19 [5%]), and one of 19 (5%) was withdrawn due to a video malfunction. As a result, 78 were included in the study.

The median age of participants was 48 years (16–78), with two participants disclosing their ages as 5 and 8, respectively. These participants were excluded from age analysis due to an obvious typographical error, as recruiting investigators confirmed that no young children were enrolled. The majority of participants were female (57/78 [73%]), with the remaining 19/78 (24%) being male and two of 78 (3%) identifying as other genders. When asked to disclose their highest level of education, most participants had completed a vocational qualification (21/78 [27%]) or postgraduate degree (23/78 [29%]). When asked how important religion was to participants, the majority (46/77 [60%]) answered "not at all important," with only two of 77 (3%) stating religion as "very important." There was no association between age, education, and religious beliefs and any of the initial CPR preference, change in CPR preference, or pre-knowledge of CPR (Table 2).

When asked, "Have you previously discussed CPR for this pet?" most participants answered no (71/78 [91%]), six of 78 (8%) had previously discussed this for their pet, and one of 78 (1%) was not sure.

When asked in the preintervention questionnaire what their resuscitation preference would be for their pet, 56 of 78 (72%) opted for "resuscitation," five of 78 (6%) opted for "do not attempt resuscitation," and 17 of 78 (22%) were "not sure." Most participants (56/78 [72%]) did not change their resuscitation preference following the intervention, but 22 of 78 (28%) did change preference (Figure 1). Preference change did not appear to be directional, with nine of 78 (12%) changing from resuscitation to "not sure" and seven of 78 (9%) changing from "not sure" to resuscitation (Figure 2).

Participant answers to the preintervention question "how confident do you feel making a decision about CPR for your pet" showed that the majority felt "extremely confident" (23/78 [29%]) or "somewhat confident" (31/78 [40%]), and fewer participants felt "neutral" (11/78 [14%]), "somewhat not confident" (9/78 [12%]), or "extremely not confident" (4/78 [5%]). Participants felt more confident in their resuscitation decision after watching the CPR-VDA ($p < 0.001$) (Figure 3), with an increased number of participants feeling "somewhat confident" (39/78 [50%]) and fewer participants feeling "neutral" (7/78 [9%]), "somewhat not confident" (8/78) [10%]), or "extremely not confident" (1/78 [1%]). Participants were asked to score their decisional conflict regarding resuscitation decisions for their pet on a scale of 1–5. A score of 1 reflected "no conflict", and a score of 5 indicated "high conflict" was felt, making this decision. Preintervention, the median score was 2.25 (1–5), and postintervention, it was 2.42 (1–5). There was no difference ($p = 0.192$) in how conflicted participants felt making this decision pre- and post-video intervention.

Regarding the knowledge assessment questions, the median number of correct answers before intervention was 5.5/9 (range 2/9–9/9) with an increase to 9/9 (5/9–9/9) after intervention ($p < 0.001$; Figure 4). The greatest knowledge impact after the CPR-VDA is related to pet survival. Preintervention, only 30 of 78 (38%) participants correctly identified that few pets survive to discharge after cardiopulmonary arrest due to an underlying disease process. This increased to 75 of 78 (96%) following the video intervention. Similarly, preintervention, 18 of 78 (23%) people correctly answered that almost half of pets sustaining cardiopulmonary arrest under anaesthesia survive to discharge. Following the intervention, 58 of 78 (74%) correctly answered this. Participants had a clearer understanding of the definition of CPR and the interventions it entails. Preintervention, 70 of 78 (90%) pet owners agreed with the statement that "CPR is a medical procedure that is performed on pets whose heart has stopped beating in an attempt to restart their heart." This increased to 77 of 78 (99%) after intervention. Preintervention, 53 participants for their pet before and after watching a CPR video decision aid (intervention). Data are presented as percentages of total responses. Left/green bar, "Attempt resuscitation"; middle/red bar, "Do not attempt resuscitation"; blue/right bar, "Not sure." for their pet before and after watching a CPR video decision aid ($n = 78$).

The thickness of the line is proportional to the number of responses, with the absolute numbers appearing above each connecting line. pre- and post-CPR informational video intervention in response to the question "how confident do you feel making a decision about CPR for your pet?"Data are represented as percentages. Extremely confident, dark green/top section of each bar; Somewhat confident, light green/second- from-top section of each bar; Neutral, yellow/middle section of each bar; Somewhat not confident, second–from–bottom section of each bar; Extremely not confident, bottom section of each bar. knowledge scores pre- and post-video intervention as assessed by nine multiple-choice questions relating to CPR. The box represents the first and third quartiles, and the central line represents the median. The outer extent of the whiskers represents the maximum and minimum knowledge score by individual participants.

78 (68%) of participants correctly identified that CPR includes interventions such as intubation, compressions, medications, and defibrillation. This increased to 75 of 78 (96%) postintervention. After intervention, 75 of 78 (96%) understood that pets would need ongoing care following successful CPR, compared to 57 of 78 (73%) before intervention.

Answers to questions relating to the acceptability of the CPR-VDA are summarised in Tables 1 and 3. Overall rating of the CPR- VDA was predominantly "good" to "excellent" (72/78 [92%]), with participants mainly rating it as clear, balanced, and providing the right amount of information. Overall, most participants found the video helpful for making decisions about CPR, and the majority were likely to recommend it to other pet owners (72/78 [92%]) (Table 3). At the end of the questionnaire, participants could add free-text comments. In total, 32 of 78 (41%) participants added free-text comments, which are summarised in Table 1.

Discussion

This study aimed to investigate the impact of a CPR-VDA on pet owners' decision-making regarding CPR for their pet. A short CPR-VDA was designed, and study participants were asked to complete questionnaires before and after viewing the CPR-VDA. Questionnaire results showed that after viewing the CPR-VDA, pet owners' knowledge increased and they felt more confident when making a decision, although still conflicted in the final decision made. Feedback on the CPR-VDA was positive, with most participants finding it helpful and recommending its use with other pet owners.

There are no consensus guidelines regarding the design of decision aids, but the IPDAS collaboration has published a checklist for users to determine the quality of decision aids, which informed the design of the CPR-VDA in this study [10]. The key objectives were to present clear, accurate information in an unbiased manner and in sufficient detail for owners to make decisions about resuscitation for their pet.

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An audiovisual format allowed visual demonstration of interventions involved in CPR, such as intubation and chest compressions. Furthermore, visual information has been shown to result in higher comprehension levels than oral or written aids [17]. Pictographs were used to display survival percentages, as these have been shown to be interpreted more accurately than other visual formats for presenting risk information [18]. Efforts were made to ensure accessibility, including closed captioning, narration, and adherence to educational guidelines in the preparation of the CPR-VDA [19]. In retrospect, there was limited audio description of visual content, and this would need to be addressed in future development of veterinary CPR-VDAs. While the majority of participants felt that the CPR-VDA was balanced in its approach, a small proportion considered it biased toward or against CPR. Future efforts should be made to limit bias when presenting probabilities and outcomes in future decision aids. The IPDAS checklist suggests that all relevant options (including doing nothing) should be presented in a decision aid. The CPR-VDA used in this study presented an alternative option of euthanasia in the event of cardiopulmonary arrest, but the option of doing nothing should also be incorporated into any future veterinary CPR-VDAs. Overall, however, participant evaluation of clarity and lack of bias was very positive.

An increase in knowledge following the video intervention was chosen as a key measure of the clarity of information provided. As expected, there was an increase in knowledge following the video intervention, with participants having a clearer understanding of the definition of CPR, CPR interventions, and survival to discharge rates. The most marked difference related to understanding of survival to discharge, which aligns with the unrealistic survival expectations previously described in a veterinary study [5].

Prior to the intervention, the majority of participants opted for "resuscitation." Interestingly, most participants did not change their resuscitation decision following the video intervention. This is in contrast to many human studies, which tend to show a decreased preference for life-sustaining treatment alongside increased knowledge of CPR after watching a CPR-VDA [20–26]. However, there is considerable variation in the design and quality of these studies, and some studies show no change in preference [27, 28]. An important limitation of this study is the omission of providing participants with different decision options based on the underlying cause of arrest. Several participants specifically commented that after watching the CPR-VDA, their resuscitation decision would depend on the underlying cause of arrest. This omission may account for some of the postintervention decisions changing from "resuscitation" to "not sure," and thus, these results should be interpreted with caution. Inclusion of this detail should be considered for future studies evaluating veterinary CPR-VDAs. Studies evaluating veterinary survival to discharge statistics after implementation of the 2012 RECOVER guidelines show variable results, with outcomes remaining generally poor [29, 30]. However, one study showed higher survival-to-discharge rates of cats following implementation of these guidelines [6]. In the current study, multiple survival statistics were not provided to pet owners in an effort to provide succinct information; however, it is possible that the provision of higher survival rates may have influenced pet owners' resuscitation decisions, and this could be considered in future studies.

Alongside an increase in knowledge, human healthcare studies suggest that people exposed to decision aids may have a better match between values and choices and show an increased confidence and reduced uncertainty in their decisions [2]. In the current study, participants felt significantly more confident in their resuscitation decision after viewing the CPR-VDA. How- ever, the degree of increase in confidence was relatively small, with the main increase being in the group feeling "somewhat confident" and an unchanged number feeling "extremely confident." Despite the increase in confidence, decisional conflict was similar before and after the video intervention. The reason for this is unclear, although the omission of different decision options depending on the cause of arrest in the postintervention questionnaire may play a part. Further investigation of pet owner confidence and uncertainty in CPR decision-making is warranted.

Pet owners also need to find the CPR-VDA acceptable if it is to be a useful tool. In this study, a relatively large proportion of pet owners approached for recruitment declined to participate, with the majority citing stress or upset as their reason. These emotions may relate to research participation at a time of anxiety about their pet, but it is also possible that the prospect of watching a CPR-VDA was stressful in and of itself. This is an important consideration when introducing such tools into practice and warrants careful thought on mitigation strategies. In human health care, there is an increasing move toward web- based formats [31, 32]. Providing access to an online CPR-VDA via a QR code or other method would give owners control over when and how they watch it, which may help to alleviate associated stress. Overall, however, our results show that those owners who participated found the CPR-VDA highly acceptable. This is related to clarity, balance, and overall rating. Importantly, participants felt the video was helpful for making their CPR decision and were likely to recommend it to other pet owners. Free-text comments also reflected an overall positive impression, with a number of participants explicitly commenting that they found the CPR- VDA informative. These results are similar to those found in human studies, where patient acceptance of CPR-VDAs tends to be strongly positive [33, 34].

Pet owner demographics were collected because sociocultural factors such as patient age, gender, religion, and level of education have been shown to influence patients' healthcare decisions and communication with healthcare providers in human medicine [35–37]. In contrast, in this study, there was no association between age, education, or religious beliefs and any of the initial CPR preference, change in CPR preference, or pre-knowledge of CPR. The overall educational level of participants was relatively high, and the proportion of owners who felt religion was very important to them was very low. This may have affected results and should be considered when developing CPR-VDA tools in different demographic areas. Data were not collected on participants' medical training or previous knowledge of CPR. Furthermore, a small number of participants had previously discussed CPR for their pet, and it is possible that this could have improved their initial knowledge base. While this could have biased the data, the expected impact would be to reduce the difference in pre- and postintervention knowledge. Given that knowledge improved, the impact, if any, was likely small.

This study only assessed pet owners presenting through an Emergency & Critical Care Service at a referral hospital. This decision was made for ease of hospital workflow, with study recruitment and intervention taking place during initial triage and stabilization of the pet. However, emergency patients are more likely to be critically ill

than patients presenting for a routine referral appointment (e.g., to an orthopedic surgery service), and the severity of their pet's illness may have affected owners' resuscitation decisions. CPR decisions are important in both groups of patients, and investigating the use of CPR-VDAs in a variety of patient populations and comparing pet illness severity with pet owner preferences may be useful in future studies.

The aim of this study was to evaluate the acceptability of a CPR-VDA in veterinary patients and to assess its effect on knowledge and decision making. Thus, a single interventional group was recruited. However, the relative effects of using a CPR-VDA versus audio-only or written-only decision aids or standardized discussions with clinicians were not assessed. This would be interesting to explore further, and the inclusion of comparative groups may be worth considering in future studies. It may also be useful to assess the use of a web-based CPR-VDA, which could increase flexibility for owners as described above, in particular when some family members are unable to be present at the consultation. The clinical relevance of this study and future similar studies should not be underestimated. As stated earlier, 28% of par- ticipants changed their decision following the video, 79% of participants described the video as "very or somewhat helpful," and 92% stated they would recommend it to other pet owners. These findings suggest that effective client education on CPR is tantamount to informed decision making on admission. It is recognized that a CPR-VDA tool may not be applicable in all situations and that in the case of unstable patients who are admitted under time-critical conditions, this may not be an appropriate method of education. However, this study confirms the findings of previous studies that there is a knowledge gap among pet owners, which may have profound implications for both patients and the clinical staff providing CPR [5, 38]. Moreover, it suggests that this may impact pet owner decisions on CPR for their pet. CPR is not a benign intervention, with potential for both physical and (in people) psychological harm to patients [37, 39, 40]. This should not be ignored when obtaining informed consent for CPR. In addition, the ethical implications for those patients for whom long-term prognosis is poor should be considered and relayed to owners effectively. In general, the CPR-VDA was well received by this pet owner population, and it positively affected their knowledge and decision-making confidence. Wider use of decision aids may better educate pet owners and help improve communication and shared decision making between veterinary professionals and pet owners in many aspects of veterinary medicine. V

Supporting Information

Additional supporting information can be found online in the Supporting Information section.

Supporting File 1:
vec70070-sup-0001-SuppMat.docx

For Tables, Graphs and references please follow this link



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SAVA
South African Veterinary Association
Suid-Afrikaanse Veterinêre Vereniging

THE SKIN BIOSPY

Steve Wimberley



As final year students, we circulated through the various departments doing two-week stints in each discipline. We had been through small animal surgery, pathology, and herd health and were now on small animal medicine. Every morning, we had to examine and treat the patients in the hospital and then deal with the new cases that came in that day.

Brutus was a gorgeous, slobbery, friendly bulldog with bad skin. His normal vet had tried everything and eventually in desperation, had referred Brutus to the veterinary faculty for specialist attention. The clinician supervising us had examined Brutus and suggested I take some skin biopsies to help make the diagnosis.

Full of enthusiasm, I read up on exactly how to do the procedure. The recommendation was to administer a sedative injection. Once the patient was suitably sleepy, some local anaesthetic could then be injected in the necessary sites, and four to five punch biopsies could be taken from the skin in various places. These little pieces of skin are then placed in a formalin bottle and sent off to the laboratory for processing. The biopsy sites are then closed with one or two sutures.

Brutus was so lovable and friendly that sedation was hardly necessary. Still, I was determined to follow the instructions as closely as possible. I found the sedative bottle and withdrew the correct calculated dose for Brutus's weight.

Brutus was so busy slobbering all over me that he didn't even notice the injection. I sat back and waited.

Within ten minutes, Brutus was deeply sedated, and I could proceed with the biopsies. My hands were shaking as I cut out the little pieces of skin and placed them in the bottle of formalin. I sutured the biopsy sites and sat back to wait for Brutus to wake up.

The hours passed, and Brutus slept on, blissfully unaware of his surroundings. By the evening, I was becoming concerned – Brutus was still deeply asleep. My clinician began to question me. He wanted to know everything I had done. I started at the beginning. When he saw the bottle of sedative I had used, a mixture of amusement, concern and irritation came over his face.

"You have used the large animal bottle of sedative and given Brutus enough sedative to make a cow sleep!" he said. His voice was filled with exasperation. What next will these students get up to? He must have been thinking. In my defence, the bottles were almost identically labelled, but that was of no consequence right then.

"You had better sit up with your patient all night and make sure he's OK", he instructed.

So my vigil began.

Brutus slept right through the night and the next day. I was made to phone his owner with regular updates.

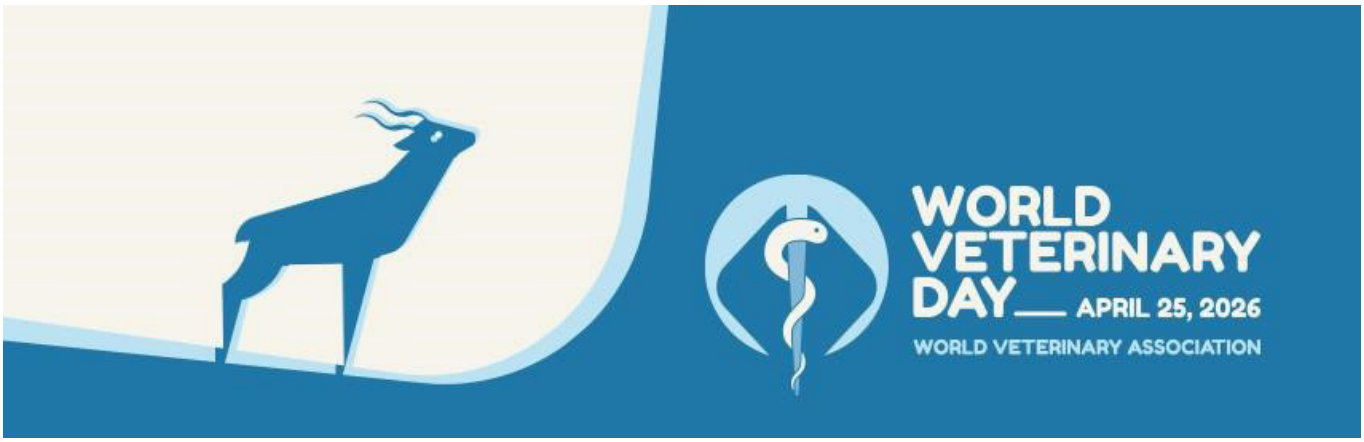
"Hi, Mr Barnes – it's Steve (the stupid student) here. Just to let you know that Brutus is fine, very stable, but still fast asleep."

On the morning of the third day, Brutus started to stir and by lunch time was awake enough for me to give his owners one last call.

"Hi, Mr Barnes – Steve here. Good news. Brutus is awake. You can come and get him this afternoon. Oh, and by the way, his skin biopsy results are back, so the doctor will speak to you about those as well. Also, his skin looks better as he hasn't been scratching for the past two days!!"

Brutus went home happy and refreshed after his long sleep, but ravenously hungry. I fell into my bed that evening, utterly exhausted from watching him sleep for two full days and nights. V





Veterinarians: Guardians of Food and Health

The WVA Council has selected the theme **"Veterinarians: Guardians of Food and Health"** to highlight the systemic role of veterinary services in safeguarding food safety, food security, public health, and animal health worldwide.

From farm to fork, veterinarians are at the frontline of ensuring that food of animal origin is safe, nutritious, and responsibly produced. Their work protects consumers, supports sustainable food systems, prevents zoonotic diseases, and strengthens global health security.

The 2026 theme recognises that global food systems are increasingly interconnected and exposed to emerging disease threats, climate-related pressures, antimicrobial resistance, and economic volatility. In this context, veterinarians act not only as animal health professionals but as essential actors in health security, sustainable food systems, and economic resilience/ sustainability. World Veterinary Day 2026 aims to elevate public understanding and policy recognition of veterinary services as a cornerstone of sustainable and secure food systems.

This toolkit has been developed to support veterinary associations, institutions, and professionals in celebrating World Veterinary Day 2026, providing key messages, activity ideas, and communication strategies to promote the theme and raise public awareness.

Key Messaging for World Veterinary Day

- **Veterinarians Protect the Food Chain**

Veterinarians play a critical role throughout the entire food production chain — from animal health management on farms to inspection, disease surveillance, and food safety systems.

- **Food Safety Is Public Health**

Safe food is fundamental to human health. Veterinarians help prevent foodborne illnesses and zoonotic diseases, protecting communities at local, national, and global levels.

- **Guardians of Sustainable Food Systems**

Veterinarians contribute to responsible antimicrobial use, biosecurity, animal welfare, and sustainable livestock production, ensuring long-term food security.

- **One Health in Action**

The veterinary profession embodies the One Health approach, recognising the interconnection between animal health, human health, and environmental health.

- **Trusted Experts in Crisis Prevention**

Veterinarians are essential in monitoring, detecting, and responding to emerging diseases that may threaten food supplies and public health. V

SAVA AWARDS

Who would you like to add to the list of distinguished recipients?

South African Veterinary Association
Suid-Afrikaanse Veterinêre Vereniging

Nominate a person you think excelled in these categories.

*For SAVA members only, the **Boswell Award** is bestowed for eminent service rendered to theprofession through the SAVA. The award may be bestowed upon more than one person in a particular year. The founder of this prestigious accolade was Dr Jack Boswell, who is known as the "father of private veterinary practice in South Africa." He was the first Onderstepoort graduate to enter private practice directly. He served on the Federal Council of the SAVA for 12 years and was awarded the SAVA Gold Medal in 1974. The award traditionally consists of a verdite-mounted ivory elephant and rhinoceros statuette. The very first recipients of the award in 1977 were R.B. (Ossie) Osrin and L.W. (Louw) van den Heever. More recent recipients are no less prestigious. Do you want to nominate somebody for this award? Please follow the guidelines elsewhere on this page.*

Previous worthy recipients of this award are:

Dr David Gerber (2023-2024)



Dr Quixy Sonntag (2022)



*The **Clinical Award of the SAVA** is awarded to any veterinarian or group of veterinarians who are registered with the South African Veterinary Council and have excelled in applied veterinary practice. It serves as an award to recognise outstanding service and scientific contributions to the veterinary profession in South Africa. There is a limit of one award per clinical discipline per year. Past recipients become eligible for another award after a period of five years, for a different contribution. Please nominate a veterinarian or group of veterinarians who you think contributed in this category*

Drs IJ Venter & AD Goodhead (2020 - 2021)



Boswell Award continued:

2024	Prof GF Bath
2023	Dr D Gerber
2022	Dr Q Sonntag
2019	Dr JJ Viljoen
2015	Dr R Campbell
2013	Dr AS Cloete
2012	Prof KP Pettey
2010	Dr R Lobetti
2009	Dr FA Van Niekerk
2007	Dr CM Cameron & Dr MJ Versfeld
2006	Dr L Cairns
2005	Prof GE Swan
2004	Dr PE Kloeck
2002	Dr A Erasmus
2001	Dr M-L Penrith
2000	Dr R de la Rey
1998	Prof RI Coubrough
1996	Prof PC Belonje
1995	Dr BL Romberg / Dr M Greenberg
1994	Dr J van Heerden
1991	Dr PMS Masters / Dr DG Catton
1988	Dr RN Pryce
1987	Prof CM Veary
1986	Dr RC Wilson
1985	Prof RC Tustin
1984	Dr GC Dent
1983	Dr RD Sykes
1982	Dr V Amos
1981	Dr BM Horwitz
1980	Dr AP Schutte
1979	Dr BH Pappin
1978	Dr GD Sutton / Dr CB Rippon
1977	Dr C Osrin / Dr LW van der Heever

Clinical Award of the SAVA continued:

2021	Dr IJ Venter/Dr AD Goodhead
2018	Dr G Crewe
2015	Dr P Caldwell
2014	Dr RD Last
2012	Dr M van Zyl
2009	Dr G Steenkamp
2004	Dr L Bester
2003	Prof JP Schoeman
2001	Dr GN Eckersley
2000	Dr RD Gottschalk
1999	Prof A Oliver
1998	Prof RG Lobetti
1997	Prof RM Kirberger
1996	Prof JS van den Berg
1995	Equine Colic Team/Dr C Kinglsey

1993	Dr RC Rous [Posthumously]
1992	Dr WAJ du Plessis
1991	Dr C Marshalll/Dr P Ardington
1989	Dr J Marnewick
1988	Dr LA Herbst
1987	Dr OM Briggs
1986	Dr CHB Marlow
1985	Prof P Bland van den Berg
1984	DR JSJ Odendaal
1983	Prof J van Heerden
1982	Dr DJ Moore
1981	Dr CJ Futter

2026 events

UPCOMING EVENTS

SAVE THE dates

SAVA
13th South African Veterinary Association & Para-Veterinarcy Congress, 2027
24-26 March 2027 | Emperor's Palace Convention Centre

17-18 APRIL
SAVA Oranje Vaal Branch Mini-Congress
Khaya iBhubezi, Parys

1-4 JUNE
13th International Crustacean Society Meeting
STIAS, Stellenbosch

10-11 JULY
SAVA Eastern Free State Branch Mini-Congress
Venue TBC, Clarens

31 JUL - 2 AUG
The South African Integrative Veterinary Medicine Conference
Protea Hotel Marriott Techno Park, Stellenbosch

1-2 AUG
Hill's Pet Nutrition Nurses Hybrid Conference
Cradle Moon, Muldersdrift

14-15 AUG
SAVA Free State & Northern Cape Branch Mini-Congress
Venue TBC, Kimberley

30 AUG - 2 SEPT
54th Annual Parasitological Society of Southern Africa Conference
ATKV Klein-Kariba, Bela-Bela

4-5 SEPT
SAVA Mpumalanga Branch Mini-Congress
Venue TBC

30 SEPT - 1 OCT
South African Association of Veterinary Technologist Congress
Krystal Beach Hotel, Gordon's Bay

7 OCT
Elanco Salmonella Scientific Symposium
Venue TBC, Gauteng

5-6 NOV
Poultry Group of SAVA Biennial Congress
Venue TBC, Gauteng

1-3 DEC
13th Congress of the Federation of African Immunological Societies
Cape Town International Convention Centre

SAVA South African Veterinary Association Suid-Afrikaanse Veterinêre Vereniging
INTEGRATIVE VETERINARY MEDICINE ASSOCIATION | SOUTH AFRICA
The Crustacean Society Mid-Year Meeting Stellenbosch South Africa 2026
Hill's SCIENCE DOES MORE
PARSA
Elanco
FAVS 2026
Poultry Group of SAVA Pluimveegroep van SAVA

Creating Exceptional Experiences...that's what we do!

SAVETCON EVENT MANAGEMENT

South African Veterinary Association
Suid-Afrikaanse Veterinêre Vereniging

CALL FOR NOMINATIONS FOR SAVA AWARDS AND HONORARY MEMBERSHIP 2026

DEADLINE: 31 JULY 2026

Nominations for the SAVA Awards are invited. These awards are conferred on persons who have made exceptional and significant contributions in the fields of Veterinary Science, or the Veterinary Profession and they serve as a prestigious form of recognition of distinguished service. They require sufficient but concise justification for the nomination in the category selected, as outlined in the criteria listed for each category. The presentation of awards will be made at a suitable venue and occasion identified by SAVA and this usually occurs every second year to coincide with the Gala Dinner of the SAVA Biennial Congress. Please adhere to the nomination guidelines as set out below.

1. GOLD MEDAL OF THE SAVA

Awarded to any person, in recognition of outstanding and sustained scientific achievement, with a major impact in the field of veterinary science in South Africa. The medal will only be awarded once to a particular person, and there will be one award per year. The award requires a very comprehensive curriculum vitae and motivation.

2. PRESIDENT'S AWARD

Awarded to any veterinarian registered with the SAVC in recognition of outstanding service to and advancement of the veterinary profession in South Africa. The award will only be bestowed once on a particular person, and there will be one award per year. The award requires a very comprehensive curriculum vitae and motivation. .

3. BOSWELL AWARD

Awarded to any member of the SAVA for eminent service rendered to the profession through the SAVA. The award may be bestowed upon more than one person in a particular year.

4. CLINICAL AWARD OF THE SAVA

Awarded to any veterinarian or group of veterinarians who are registered with the SAVC and have excelled in applied veterinary practice. There is a limit of one award per clinical discipline per year. Past recipients become eligible for another award after a period of five years, for a different contribution.

5. RESEARCH AWARD OF THE SAVA

Awarded to one or more veterinarians for a body of research related to Veterinary Science, and published in scientific journals, that has made an important contribution to a particular field of study. Recipients of this award may be eligible for nomination for new original research. Submission to the Awards Committee may be made by candidates themselves.

6. YOUNG VETERINARIAN OF THE YEAR AWARD

Awarded to one veterinarian registered with the SAVC per year, younger than 35 years of age or who has not been registered for longer than 10 years and who has made a significant contribution to veterinary science in his / her work sphere.

7. SOGA MEDAL

Awarded in recognition of exceptional community service rendered by a veterinarian registered with the SAVC or a veterinary student enrolled at a South African veterinary faculty. In addition to veterinary-related services, other forms of community service may be considered to support the nomination.

8. CITATION OF THE SAVA

The SAVA may bestow a citation upon one or more persons, including non-veterinarians, in recognition of specific achievements and / or meritorious contributions to the veterinary profession or the SAVA. More than one citation may be bestowed per year.

9. HONORARY LIFE MEMBER

Any SAVA member who has rendered long and outstanding service to the veterinary profession may be awarded Honorary Life Membership. Honorary Life Membership will not be granted to more than three people in one year.

10. HONORARY ASSOCIATE LIFE MEMBER

Any person who is not a veterinarian and who has rendered outstanding service to veterinary science, or the veterinary profession may be awarded honorary associate life membership. Honorary Associate Life Membership will not be granted to more than three people in one year.

All nominations must be supported by:

- Submissions must be made on the official nomination form available from the SAVA office.
- A brief motivation in terms of the conditions of the specific award, including the impact the work of the nominee has had. Evidence supporting the motivation, such as testimonials, may be included.
- A full *curriculum vitae* of the nominee, including a list of publication(s) where applicable and all the contact details of the nominee.
- Copy (ies) of the relevant publication(s) in the case of the Research Award.
- It should be clearly understood that all SAVA Awards are conferred for contributions that have been made specifically in a South African context and not elsewhere.

Please note that:

- Any member of the SAVA may submit nominations, while others making nominations must include the support and signature of a SAVA member. Nominators are encouraged to channel their nominations via a SAVA Group or Branch.
- Non-SAVA members may be nominated for all categories except the Boswell Award and Honorary Life Membership.
- Unsuccessful nominations of previous years may, at the discretion of the Awards Committee, be held over for consideration in the following year.
- Where the nominator and seconder have indicated their permission, award categories of nominations could be changed by the Awards Committee.
- Members of the Awards Committee are permitted to propose or second candidates for awards, on condition that they recuse themselves when such nominations are discussed.

The onus is on members to submit appropriate nominations by the due date.

Failure to comply with the above will lead to disqualification of the nomination.

All nominations, in electronic format, marked for the attention of Prof G Bath, Chairperson, Awards Committee of the SAVA, must reach the SAVA office, Debbie Breeze by

FRIDAY, THE 31ST JULY 2026

Nomination forms may be obtained from Ms Debbie Breeze 012 346 1150 or please send an email to debbie@sava.co.za

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https://www.sava.co.za/vetnews-2026/

Support:

If you have any questions or need assistance, please contact Sonja van Rooyen at assistant@sava.co.za on 012 346 1150

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Have you joined yet ?

Our WhatsApp Communication Platform is now active!
Stay updated on member news and important topics
in the veterinary industry.

Joining the Community: A Step-by-Step Guide

Prerequisites:

- Ensure you have WhatsApp installed on your device.
- Please add/save SAVA's WhatsApp number to your contacts: 081 849 6088.
- To join, you will need an invitation link or an invite from a community admin or an existing SAVA member.

Joining via an Invitation Link:

1. Obtain the invitation link from a SAVA member or community admin.
2. Click the link, which will open WhatsApp and prompt you to JOIN.
3. Tap "Join" to confirm your membership.

Did not receive the link invite? Are you encountering other issues?

Please contact Sonja van Rooyen at +27 (0) 12 346 1150 or at assistant@sava.co.za

We look forward to connecting with our members on this community platform!

CREDO

SAVA
South African Veterinary Association
Suid-Afrikaanse Veterinêre Vereniging

We, the members of the Association, resolve at all times:

- To honour our profession and the Veterinary Oath
- To maintain and uphold high professional and scientific standards
- To use our professional knowledge, skills and resources to protect and promote the health and welfare of animals and humans
- To further the status and image of the veterinarian and to foster and enrich veterinary science
- To promote the interests of our Association and fellowship amongst its members.

Ons, die lede van die Vereniging, onderneem om te alle tye:

- Ons professie in ere te hou en die Eed na te kom
- 'n Hoë professionele en wetenskaplike peil te handhaaf en te onderhou
- Ons professionele kennis, vaardigheid en hulpbronne aan te wend ter beskerming en bevordering van die gesondheid en welsyn van dier en mens
- Die status en beeld van die veearts te bevorder en die veeartsenykunde te verryk
- Die belange van ons Vereniging en die genootskap tussen sy lede te bevorder.

Influential Life Coaching

THE BALANCE THAT IS ELUSIVE



Dr Mats Abatzidis

B.Sc. B.V.Sc.

New Insights Certified VIP Life Coach
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Founder of Influential Life Coaching
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Author of the published book "Life outside your comfort zone. Better and beyond all expectations".
http://www.amazon.com/s/ref=nb_sb_noss?url=search-alias%3Ddigital-text&field-keywords=Abatzidis
http://www.life-coach-directory.co.za/mats-abatzidis

Greetings everyone, and hope that it has been a wonderful and re-energised start to 2026! Meetings are essential for collaboration in veterinary practice—whether you are coordinating patient care, discussing clinic operations, or planning continuing education. But when meetings run long, stray off-topic, or rehash the same issues across multiple sessions, they waste valuable time that could be spent with patients, clients, or on high-impact tasks. Below are four practical, easy-to-implement strategies to keep meetings on time, focused, and professionally closed so everyone's time is respected.

1. Set a tight, visible agenda — and stick to it!

- Before the meeting: Share a short, timed agenda at least 24 hours in advance. Keep it concise (5–8 items max) and assign a time allotment to each item (e.g., "Daily caseload updates — 10 minutes; Equipment maintenance budget — 15 minutes"). Include the meeting objective: what decision or outcome is expected.
- During the meeting: Display the agenda where everyone can see it (screen share, printed handout, or whiteboard). Start by quickly reiterating the objective and time constraints.
- Enforce the timing: Appoint a timekeeper (rotating role) whose single job is to track time and give gentle reminders when an item is nearing its limit. A simple cue ("two minutes left") is sufficient.
- Why it works: A visible, timed agenda creates shared expectations and reduces scope creep because everyone knows when a topic must be wrapped up or deferred.

2. Use a "parking lot" for off-topic items.

- What it is: A parking lot is a designated place (physical board, chat thread, or a bullet list in the meeting notes) where off-topic issues get noted for later discussion.
- How to apply: When someone raises a valid but off-agenda topic, thank them and say, "That's important—let's park it and address it at the right time." Quickly capture a one-line description and who raised it.
- Resolve the parked items: At the end of the meeting, review the parking lot and triage entries: decide which can be resolved by email, which need a short follow-up meeting, and which require a longer future agenda item. Assign owners and deadlines.
- Why it works: The parking lot acknowledges contributors respectfully while preventing the meeting from detouring. It reduces duplication because parked items are tracked and actioned intentionally.

3. Limit attendance and define roles.

- Invite only necessary people: Before sending the invite, ask, "Who truly needs to decide or contribute live?" Routine informational updates can be sent via email or a shared post-meeting summary instead of requiring full-team attendance.
- Clarify roles at the start: Name a meeting leader (facilitator), a timekeeper, and a note-taker. The facilitator guides discussion and enforces the agenda; the timekeeper manages timing; the note-taker captures decisions, action items, and owners.
- Set expectations for participation: Share a one-line meeting etiquette reminder in the invite—e.g., "Come prepared, be concise, and avoid multitasking." For hybrid meetings, request cameras on if feasible to maintain engagement.
- Why it works: Fewer, well-defined participants keep the discussion targeted and speed decisions. When everyone knows their role, it is easier to manage flow and produce usable outcomes.

4. End with clear decisions and next steps — and close on time!

- Last 5–10 minutes: Reserve the final portion of every meeting to summarise decisions, confirm action items,

assign owners, and set deadlines. Use a simple template: What was decided? Who will do it? By when?

- Time-box the close: If you have scheduled a 45-minute meeting, start a visible countdown for the last five minutes so the group knows it is time to wrap. If an important topic remains incomplete, use the parking lot and schedule a short follow-up with the required people.
- Close professionally: Thank participants for their time, restate any immediate next steps, and confirm when notes will be circulated. If someone needs to stay behind for a side conversation, invite them to do so after the official close.
- Why it works: Clear outcomes and deadlines prevent tasks from slipping and stop unresolved discussions from re-emerging in future meetings. Ending exactly on time builds trust in the meeting culture.

Bonus quick tactics you can adopt immediately.

a) Shorten meetings by default: Try 15-, 25-, or 50-minute slots instead of 30, 60, or 90. Shorter meetings focus attention and discourage rambling.

b) Start on time, even if people are late: This signals that time is respected. Share key updates in notes for latecomers instead of repeating them.

c) Use a shared meeting template: A one-page agenda template with time slots, objectives, attendees, and a parking lot makes preparation and execution consistent.

d) Follow up promptly: Send meeting notes and action items within 24 hours. When people see clear documentation, there is less incentive to re-discuss the same issue.

Culture change starts small. Building a meeting culture that respects time begins with clear norms and consistent enforcement.

Start by piloting these steps in one recurring meeting or within a single team.

After a few cycles, collect quick feedback—what helped, what did not—and refine.

Over time, your clinic or team will spend less time in unproductive meetings and more time on patient care, client relationships, and other high-value work.

Next month, we will continue looking at more ideas for improving our quality of life and overall performance both at work and at home.

The SAVA Stress Management Hotline is there to assist members who are experiencing personal problems by offering access to professional counselling/advice.

The hotline can assist with referrals or simply offer much needed emotional support when anxiety, depression, anger, grief, lonelinessand fear are at their highest.



The following SAVA members are available on the SAVA stress management hotline. If required, they will refer you to professionals.

Ken Pettey	082 882 7356	ken.pettey@gmail.com
Aileen Pypers	072 599 8737	aileen.vet@gmail.com
Willem Schultheiss	082 323 7019	schultheisswillem@gmail.com
Mike Lowry	084 581 2624	mikelowry@sai.co.za
Tod Collins	083 350 1662	todthevet@gmail.com

24-Hour, Toll-Free Helpline

Manned by psychologists, social and frontline healthcare workers: 0800 21 21 21

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Champagne Sports Resort, Drakensberg, KwaZulu Natal
8-10 June 2026

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THE NEW NORMAL

ADAPTING RUMINANT VETERINARY PRACTICE TO EMERGING BIOSECURITY DEMANDS – STRATEGIES FOR SUSTAINABILITY AND SUCCESS

INTERNATIONAL KEYNOTE SPEAKERS



Prof. Jo Leroy is a full Professor of Veterinary Sciences at the University of Antwerp (UA), Belgium, with a distinguished career in reproductive biology and animal health. He earned his MSc in Veterinary Medicine, Magna Cum Laude, from Ghent University, where his award-winning research focused on subclinical mastitis in heifers. He subsequently completed a PhD on metabolic changes in high-producing dairy cows and their impact on oocyte and embryo quality, publishing seven peer-reviewed articles during his doctoral studies. Prof. Leroy heads a renowned research program exploring maternal health, oocyte and embryo quality, and postnatal outcomes, using innovative in vitro and in/ex vivo models across multiple species. He also bridges science and society, translating research into practical applications for veterinarians, farmers, and clinicians, and has founded the Camelid Immunisation Facility to advance veterinary biotechnology



Dr Gavin Staley graduated from the Faculty of Veterinary Science, University of Pretoria, South Africa as a veterinarian in 1984. After two years of compulsory military service, joined the Faculty of Veterinary Science (Univ. Pretoria) as a lecturer in reproduction. While on staff, completed a M.Med.Vet in Reproduction and qualified as a Veterinary Specialist (Theriogenology). After 6 years in academia, joined the largest dairy practice (Howick Veterinary Clinic) in South Africa in 1993 as a partner, with dairy and equine focus. He emigrated with his family to the USA in 1998 and joined a dairy practice in Door County, Wisconsin. While in practice in Wisconsin, qualified as a Diplomate of the American College of Theriogenologists (2001). Relocated to the Central Valley of California in 2003 and has worked in industry for past 22 years in Technical Services positions. Dr Staley has presented at most of the national US dairy meetings and is a well-recognized consultant in the US dairy industry. He is known as a thought leader, identifying and addressing several key issues in the dairy industry. Particular interest in dairy record evaluation, heifer maturity and dairy productive life.



Dr Peter Sutovsky earned his PhD degree from the Czech Academy of Sciences in 1994. He was a Postdoctoral Fellow at the University of Wisconsin, Madison WI, and Staff Scientist at the Oregon Health; Science University, Portland OR, before his 2001 faculty appointment at the University of Missouri, Columbia MO, where he is currently a Professor of Animal Science, and Obstetrics, Gynecology and Women's Health. He is recognized for his studies of mammalian gametogenesis, fertilization, and embryo development with emphasis on the gametic and zygotic ubiquitin-proteasome system (UPS). He was the first to describe the role of UPS in the regulation of mitochondrial inheritance and introduced the concept of extracellular UPS and its role in sperm maturation and fertilization. In his career, Peter received numerous national and international awards and honors, including an honorary doctoral degree, several honorary professorships, and membership in the National Academy of Inventors. He is an elected Fellow of American Association for the Advancement of Science (AAAS) and Distinguished Fellow of The Society for The Study of Reproduction (SSR). He has an extensive record of publications, citations, patents, grant awards and senior level editorial appointments. His most recent work focuses on biomarker-based flow cytometric semen analysis, semen nanopurification, sperm genome-to-phenome research, and sperm capacitation studies aimed at improving conception rates in livestock and assisted reproductive therapy (ART) humans.

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Ocular Immunology and Uveitis

Dr Paul Burger & Dr Anthony Goodhead
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Ocular Immune Responses

The eye follows the general principles of immune response seen elsewhere in the body, but it has specialised requirements due to its unique structure and function.

Like the gastrointestinal and respiratory systems, the eye is frequently exposed to pathogens and antigens. However, it is also composed of delicate neural tissue with limited ability to regenerate, making it highly sensitive to inflammation and scarring.

To address this, the eye has protective mechanisms similar to other mucosal surfaces, including secretions that help reduce pathogen entry and limit exposure. At the same time, it carefully regulates immune activity within its tissues.

The ocular surface immune system must strike a balance: it needs to mount strong, targeted responses against harmful microorganisms while avoiding excessive inflammation that could damage sensitive structures and impair vision.

As a result, ocular immunity relies on a coordinated interaction between the innate and adaptive immune systems to defend against infection while preserving tissue integrity.

Uveitis

Uveitis is a common condition and often occurs alongside both intraocular and systemic diseases. This is largely due to the uvea's rich blood supply, high immune responsiveness, and close association with surrounding eye structures. As with inflammation in other parts of the body, uveitis involves three key processes: increased blood flow, enhanced vascular permeability, and migration of white blood cells to the affected area.

Uveitis is classified based on the part of the uvea involved. Anterior uveitis affects the iris and ciliary body, posterior uveitis (choroiditis) affects the choroid, and panuveitis involves all three structures. In clinical practice, the term anterior uveitis is most commonly used because it is difficult to distinguish between inflammation of the iris (iritis) and ciliary body (cyclitis), and both are usually affected together.

Posterior uveitis can occur independently of anterior involvement. More severe forms of inflammation include endophthalmitis, which affects the internal eye structures and cavities, and panophthalmitis, which involves all layers of the eye and may also lead to signs associated with orbital disease.

Etiopathogenesis

Uveitis may occur as a primary condition within the eye or develop secondary to diseases affecting other ocular structures such as the lens, cornea, or sclera. It can also be associated with systemic conditions, including neoplastic, infectious, or immune-mediated diseases.

Determining the underlying cause of uveitis in dogs can be challenging. However, identifying the etiology is essential, as uveitis may lead to blindness or indicate a life-threatening condition. A systematic diagnostic approach is therefore recommended, taking into account the animal's signalment, medical history (including travel), and findings from both ocular and general physical examinations, as well as geographic factors.

The causes of uveitis are broadly classified as endogenous or exogenous. Endogenous causes originate within the eye or reach it via the bloodstream or from adjacent tissues and account for the majority of cases. These include infectious, neoplastic, toxic, metabolic, and autoimmune conditions. Among these, immune-mediated and autoimmune diseases represent a rapidly increasing category of endogenous uveitis.

Several endogenous antigens have been linked to the development of uveitis, including retinal S-antigen, melanin, and proteins from the lens and cornea. In contrast, exogenous causes originate outside the eye and are most commonly related to trauma. This includes surgical procedures as well as penetrating and non-penetrating injuries, which may occur with or without secondary infection.

In many cases, no specific cause can be identified. Idiopathic uveitis is therefore the most common diagnosis in dogs with anterior uveitis. One study reported that the underlying cause could not be determined in 47% of cases. Among the identified causes, infectious diseases accounted for 18%, neoplasia for 25%, and conditions such as uveodermatologic syndrome (UDS) or vaccine reactions for 10%.

This study excluded cases of anterior uveitis that were secondary to cataracts or trauma.

General Uveal Inflammatory Responses

Uveitis is initiated by tissue injury, which may result from trauma, infectious agents (bacteria, fungi, parasites, viruses), or immune-mediated disease. The resulting clinical signs are largely due to disruption of the blood–ocular barrier and the release of inflammatory mediators.

The blood–ocular barrier consists of the blood–aqueous barrier (anteriorly) and the blood–retinal barrier (posteriorly). The blood–aqueous barrier is formed by tight junctions between non-pigmented ciliary epithelial cells, junctions within the iris vasculature, and non-fenestrated capillaries. Its stability varies between species, being highly stable in primates, very unstable in rabbits, and intermediate in dogs. Breakdown of this barrier marks the onset of anterior uveitis.

The inflammatory response progresses through three phases: acute, subacute, and chronic.

The acute phase is characterised by the classic signs of inflammation: redness, heat, swelling, pain, and loss of function.

>>>44

It is exudative in nature, with four main types of exudates:

- Serous (protein-rich) --> aqueous flare
- Fibrinous --> fibrin clot
- Sanguineous --> hyphema
- Purulent --> hypopyon

Polymorphonuclear leukocytes (PMNs) predominate during this stage and can contribute to further tissue damage.

The subacute phase is critical, as it determines whether healing, necrosis, recurrence, or progression to chronic inflammation occurs. If inflammation is controlled, healing may occur with minimal scarring. However, severe or uncontrolled inflammation can lead to granulation tissue formation, excessive fibrosis, and impaired ocular function.

The chronic phase develops when the causative agent persists or when inflammation is not adequately resolved. It is associated with permanent changes in uveal vasculature and is characterised by a predominance of mononuclear cells rather than PMNs.

Cytokines such as tumour necrosis factor-alpha (TNF-α) also contribute to inflammation and immune activation in uveitis.

Chemical Mediators

Prostaglandins (PGs) are key mediators of ocular inflammation and are produced by most ocular tissues. They play a major role in the clinical signs of uveitis, including pupil constriction (miosis), increased blood flow (hyperemia), altered vascular permeability, and changes in intraocular pressure.

PGs disrupt tight junctions in the ciliary epithelium and iris vasculature, leading to protein leakage and aqueous flare. In dogs, PGF_2 strongly constricts the iris sphincter muscle, while PGE_1 and PGE_2 have minimal effect. Although PGs also have normal physiological and therapeutic roles, they are present in excessive amounts during uveitis.

The eye has a limited ability to inactivate PGs due to low levels of the enzyme responsible for their breakdown, and their removal is further impaired during inflammation. Arachidonic acid, released from damaged cell membranes, is a key precursor in PG production and can be metabolised through cyclooxygenase, lipoxygenase, or oxidation pathways.

Substance P, a neuropeptide found in sensory nerves, may also contribute to uveitis, particularly in cases involving corneal irritation. It is thought to be released via a trigeminal nerve–mediated reflex, leading to vasodilation, increased vascular permeability, and recruitment of inflammatory cells. However, its exact role in canine uveitis remains unclear.

Diseases proven or suspected of causing uveitis

- Algal
  * *Prototheca* sp
- Bacterial
  * *Brucella canis, Borrelia burgdorferi, Leptospira* sp, septicaemia of any cause
- Fungal
  * *Aspergillus fumigatus, Candida albicans, Coccidioides immitis, Cryptococcus neoformans and C. gattii, Histoplasma capsulatum*
- Immune-mediated
  * Cataracts (lens-induced uveitis), immune-mediated thrombocytopaenia, immune-mediated vasculitis, lens trauma (phacoclastic uveitis), Uveodermatological syndrome
- Metabolic
  * Diabetes mellitus (cataract-induced uveitis), hyper-lipidaemia, systemic hypertension
- Miscellaneous
  * Coagulopathies, deep necrotising or non-necrotising scleritis, drug-induced (prostaglandin agents), idiopathic, idiopathic uveitis, exudative retinal detachment, radiation therapy, snake bite, trauma, toxaemia, ulcerative keratitis
- Miscellaneous parasitic
  * Ophthalmomyiasis interna (*Diptera* sp), ocular filariasis (*Dirofilaria immitis*), ocular larval migrans (*Toxacara*)
- Neoplastic and Paraneoplastic Disorders
  * Histiocytic proliferative disease, hyper-viscosity syndrome, MUO, primary and secondary neoplasms
- Protozoan
  * *Toxoplasma gondii, Neospora caninum, Trypanosoma evansi*
- Rickettsial
  * *Ehrlichia canis, Rickettsia rickettsii*
- Piroplasms
  * *Babesia* sp
- Viral
  * Adenovirus, herpes virus, FIV, FeLV, FIP

Clinical signs associated with uveitis

Anterior uveitis

- Aqueous flare, fibrin in the anterior chamber, keratic precipitates, hypopyon, hyphema, miosis, decreased intraocular pressure (initially), ciliary flush, corneal oedema, iris colour change, iris swelling, pain, posterior synechiae, decreased vision, and conjunctival hyperaemia

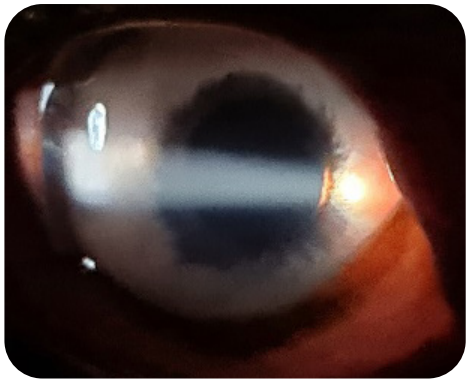
Posterior uveitis

- Vitreous opacity, decreased vision, chorioretinal

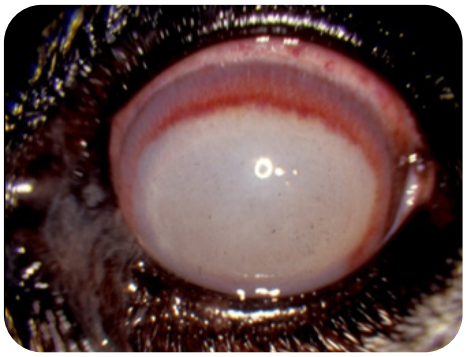
granulomas, retinal detachment, retinal haemorrhage, and choroidal effusion

Additional adverse sequelae

- Deep corneal vascularisation, ectropion uvea, iris atrophy, iris bombe', secondary glaucoma, cataract, lens luxation, endophthalmitis/panophthalmitis.



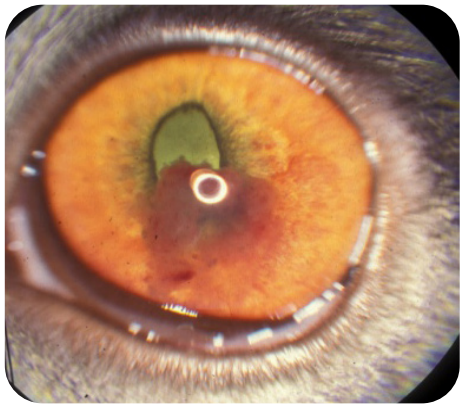
Uveal flare



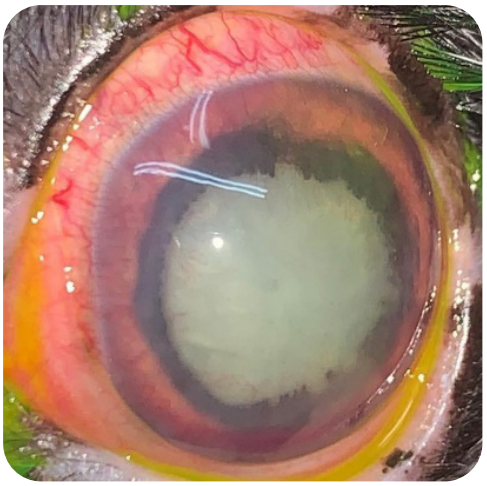
Ciliary flush and corneal oedema



Keratic precipitates



Fibrin clot in the mid-ventral anterior chamber



Conjunctival hyperaemia, posterior synechiae and cataract

References

1. *Veterinary Ophthalmology, 6th edition, Kirk N. Gelatt, 2021, Wiley & Sons*
2. All images: Johannesburg and Cape Town Animal Eye Hospitals.

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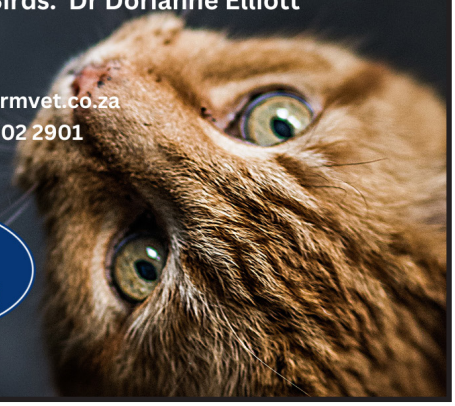
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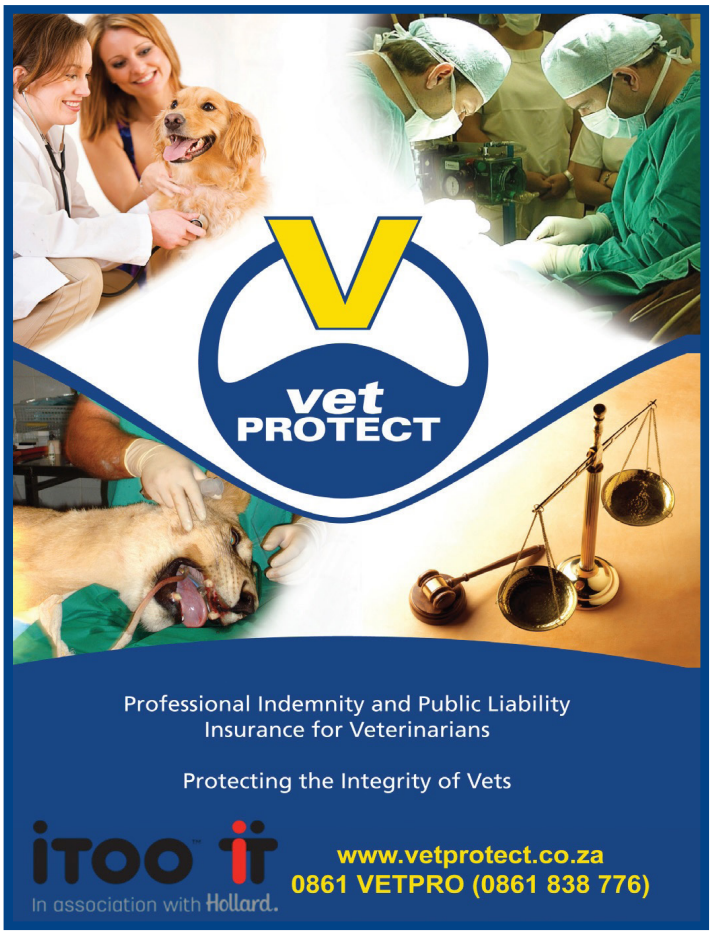
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Willem Schultheiss :
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Preliminary Programme

7:30	Registration and welcome coffee
8:00	Welcome & Introduction of speakers
8:05	Case-based history taking in veterinary dermatology: How to get the right information | Prof. Ralf Meuller
8:55	Tips and tricks for in-house testing | Prof. Ralf Meuller
9:45	**TEA**
10:15	Update on the treatment of AD (with the new ICADA guidelines and the ICADA feline papers as a basis) – part 1 | Prof. Ralf Meuller
11:05	Update on the treatment of AD (with the new ICADA guidelines and the ICADA feline papers as a basis) – part 2 | Prof. Ralf Meuller
11:55	Welcome Hills Pet Nutrition
12:25	**LUNCH**
13:10	Welcome MSD Animal Health
13:40	Diagnosis of infectious diseases: Which tests are best for which disease? – part 1 (cats) | Prof. Katrin Hartmann
14:30	**TEA**
15:00	Diagnosis of infectious diseases: Which tests are best for which disease? – part 2 (dogs) | Prof. Katrin Hartmann
15:50	Update on treatment of FIP | Prof. Katrin Hartmann
	Snack and drinks - TBC

7:30	**Registration and welcome coffee**
8:00	Diagnosis and treatment of alopecia in the dog | Prof. Ralf Meuller
8:55	How do I deal with FeLV infection? | Prof. Katrin Hartmann
9:50	How do I deal with FIV infection? | Prof. Katrin Hartmann
10:45	**TEA**
11:15	How do we approach a case with vasculitis? – interactive case discussions – part 1 | Prof. Ralf Meuller& Prof. Katrin Hartmann
12:05	How do we approach a case with vasculitis? – interactive case discussions – part 2 | Prof. Ralf Meuller& Prof. Katrin Hartmann
12:55	Close and thank you
13:10	**LUNCH**



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