In this issue ...

1  President’s Report
5  From the EO’s Desk
8  Former Melbourne Veterinary College
10  RSPCA’s ‘Dogs Die in Hot Cars’ AND DEPI’s ‘The Pig Specialist Centre’
11  The Big Bang Theory - Noise Sensitivity in Dogs
13  Bushfire Volunteering
15  Member Spotlight - Dr. Matthew Munro
17  Treatment of Burns in Wildlife
25  Clearing the Hurdle - the cost of veterinary care
27  Avian Radiology - taking and interpreting
31  Compassion Fatigue
33  Madpaws - pet sitter registration
34  Ross River Virus Predictive Modelling in Victoria
37  Abstracts of Interest
44  Let vet students do research and your lunch will never taste the same.

President’s Report

2014 has been a big year for the AVA Victorian Division. With Christmas fast approaching, I look back on the past few months and I am amazed at what the division has achieved in this time. Of course none of these achievements would have been possible without the incredibly hard work and long hours that our fantastic staff have put in. Susan Chandler, our Executive Officer has been a great coordinator of events as well as working very hard on behalf of all Victorian veterinarians in advocacy to the Victorian state and local governments and to the general public. Jenny Cumming has also been invaluable in the coordination of events, in communicating with our members as well as the general public and has done the main work in matching mentors and mentees in the first Victorian AVA Graduate Support Scheme. The AVA Victorian Division would simply not work without such a dedicated team who are also passionate about helping our profession.

Continued on Page 2
The big events in the last part of the year were the two major celebrations of our Victorian Division Centenary. The dinner at parliament house was indeed a memorable night, thanks to great organisation by our staff. It was Susan Chandler’s brain child and was made possible by Dr Bill Sykes MP who was at that time the local member for Benalla. Bill is a veterinarian and has since retired from politics as of the last election.

It seemed fitting on the night to have him address the gathered AVA members in the Federation Room in Spring Street to help us celebrate 100 years of a Victorian Veterinary Association. We were also treated to a surprise entrance of the then Victorian Premier, Dr Denis Napthine, also a veterinarian, who gave us all an impromptu address. Dr Napthine circulated easily amongst the crowd which contained many of his colleagues.

Most of the guests opted for a tour of the marvellous and historic building in Spring Street, where we saw both the upper and lower houses in action - even though it was after nine o’clock at night. This great old building of course was the place where the federal government of the day sat in the year that world war one broke out, also 100 years ago this year. Prime Minister Joseph Cook declared Australia’s allegiance to the allies at the outbreak of war in August 1914 and after the September election the Labor Prime Minister, Andrew Fisher, came into power and continued to support Australia’s involvement.

The second celebration, the high tea at the Metropole Hotel, was lower key, but just as special. Over 40 guests attended and enjoyed a terrific talk of the history of the Victorian veterinary profession by Professor Ivan Caple, the past Dean of the University of Melbourne Veterinary School. His knowledge of veterinary history in this state is extraordinary and we are lucky to benefit from it.

It was fantastic to see so many past Victorian AVA presidents and many people at the top of our profession at one of or at both of these events. Sadly it has become clear that the building which was the first veterinary school in Australia is up for sale. This became apparent when we had to change our venue for the centenary high tea as we had hoped to have it in the old vet school next to the Metropole Hotel in Brunswick Street Fitzroy.

Another major initiative we have been working on lately is the establishment of the first Victorian AVA Graduate support scheme. This is now up and running with the mentees having been matched with mentors. I am absolutely delighted to have seen the birth of the Victorian scheme and I hope that it helps the new graduates of the University of Melbourne Doctor of Veterinary Medicine (DVM) as they launch into their first exciting and challenging year after graduation.

I would like to also profusely thank all of the AVA Victorian members who have kindly volunteered their time to become mentors within the scheme. You are an amazing group of people without which there would be no mentor scheme at all.
In November we held the AVA Victorian Branch Summit with presidents or their representatives from the AVA Victorian branches. It was a very good meeting, enabling us to all meet face to face and find out what each of us have been up to. This vital gathering helps us to coordinate all of the events held around the state while also inspiring each other with what we all achieve on a purely volunteer basis. I am so grateful to all of these people that I thought I should let you all know who your hard working local people are.

Please don't forget to thank these wonderful people (listed below) for all the work they do on your behalf next time you see them and please support them in whatever way you can.

I would also like to thank Mike Harrison for all his tireless work over the years, most recently as the editor of the Vic Vet and Chairman of the Victorian Awards committee. Unfortunately Mike has had to relinquish this task due to ill health. We wish him all the best.

The Victorian State election results see us with a Labor government for at least the next four years. Before the election, Susan Chandler sent an email out to you all with the major parties responses to our election platform requests. In their response the Labor Party clearly stated that there will be a parliamentary review on restricted breed legislation and they will revert to the previous and much more rigorous draft Code of Practice for Breeding and Rearing businesses of cats and dogs, which amongst other requirements will require that breeding bitches have veterinary examinations both pre and both litters. We hope to schedule a meeting early next year with the Minister for Agriculture, Jaala Pulford MP to ensure their pledge are met and to discuss further issues on behalf of the veterinary profession. Next year will be an interesting year for the AVA Victorian Division as we advocate for better animal welfare and for the veterinary profession.

As we approach the festive season, I would like to wish you all a very merry Christmas and a wonderful New Year. I hope you have a lovely, relaxing time with your family and loved ones.

Yours,
Trish

AVA (VICTORIAN DIVISION) 2014 BRANCH SUMMIT ATTENDEES

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From the EO’s Desk

Susan Chandler, Executive Officer

As we near the end of the year, I would like to thank all AVA Victorian members for their passion and dedication to the veterinary profession. Without your support, there would be no AVA and we really appreciate you all.

Thank you also to all of our amazing and generous sponsors that financially support the production of VicVet, our annual state conference and branch events all over Victoria. I encourage all members to consider their products and services.

I would also like to thank the AVA Victorian Division Executive Committee, magnificently led by Dr Trish Stewart. The committee are a fantastic group of vets that are a pleasure to work with. Trish has generously given her time and expertise to countless advocacy meetings and issues throughout the year in addition to spearheading the inaugural AVA Victorian Graduate Support Scheme that is now operational thanks to her passion and determination to get it off the ground.

Finally I would like to thank the AVA Victorian Division’s Office Administrator, Jenny Cumming for her passion and dedication to all AVA members. Jenny is the kindest and most hard working member of staff you will find and has done an exceptional job once again this year in coordinating branch and division events, working on the graduate support scheme and keeping the office running via all administrative tasks. I am very lucky to have such a wonderful colleague and I truly appreciate all she does.

Restricted Breed Legislation

As Trish mentioned in her report, we now have a new Victorian government and it is great that they made a pre-election pledge to have a parliamentary review into the restricted breed legislation. AVA will not let up on this important issue so hopefully this review will be initiated promptly. On the issue of restricted breed legislation, recently there has been very significant victories for two owners of dogs that were assessed by council to be restricted breed dogs and have been impounded for extraordinary amounts of time. Neither of these dogs were involved in an incident that constituted dangerous behaviour - they merely looked like a standard set by the government. Dr Jack Ayerbe was an expert witness in both of these cases, so importantly the veterinary profession has been involved and his expert evidence valued.

The first dog, Kerser, was seized two years ago by Monash Council and assessed as a restricted breed dog and impounded. Kerser is now free to return home for Christmas. An initial hearing at VCAT upheld the assessment by Monash Council and the owner of Kerser then appealed this decision to the Supreme Court successfully for it again to be heard at VCAT. The final VCAT hearing judged that Kerser did not fit the standard of a restricted breed dog as gazetted by government. It is estimated that Monash Council may have spent up to $200,000 on trying to prove Kerser to be a restricted breed dog.

The second dog, Mylo, will also be home for Christmas after being seized by Brimbank Council in June 2012. In the case of Mylo, there have been three VCAT hearings and two hearings at the Supreme Court. The final VCAT hearing overturned the council’s assessment and is estimated to also have cost Brimbank Council an enormous amount of money. Mylo was assessed by a behaviourist to be one of three per cent of dogs suitable for therapy dog because he was so docile but of course this didn’t factor into any deliberations because the laws only address how a dog looks.
Access to firegrounds by veterinarians

We have been advocating continuously to government about lack of access to firegrounds by veterinarians. Many veterinarians have encountered difficulties trying to assist their clients by inspecting and treating their animals. AVA is certainly not advocating that veterinarians should be let through roadblocks in dangerous situations but there have been instances in the past where perhaps entry could have been facilitated and wasn’t.

A couple of weeks ago I attended a high level meeting at the State Control Centre. Present at the meeting was the Superintendent responsible for all police at roadblocks, a representative from the State Control Centre, DEPI representatives, representatives from the National Farmers’ Federation, RSPCA and Municipal Association of Victoria. At that meeting we were advised of the revised Guidelines for the Operation of Traffic Management Points During Class 1 Emergencies. The Guidelines have been revised to include sections relating to animal welfare. Additionally there are processes now in place for liaison between animal welfare agencies (including AVA) with the DEPI representative who will be coordinating animal welfare during bushfires.

There is now a much more empathetic effort in consideration of road blocks concerning animal welfare. DEPI have a focused effort on collecting as much data as possible through industry and much better communication plans in place. The AVA as well as the other welfare organisations above will be getting constant briefings and from DEPI in the case of bushfire emergencies (constantly during those days). The AVA will be able to filter any animal welfare issues into their operations and veterinarians will be able to report any concerns to the AVA so we can pass information along.

There will be concerted efforts by DEPI to escort private vets to properties to inspect animals (if veterinarians are requested by owner). This of course will only happen if it is safe to do so. Obviously human life is the priority but importantly police and incident controllers at roadblocks have now been briefed to factor animal welfare into their thinking.

In localised bushfires that are not on the severe level, local vets in that area will have a fact sheet provided to them by DEPI that explains procedures and gives contact numbers.

A genuine effort for animal welfare is being made here so if there does happen to be the unfortunate incident of severe bushfires (which are predicted), I believe animal welfare will be better handled than in the past.

Puppy Socialisation Classes

Another long running issue for many veterinarians has been having to register as a domestic animal business when running puppy classes. I am pleased to say we are slowly but surely making headway on this issue.

As it stands currently, Council use their discretion to assess whether or not veterinary clinics running puppy classes should be considered to be obedience training. To do this they use the legislated Domestic Animals Regulations 2005, specifically section 49 (3) as their guide. If they believe that veterinary clinics teach the following in their classes, they may conclude that the clinic is operating as a domestic animal business-

- heeling or walking with handler
- sociability with other dogs
- staying on command
- coming to handler on command
- absence of aggression towards humans or other animal

As you will probably agree, the above is fairly basic and broad so this is what we will seek to address.

The Domestic Animals Regulations 2005 will sunset on 1st December 2015 which means that the regulations will be open for consultation during next year. At a meeting a couple of weeks ago convened by DEPI, it was resolved by dog training organisations and the AVA that veterinary clinics running puppy classes should not be considered obedience training and the way to rectify the regulations to reflect this is to make Section 49 of the regulations more prescriptive to reflect actual obedience training, rather than socialisation/health classes that the typical veterinary clinic runs.

The regulations will be put out for consultation during next year and the AVA will make a submission so hopefully a positive outcome can be achieved. We will seeking member comments at this time. I acknowledge this will not assist members in the interim but unfortunately the wheels of legislative change move slowly but I do believe there is light at the end of the tunnel.

Dr Mike Harrison

In conclusion I would formally like to record my great appreciation to our outgoing VicVet Editor, Dr Mike Harrison. Mike has also left the post of Chairman of the Awards Committee for the Victorian Division. Mike is unfortunately battling health issues currently and needs to concentrate his efforts there. Mike is a Past President of the Victorian Division and has been a tireless volunteer for an enormous amount of years. He has been of great assistance to me since I began at AVA and a wealth of knowledge and history. I am sure I speak for all AVA members when I say thank you for your enormous contribution to AVA and that our thoughts are with you and your family at this difficult time.

We are happy to advise that Dr. Peter Penson has agreed to take on the role as Honorary VicVet editor from 2015.

I wish all members and their families a safe and happy break over Christmas and look forward to continuing our efforts for the veterinary profession in 2015.
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Prof Emeritus Ivan Caple AM

In March 1914 when the Veterinary Association of Victoria held its first official meeting, the amount of money received by the University Veterinary School represented 13.5% of the funds provided to the University of Melbourne by the Victorian Government. In March 2014 when the AVA Victorian Division celebrated its centenary, the Melbourne Veterinary School Budget represented less than 0.5% of the University of Melbourne Budget.

What a remarkable improvement in efficiency demonstrated by the veterinary profession after 100 years!

1885, Kendall purchased property in Brunswick St Fitzroy http://www.biodiversitylibrary.org/item/52745#page/826/mode/1up
He held a formal opening of the Veterinary Institute on Thursday 17 June 1886 http://trove.nla.gov.au/ndp/del/article/6099301/276892 After the Veterinary Surgeons Act was passed on Saturday 17 December 1887 a second official opening was held on Tuesday 16 January 1888 when students commenced their four-year course as required under the legislation. http://trove.nla.gov.au/ndp/del/article/143305983

Below are short biographies for people named in the photograph of Examiners Staff & Students at the Melbourne Veterinary College in 1894

Charles Cummings Cherry (GMVC 1898) in practice and then joined the Customs Department as Meat Inspector. Later went to England as Veterinary Officer at Australia House. Returned to Victoria where he retired. Wairarapa Racing Club.

William McLaughlin was a RVS (Registered veterinary surgeon 1891) then graduated GMVC 1897 - died in 1901. Charles Joseph Peter Christensen (GMVC 1897). Won the Creswell Prize for Hygiene, equal with SA Le Souef. He went into practice at St Kilda.

R Kerr – did not complete the course

David McConnell Kerr (GMVC 1897). He examined first year students in elementary anatomy in November 1901.

Ernest Arthur Kendall (GMVC 1897, BVSc 1910). http://www.vet.unimelb.edu.au/honour/kendall_e.html EA Kendall and HSS Kyle were appointed as Captains in the Victorian Rifles after graduating GMVC. EA Kendall helped his father WT Kendall in so many ways - as a lecturer at the MVC, as an international ambassador during and after the Boer War. He attended the International Conference on Tuberculosis in London in July 1901, completed postgraduate studies in veterinary bacteriology in London. He lectured at the Melbourne University Veterinary School. He provided leadership in WWI. Later as Chairman of the Milk Board he ensured Melbourne had its milk supplied from healthy dairy herds. He is buried in (unmarked) Grave 429 Church of England Compartment UU. Melbourne General Cemetery Carlton North.

Ernest Albert Le Souef (GMVC 1895, BVSc 1911). Veterinary Officer and Accountant at Melbourne Zoo until 1897 when he resigned and moved to Western Australia. Supervised the building of the South Perth Zoological Gardens of which he became director in 1897, and occupied this position until 1932.

Herbert Seton Stewart (Bert) Kyle (1873 - 5 January 1955) (GMVC 1895). Moved to New Zealand where he married Alice Stewart Mair at Don Street Invercargill on 7th November 1904. Kyle conducted veterinary practice, farming, and entered politics. He was active in NZVA affairs. Bert Kyle won the Christchurch electorate of Riccarton in the 1925 NZ general election and held it to 1943. He was awarded OBE in 1953.

Samuel Octavius Wood GMVC 1895). Member of the 4th (1897-1900), 7th (1906-1909), and 9th (1912-1915) Veterinary Surgeon Board of Victoria.

Sherbie Albert Le Souef (GMVC 1897). Born 1877. Accountant and Assistant Director of Melbourne Zoo. In 1903 was appointed to Sydney Zoo at Moore Park which was later transferred to Taronga Park. Wrote “The Wild Animals of Australasia” with H Burrell.

Charles Dennison Strong (GMVC 1898). Served in the Boer War and WWI. He was employed in the Department of Agriculture.

Sydney Stanley Fletcher (GMVC 1895 BVSc 1920) – spent most of career in New Zealand where he lived to 89 years. Worked at Masterton and was Veterinary Surgeon to the Wairarapa Racing Club.

Seated

William Beckwith, RVS (1889) was employed by the Police Department. He served the Veterinary Surgeons Board of Victoria for 27 years. He provided lectures to students at the MVC and was an examiner. In March 1900 Inspector Beckwith and Mr Kendall selected horses purchased by the Australian Imperial Regiment for use in the Boer War http://trove.nla.gov.au/ndp/del/article/9054714. On 28 November 1906, William Beckwith moved that Belle Bruce Reid http://www.vet.unimelb.edu.au/medal/intro.html should be
registered after passing the examination and payment of the required fee. This motion was seconded by John Black Leitch (GMVC 1891) who served on the 8th Board.

Robert E Weir  MRCVS (Glasgow 1884) was appointed Inspector of Stock by the Western Australia Department of Agriculture and Industries in 1896. In 1904 he was appointed the Chief Inspector of Stock in Western Australia, the first veterinarian to hold this position. He retired in 1924.

William Hunter  RVS (1889) advertised his veterinary medicines in the veterinary journals at the time. He served on the 3rd, 4th, 5th, and 11th Veterinary Surgeons Board, and was the last RVS to hold this appointment (1918-1921).

Samuel Sherwin Cameron  MRCVS (New Edin 1888, DVSc 1909). Graduate of Royal Dick Veterinary School at Edinburgh then joined Melbourne Veterinary College for five years. Contributed lectures to the University Veterinary School, and later became Director of Agriculture, Victoria. http://adb.anu.edu.au/biography/cameron-samuel-sherwen-5478

Richard Tampling Kings  RVS (1889) dropped dead after dinner in the University Union in April 1914, just before the start of the evening scientific session of the Veterinary Association of Victoria. The scientific session was cancelled. Kings had served on the 3rd, 4th, 5th and 6th Boards.

Kings was a non-qualified registered veterinary surgeon, and like many others in the RVS class were valued for their contributions by the qualified (GMVC, BVSc, MRCVS) registered veterinary surgeons. This was the reason given by Murray Pullar why the Veterinary Association of Victoria continued to exist as a separate entity from the Australian Veterinary Association until 1919.

The Australian Veterinary Association was formed in 1921.

Henry Wragge  MRCVS (London 1851), the President who took over from Aked during the term of the first Veterinary Surgeons Board of Victoria (1888-1890). Wragge served on the first three Boards. He diagnosed pleuropneumonia in an imported cow (St Bees) in 1858. The Colonial Government of Victoria ignored his advice to slaughter the herd and the disease became endemic - finally eradicated in 1970. In 2002, Henry’s day book was found under the floorboards of his brother’s house “Yallambie” in East Heidelberg. The entries were analysed by his great grandniece Winty Calder and published in: ‘Finding Uncle Harry’. The Search for Henry Wragge, MRCVSL, Castlemaine and Melbourne, 1857-1898. Jimaringle Publications, Mt Martha. 2004.


RH Jackson, BSc FCS MPS was recruited by WT Kendall from the Pharmacy College as a part-time lecturer to teach chemistry at the Melbourne Veterinary College. That caused a bit of commotion too.

Charles Marson  MRCVS (London 1855) was a long standing veterinary practitioner in Melb. He served on the 2nd & 3rd Boards.

W. J. Cother (GMVC 1891) topped the first class of graduates from the MVC while he was employed in the Postmaster’s Department. He transferred to the Stock Department as an Inspector, and later became a Veterinary Officer in the Department of Agriculture. In 1913 he was appointed Chief Inspector of Stock, the first qualified veterinarian to hold this position. He retired in 1916.

Joseph Horatio Nelson Keane  RVS (1889) served on the 2nd, 3rd and 4th Boards. He resigned from the Board to accept a position with the Western Australian Government at Coolgardie in 1896.

Arthur William Knight Tuck (GMVC 1895) Left for South Africa shortly after graduation. He returned in 1897 to set up practice in Warrnambool, and continued his professional work there until shortly before his death on 3 March 1942.

Harold Sugden Rudduck  (GMVC 1894) was recruited by WT Kendall from the Pharmacy College as a part-time lecturer to teach chemistry at the Melbourne Veterinary College. That caused a bit of commotion too.

Six students in this photograph served in The First World War (1914-1918) and are named on the WWI Roll of Honour Board http://www.vet.unimelb.edu.au/honour/index.html

References


University of Melbourne, University Library. History of Veterinary Sciences in Australia and overseas http://www.unimelb.libguides.com/content. php?pid=4363027

It’s that time of year again!

As the weather heats up, we must remember to keep our pets cool.

RSPCA Victoria is giving out free posters to veterinary clinics in an attempt to educate the public and save dogs from deaths as a result of being left alone in hot cars this summer. Even on a 23°C day cars can reach 40°C in a matter of minutes, leading to pets suffering an agonising death from heat exhaustion.

For A2 posters to display in your clinic, contact Reeni Ekanayake, Campaign Coordinator, on (03) 9224 2587.

The Pig Specialist Centre (PSC) based in Bendigo offers assistance and advice to veterinarians on pig diseases.

For more information contact Dr. Trish Holyoake, Principal Veterinary Officer Pigs (W) 5430 4412, (M) 0419 231 534 or (E) trish.holyoak@depi.vic.gov.au

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The Big Bang Theory - Noise Sensivity in Dogs

Gary Landsberg MRCS, DVM, DACVB, DECAWBM
Veterinary Behaviourist
North Toronto Veterinary Behaviour Specialty Clinic
99 Henderson Ave, Thornhill, ON, Canada, L3T 2K9
Reprinted with permission from the Proceedings of the AVA 2014 Conference

Sensitivity to noise is one of the most common concerns of dog owners with as many as 40 to 50% of dogs reported to be fearful of some sort of noise.1 More recently one United States survey of 1201 owners with 1960 dogs found that 17% of dogs were fearful of noises, with storms (86%), fireworks (74%) and vacuum cleaners 41%.2 Similarly a study out of the United Kingdom of almost 4000 dogs based on a postal survey reported 17% of dogs with noise phobias, which increased to 49% when owners were directly questioned using a structured questionnaire.3 Fireworks fears were most common at 83%, thunderstorms at 65%, gunshots 30% and cars and trucks backfiring at 28%. Risk factors vary between studies although an increase with age is consistently reported. Spontaneous resolution is uncommon with about 8% of dogs improving with age; however in about 1/2 of these cases improvement was associated with loss of hearing. Common signs include trembling, hiding, freezing cowering, seeking people, pacing, running, vigilance, startle, bolting, salivation, panting, vocalizing, soiling and destructive behaviour.

There may be both genetic contributing factors, with some dogs having a poor ability to habituate, and learned factors, including traumatic earlier experiences. Herding breeds e.g. Border Collies, German Shepherds and Cattle Dogs, appear to be at higher risk with gundogs e.g. Pointers, Retrievers, Spaniels and mixed breeds at lower risk. Possible mechanisms for the development of sound aversion include a lack of habituation, stress-induced dishabituation, sensitization, and social transmission from other pets.

One study found that 88% of dogs with noise phobia had separation anxiety, 63% of dogs with separation anxiety had noise phobia, and 90% of dogs with thunderstorm phobia had noise phobia, however the general population survey in the United States found of the dogs with noise phobias only 18% had separation anxiety and 41% of dogs with separation anxiety had noise phobias. What appears most likely is that dogs that respond to salient noises that are intense, unpredictable and intermittent, including thunder, gunshots and fireworks, may not have significant comorbidity with other forms of fear and anxiety, while dogs with fear to less salient noises such as traffic, and vacuums are more likely to have a fearful disposition and do have comorbidity with other fears (e.g. people, animals) and separation anxiety.3

Prevention
Exposure to fireworks, engine noises, door bangs, vacuums, and loud voices as a juvenile less than 6 months of age, seemed to have a protective effect.3,4 Similarly, it has been found that dogs that remained with the breeder were less likely to have noise fears; early exposure to thunder decreased fear of fireworks, and dogs acquired during the shooting season had less gunshot fear.4 In addition, a domestic maternal environment and exposure to stimuli in an urban environment was also protective.3,4

Management
For more immediate management of upcoming storms or fireworks the owners should plan ahead both for management as well as for the use of medications. Alterations to the environment to minimize or mute exposure to the stimuli can help the pet and owner cope. The owner could try taking the pet to a room or area of the house where the stimuli will be at their mildest and the dog can be most easily distracted. Curtains and drapes might seal out many of the external visual stimuli and storm shutters, well-sealed windows and doors might block out much of the sound. Visual stimuli might be further reduced with eye covers such as Doggles® or a ThunderCap. Nested cardboard boxes or a blanket placed over the crate might further mute the sound. The ThunderHut™ is a sound reducing crate cover that might also be useful for decreasing audible stimuli. Retreat to a safe hiding place during a storm is an appropriate and adaptive response. External sounds might be further reduced by turning on a TV, fan, air conditioner, humidifier, radio, white noise, or CD (e.g. with a constant beat such as drums or rap) and by providing the pet with a few novel and highly motivating food filled toys or chews. Mutt Muffs® are a commercial available ear covering for dogs. If a head halter is used for train settled behaviours, it may also help the dog to calm. The Thundershirt and anxiety...
wrap may also have a calming “swaddling” effect while the Storm Defender cape might reduce the static associated with storms. The owners should be instructed to focus on reducing fear by offering favoured toys, engaging in play, giving favoured treats or chews, or training to settle (e.g. going to a safe haven). The owners should be assured that anything that might help the pet calm (e.g. cuddling) is acceptable (and will not reward fear as it is an emotional state and not a behaviour). However consideration should be given to which strategies can also be used when the owners are not present so that the pet can learn to cope at these times. While a positive and upbeat attitude or a calming approach would be supportive and productive, punishing or disciplining the pet, or displaying fear, anger or frustration will only serve to increase fear and anxiety.

Behaviour modification
At times when there are no distractions and with high value rewards, the owner should train the dog how and where it should settle in the presence of fear evoking events. Training should begin at times when the fear evoking noises can be entirely avoided so that improvement and control can be achieved before the season arrives. Consider clicker training, a Treat and Train, lure training, or providing all of the pet’s high valued food toys and treats in the area where you want the pet to settle. Where possible give the pet control to make choices that are consistent with what you want to achieve. Add consistency and predictability to all interactions by implementing a program of structured interactions (say please, learn to learn) where anything given to the dog of value (food, chews, toys, treats) or anything the dog wants (affection, going outdoors, play) are given only for calm and settled behaviours (e.g. sit / watch, down / settle, bed / mat). Gradually more calm and settled behaviours should be shaped. The owners must be certain to maintain a calm demeanour in the face of the stimuli and avoid bringing attention to the stimuli when they first arise. They should work to distract the pet through play, favoured toys and treats, or use the settle training to help the pet focus and calm. In this way, during exposure to noise evoking stimuli, they can focus on guiding and rewarding desirable responses, rather than inadvertently reinforcing undesirable responses or worse, punishing undesirable responses. Alternatively, some dogs do well if the family engages in “storm parties” in which the storm time is a happy and fun time for the dog with lots of treats and playtime – with this approach the dog may be classically counter conditioned to anticipate pleasant interactions during the storm (much like a leash may predict going for a walk). Some owners may find that physical manipulation such as T-Touch or gentle massage can be successfully used to help the pet calm. In addition any time the dog is observed resting, napping or focused on its toys in the safe haven, it should be calmly praised, rewar ded with Treat and Train (formerly Manners Minder) or by going to the pet and offering additional treats or toys (provided the pet will stay in place while the owner approaches). Odour and tactile cues such as a family member’s sweatshirt, audible cues such as a CD, TV or white noise, lavender aromatherapy or pheromones might help to settle if associated with the relaxation training. Owners that are anxious or upset during training will further condition anxiety.

Desensitization and counter conditioning
Although it requires extensive time, commitment, patience and guidance, the primary treatment modality is desensitization and counterconditioning to an audio or video recording of the fear evoking stimulus, beginning at sufficiently low intensity that fear or anxiety is not evoked. The owner must learn to “read” signs of anxiety and relative state of relaxation for this to be effective. Using a “surround-sound” recording system is more likely to produce a stimulus that is similar to the actual stimulus. Be certain the pet is relaxed prior to exposure. If the pet cannot be successfully settled and relaxed in the presence of the recording in the absence of the stimuli, then it is impractical to begin exposure exercises. If any anxiety is seen the owner should go back to a point where success can be achieved. Training is aimed at exposing the pet to gradually more intense levels of the stimuli while the dog remains relaxed (desensitization) and pairing favoured rewards with each training session to make a positive and enjoyable association with the stimulus (counterconditioning). Over subsequent training sessions the intensity of the stimuli can be gradually increased.

Medication
Many clients are hesitant to use sufficient pharmacological intervention to ease their pet’s fears until the pattern of anxiety and panic is well established. Yet, early intervention is most helpful since the dog learns from each negative experience. In addition, the welfare of the pet is best served by reducing states of anxiety, panic or phobia. Two drugs, clomipramine and fluoxetine are presently licensed for separation anxiety for dogs. While there have been no drugs tested in placebo controlled trials for the treatment of noise fears and phobias, in one retrospective study clomipramine in conjunction with a behaviour program, was effective in the treatment of storm phobias when combined with diazepam on the day of the storm. Fluoxetine and paroxetine have been demonstrated to be effective in the treatment of generalized anxiety disorders in dogs. In addition, short term anxiolytics such as benzodiazepines (e.g. diazepam, lorazepam or alprazolam) may be used alone or as adjunctive therapy immediately preceding noise exposure to reduce anxiety situationally. In another study, trazodone was used in noise phobias in conjunction with an SSRI or TCA either as needed one to two hours in an advance of a fear evoking event or on an ongoing basis once or twice a day.6 Another option is to add clonidine an alpha-2 agonist, that blocks noradrenaline one to two hours prior to the fear evoking event.7 Another suggested approach is the use of selegiline on an ongoing basis.
combined with propranolol and alprazolam on the day of storms. Natural supplements such as the pheromone Adaptil® in combination with desensitization and counterconditioning has been reported to be effective in reducing fireworks fears. It has also recently been demonstrated to be significantly more effective than placebo in reducing signs of fear during exposure to a thunder simulation recording. Also see www.adaptil.co.uk/Firework-Fear/Tips-to-cope-with-firework-fear.

Other natural products that might have some effect on reducing anxiety include l-theanine, alpha-casozepine (alone or combined with tryptophan in the Royal Canin Calm Canine diet, aromatherapy, melatonin or Harmonease (extracts of Magnolia officinalis and Phellodendron amurense). On the other hand, homeopathic preparations were no more effective than placebo in reducing thunder related anxiety.

References

Bushfire Volunteering - veterinarians and nurses

The Department of Environment and Primary Industries together with the Australian Veterinary Association (Victorian Division) and other affiliate organisations developed the Victorian Emergency Animal Welfare Plan following the Royal Commission on the 2009 bushfires. The responsibility of the Victorian Division within this Plan is to maintain a volunteer database of veterinarians and veterinary nurses that can be called upon in an emergency situation to assist with the welfare of animals.

With the lead up to bushfire season, we are inviting all veterinarians and veterinary nurses to register as a volunteer by registering via the link below. The AVA will maintain a database of all volunteers and this information will be accessed only in the case of an emergency situation occurring. The main task of veterinarian and veterinary nurse volunteers would be to facilitate Triage Centres to assess and treat animals. There may be other tasks that are required such as being involved with local veterinary clinics to assist with large volume patients and assisting with coordination of resources.

If you registered last year, we ask that you please register again.

Registration should only take a few minutes.

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Member Spotlight

Matthew Munro

2014 University of Melbourne DVM Graduate and AVA Student Award Winner.

Adults always love to ask children what they would like to be when they grow up: I have always loved answering the question, “a vet of course”. I grew up surrounded by animals – pet dogs, relatives with farms – and combined with a love of science, veterinary science made for the perfect career path.

When I graduated for Box Hill High School in 2007, Melbourne was just launching its new curriculum. I enrolled in the Bachelor of Science and decided to complete my undergraduate degree and apply to Melbourne’s new post-graduate course, the Doctor of Veterinary Medicine. I completed my undergraduate course with a major in zoology and was lucky to undertake one semester abroad in Berlin, Germany.

Having spent a lot of time in the zoology faculty I developed a strong interest in wildlife. Upon attaining a place in the University of Melbourne’s Doctor of Veterinary Medicine course in 2011, I was hoping to use my degree to pursue a career in conservation medicine. I was fortunate enough to undertake a wildlife placement in South Africa in 2011/2012.

Over the course of the degree my interests shifted and I developed a strong passion for small animal internal medicine. This was something I pursued throughout the lecture free final year. I was fortunate enough to undertake a placement with the medicine department at the University of Glasgow in 2014 which consolidated my interest in the field. An amazing placement at the University of California, Davis confirmed my passion and led me to make the decision to apply for internship programs in America as a new graduate. I will find out in 2015 if I have been lucky enough to have attained a place.

Winning the AVA Student Award at the 2014 Graduation Dinner was a definite honour. It kindly recognises the work I have done as president of the Veterinary Students Society of Victoria and Parkville and other tasks I have performed around campus. The prize donated, two year’s membership, is a fantastic one – I believe the AVA to be a very important part of the profession. In addition to representing the profession, I am particularly impressed and excited by the mentor scheme, which is beginning in 2015.

It is a wonderful time currently – celebrating graduation and starting the next chapter of the journey.

The 2014 graduates are excited to make the transition from students to professionals & colleagues and we look forward to the challenges and joys presented by this wonderful profession.
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**Merry Christmas and Happy New Year from all the team at Sound Veterinary Equipment!**

We would like to take this opportunity to thank you for your continued support during 2014 and we look forward to being of service to you in the new year.
Treatment of Burns in Wildlife

Dr Anne Fowler
BSc(Vet)(Hons), BVSc, MANZCVS (Avian health, Wildlife health, Medicine of Unusual Pets)
Reprinted with permission from the Proceedings of the 2013 AVA (Tas Div) Conference

Introduction

There are many ways to treat a burn. However, in the emergency response situation, there is a requirement for consistency and simplicity. If all attendees understand that a treatment protocol exists and is to be followed, then conflict is avoided and animals can get timely and effective treatment. Often the species involved are not those treated routinely by large or small veterinarians. Protocols have been devised to prevent accidental death in an individual with drug physiology different to domestic pets and livestock. By having a simple equipment list, donations can be streamlined. However, as a vet, if you are treating a burn that is not healing, if a complication arises then your veterinary judgement can be used to alter a treatment regime.

Table 1: Equipment used in treating burns

- 0.9% sterile saline solution (Baxter)
- Tissue scissors
- Bandage scissors
- Syringes: 3, 5, 10, 20ml sizes
- Needles: 23, 21, 20, 18G
- Flamazine® cream (Smith & Nephew)
- Betadine® 1% or Chlorhexidine gluconate scrub (not alcohol-based)
- Melolin® (Smith & Nephew)
- Cotton gauze, cotton buds, cotton makeup pads
- Basin to hold water for cleaning
- Bandages: crepe bandages, Vetrap®, Coplus®
- Cotton mittens have been made by some carers.
- ‘Sharps’ container
- Container for contaminated wastes (bandages, dirty swabs)
- Drip stand or hooks to elevate fluid bags above the patient
- Insecticide for maggots: Centrigen®, Permoxin®
- Celluvisc® eye ointment – keep dehydrated animal’s eyes moist

Treating the burn

In the true first aid setting with an animal coming immediately off the fire front, the initial treatment of a burn is to flush it in tepid water for 10 minutes. The goal is to stop the ‘microwave’ effect. The skin traps heat and the subcutaneous fat continues to burn – thus the burn extends underneath the skin. Flushing the burn will also remove some of the debris such as soot and plant material. However, past experiences in Victoria, has seen that this scenario is unlikely and the animal will be rescued not hours but days after the initial burn. Thus the 10 minute flush is not necessary – particularly at the point of rescue. When it comes to treating burns, the first thing to do is to get organized. Lay instruments out ready for use, have bandages cut to size and work from a clean side to dirty side. It is appropriate to use disposable gloves when treating partial and full-thickness burns to prevent the transfer of bacteria from your hands to the burn.

The procedure for treating a burn is described below:

1. Weigh the animal – this permits accurate drug dosing
2. Sedate and/or anaesthetise the animal.
3. Valium provides sedation, addresses capture myopathy and causes short- term amnesia, making it an ideal premedication
4. Anaesthesia can be induced with alfaxan IM at 1-2mg/kg. This provides a good 20 minutes of anaesthesia. Alternatives include Zoletil given IM.
5. Once sedated, start SC fluids with 0.9% saline given between the shoulder blades. The groin is used for echidna and platypus.
6. Bathe the eyes with saline to flush debris.
7. Clean the nostrils with a cotton bud to remove soot
9. Trim singed fur over burnt skin.
10. Bathe the burns in tepid 0.9% saline for 5 – 10 minutes. If possible, do more than one foot simultaneously. A burns team consists of 4 people (1 per foot) and a scribe. Change the water when it becomes dirty. Bathing separates dead tissue (black, yellow) from live (pink, bleeding) making debriding more easy.
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As insurance specialists for veterinary professionals and, with no allegiance to any particular insurer we ensure the best terms, structure for tax effectiveness, and most importantly manage any claims that may arise on your behalf.

Experien act as your personal insurance concierge - at no additional cost.
Debride flaps of dead skin back to living tissue with scissors. Be aggressive – this will reduce healing time.

Dry the burns with cotton gauze or cotton towels. Do not use cotton wool balls – it acts as a foreign body.

Treatment of the burn: first stage: In the first 3 – 5 days, a saline wet-to-dry bandage is used for physical debridement. Avoid the use of chemical debriding agents as they are often toxic to tissue. Use 3 – 5 layers of cotton gauze squares wet with saline, then apply 3 – 5 layers of dry cotton gauze squares. Cover with a bandage.

Three days are sufficient for a superficial partial thickness burn

Five days may be needed for a deep partial thickness burn. Do not go beyond this time.

The dressing is changed daily.

Treatment of the burn: second stage

After 5 – 10 minutes of soaking (time will reduce with successive bandage changes), apply Flamazine (Smith & Nephew) to the burn surface – covering around nails, sides and back of feet. This cream is applied until the skin has returned.

Apply a layer of Melolin (Smith & Nephew), or equivalent, shiny side to the burn.

Wrap the feet in the mitten bandage using Coplus or vetrap. Leave nails out for possums. Echidna and wombat burns are likely to involve the nail and should be covered.

Bandages can now be changed every second day. This reduces the number of anaesthetics the animal must go through. Do not delay beyond the second day change as Flamazine is only effective for 24 hours and slowed healing will result.

Other suitable dressings include
- Acticoat 7 (Smith & Nephew), can be used after the first week for animals that require regular anaesthesia for bandage changes – this dressing stays moist and releases silver over a seven day period. It is suitable for birds and possum burns.
- Duoderm extrathin and paste – used to cover nail beds
- Duoderm extrathin and paste – used to cover nail beds.

Table 2: Creams to use/avoid

- Use aloe vera either from the plant or as an ointment.
- Use paw paw cream – it has a petroleum base.
- Use creams labeled for superficial burns e.g.: Soov-deeper burns.
- Do not use cotton wool on the burn.
- Do not use petroleum-based creams.
- Do not use creams with volatile oils, e.g.: tea tree oils.

Table 3: Changes seen in burns over time

<table>
<thead>
<tr>
<th>Day</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-7</td>
<td>A weepy, infected wound, with lots of discharge (necrotic tissue). Bandage changes are required daily to remove the discharge.</td>
</tr>
<tr>
<td>7-10</td>
<td>The eschar (burnt dead tissue) lifts. It may only be at this point that the severity of the burn becomes apparent. A proportion of animals may require euthanasia at this point due to extensive damage to underlying structures. Bandage changes can now be done on alternate days.</td>
</tr>
<tr>
<td>14-21</td>
<td>In a well-treated partial thickness burn, granulation should have begun and some areas of the burn may already have intact skin. Nails are often only starting to fall off at this point. The nail bed is very sensitive and needs to be covered in a bandage while it heals – which may easily take a month or more.</td>
</tr>
<tr>
<td>21-35</td>
<td>The burn should now be covered with pink thin skin. Hair may be beginning to regrow. It can take a longer period of time for pigmentation to return to the feet</td>
</tr>
</tbody>
</table>

Providing first aid to burnt wildlife

In all of the drama of burns, it is important to remember that behind every burn is a patient that requires first aid to stay alive.

Treat for shock
- Keep the animal warm, dark and quiet.
- The ambient temperature should be between 24 – 30°C. Loss of skin results in the loss of body heat through the burn.
- Use a form of heating, e.g.: heat pad, incubator, as required.
- Monitor the temperature around any animal that has been provided with heat.
- Pay particular attention to the temperature when an animal has decreased mobility and cannot move away from the heat.
- Some animals will have hypothermia (low body temperatures) from shock, excessive wetting, or being wrapped in wet towels.
- Treat hyperthermia by spraying the animal’s head with water, draping cages with wet cotton sheets, and moving the animal to an air-conditioned site. Be aware that the temperature of the animal can drop quickly, resulting in hypothermia.
- Keep domestic pets and children away from the animals.
- Limit the number of people who see and treat the animals.
- Speak and act calmly and quietly around these animals.
Treat dehydration
These animals have been stuck in a tree in hot air leading up to and through the fire front. Ambient humidity of air may only be 10% instead of 50%. Leaves which are food and water may have shrivelled and died. A normal leaf is composed of 50% water. Rehydration is essential. Offer fresh water – and yes, every animal – including koalas, will drink water if it wants it. Leave fresh water available at all times – but remember that the animal may be too disoriented or sore to move to the water bowl – so continue to offer water several times a day.

Clinical signs of dehydration are shown below

<table>
<thead>
<tr>
<th>%</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>Dry tacky mouth when touched with a finger, no skin tenting</td>
</tr>
<tr>
<td>8%</td>
<td>Tented skin returns to normal over 1-2 seconds</td>
</tr>
</tbody>
</table>
| 10%| Skin remains tented for greater than 2 seconds, cold limbs.
    | - This stage is very hard to reverse, even with intravenous fluids. |
| 15%| Skin remains tented for longer than 3 seconds. The animal is very close to death and euthanasia would be appropriate. |

Amount of fluid to give
Each animal requires the amount of fluid to be given in a 24 hour period to be calculated. This amount and the amount given should be recorded. Although Parklands formula could be applied, in the emergency setting, a simpler method of fluid calculation appears to be as effective – probably because the animals have a similar extent of burns.

1. Weigh the animal.
2. Assume 10% dehydration for all animals coming into care. They may be shocked and probably have not eaten/drunk for 12-24 hours or longer.
3. The amount of dehydration will be corrected over three days. Give 50% of the dehydration on the first day then 25% on each of the next two days.
4. Add 10% dehydration weight to actual weight to get the normal weight.
5. Normal fluid maintenance requirements for animals are 5% of the body weight per day. A summary of the amount to be given over the first three days is described:

\[
\text{Day 1} = 5\% \text{ maintenance} + 5\% \text{ dehydration} = 10\% \text{ body-weight}
\]

\[
\text{Day 2} = 5\% \text{ maintenance} + 2.5\% \text{ dehydration} = 7.5\% \text{ bodyweight}
\]

\[
\text{Day 3} = 5\% \text{ maintenance} + 2.5\% \text{ dehydration} = 7.5\% \text{ bodyweight}
\]

Treat for a minimum of 10% dehydration for at least three days. Some animals will require a longer time to rehydrate – and this is assessed on an individual basis. The more severe and extensive the burns are, the longer that fluid therapy should be given. Aggressive rehydration initially can prevent later problems with kidney damage. Renal failure is a common sequelae to burns in koalas and this may be able to be prevented with regular, ongoing fluid therapy. Providing extra fluid for 3, 5 or 7 days will be appropriate for some individuals. Fluids should be given each time an animal is sedated or anaesthesised for bandage changes. This is recommended as the animal will have been starved prior to the procedure. The fluids can be given at the time of the procedure and support the organs throughout the sedation/anaesthesia.

Complications and Problems Associated with Burns
There are a number of other problems associated with burns that may complicate the simple burn on the patient.

Maggot infestation
With summer fires comes summer flies. Burnt animals should be housed in a fly-proof area while their burns are healing. If maggots are found the wound can be flushed with:

1. Permoxin diluted 1:40 (active ingredient: permethrin, Dermcare)
2. Centrigen (cetrime, purple dye, and unnamed insect repellents, Virbac).
3. 0.9% saline – use a syringe with a needle on to create higher pressure.

Maggots may be removed individually with tweezers and maggot rafts can be combed from the fur. It may take a few days for all maggots to be removed. Antibiotics are indicated for all maggot-infected wounds.

Corneal ulceration
Some animals suffered from burns to the cornea

Clinical signs:
The surface of the eye may appear Red (congested blood vessels), White (scar tissue present), or; Blue (oedema from a sick cornea). Eye may be partly or fully closed. Clear discharge (tears) or purulent discharge may be present.

Treatment:
Conoptal – an antibacterial ointment applied (4-6) times a day to the eye. Anti-inflammatories, e.g.: Metacam, are
used to control pain and reduce scarring.

**Prognosis:**
Aggressive treatment is required to prevent scarring.

**Arthritis of digits**

**Cause:**
Digits are either bandaged in a ball bandage or curved position and physiotherapy is not performed. As the skin heals and contracts, it can force the digits to bend. This may be seen with animals that have burns that are untreated and may be seen some weeks or months after the fire. Burns over the surface of the foot can result in tendon contraction of the tendons of the palm (as seen in humans).

**Clinical signs:**
The toes are bent in towards the palm. The skin appears tight over the joints. They are unable to be extended, or extend with great difficulty.

**Treatment:**
Change bandages every second day to maximize the speed of healing. Perform gentle full-range of movement and extension of toes under sedation at each bandage change. Provide pain relief.

**Prognosis:**
The scarring may permanently restrict the movement of the toes.

**Smoke inhalation pneumonia**
The damage may be caused by:
- The inhalation of carbon monoxide or
- The toxicity from the smoke itself.
- Irritant toxins, eg: sulfur dioxide burns the mucosa, acrolein denatures DNA and results in cell death (Fitzgerald et al, 2006).
- Particulate carbon matter is inhaled and binds to the mucosa
- Chemical asphyxiants - such as carbon monoxide prevents oxygen binding to haemoglobin, resulting in difficulty exchanging oxygen. The result is the deprivation of oxygen to organs. Thus the animal may appear weak or unconscious.
- The heat causes thermal burns to the respiratory mucosa. The sloughing occludes small airways and thus bacteria are able to grow.

Smoke inhalation victims are often very sick and die in within three days. Suspect smoke inhalation with pneumonia as a consequence if there are:
- Burns to the skin around the nose and mouth; frizzled whiskers
- Bloody discharge from the nose, sooty spit
- Wheezing, or noisy breathing
- Disorientation; weakness
- Nasal discharge which may be purulent or bloody usually occurs very late in the course of the disease.

**Treatment:**
Simply removing these animals from the smoky environment to clean air will result in some improvement as the carbon monoxide is slowly removed from the circulation. Aggressive treatment with 100% humidified oxygen which is provided by face mask (using nebulisers that are used for children with asthma). Provide oxygen for at least one hour (and up to four hours) upon arrival to remove the carbon monoxide levels in the blood. Very short-acting cortisones may be given in the first 24 hours to reduce the oedema in the airways (larynx) if this is suspected to be present. Antibiotics and fluids can be used to attempt to treat the disease. Bronchodilators may play a role in preventing collapse of small airways.

**Damage to Nails**

**Cause:**
The nail bed is burned. The bone under the nail may be damaged.

**Clinical signs:**
The nail bed appears white instead of pink. Burns are present on the skin around the base of the nail. The nail falls off – usually around the 14 day mark

**Treatment:**
Ensure that Flamazine® is placed around the nail beds from first treatment. Bandage loose nails to provide stability. Remove nails if they are loose, and ready to be removed under anaesthesia. Cover these nails with Duoderm Extra thin® and bandages. Rub Daktarin® cream around the nail beds once daily for 2 – 4 weeks once the skin has healed and is no longer bandaged.
Prognosis:
It takes a month for a healthy nail bed to grow a healthy nail. Fungal infections of the nail-bed are a common sequelae to burns. These nails are flaky, white and weak. Normal nails are required to climb trees, fight, mate, groom, and care for young.

Gangrene due to tight bandaging
Cause:
Bandages are placed too tightly, cutting off circulation to the feet
Clinical signs:
Animal is quiet, off food, bites at bandages. Foot is swollen, purplish. Skin and deeper tissues slough
Treatment:
Euthanasia is indicated

Renal Failure
Cause:
Inadequate rehydration upon arrival. Long delay between the fire and receiving care. Inadequate water provided during care. Systemic inflammatory response leads to damage to kidneys.
Clinical signs:
Increased amount of water consumed voluntarily. Urinating more frequently. Declining weight, appetite; lethargy
Diagnosis:
Blood tests performed by vet: urea, creatinine and phosphorus Urine tests performed by vet: dilute urine with high protein, casts Ultrasound of kidneys
Treatment:
Early renal failure can be aggressively treated with fluids, and Vitamin B complex injections. Advanced renal failure cannot be treated and euthanasia is recommended to alleviate suffering.
Prognosis:
Guarded once clinical signs occur
Prevention:
Provide fresh water every day to every animal. Monitor urination.

Septic shock
Cause:
Bacteria from the wound or intestine travel to the blood stream and affect filter organs (liver and kidney). Likely to be seen in animals with burns to greater than 20% of the body. A systemic inflammatory response syndrome (SIRS) is seen.
Clinical signs:
Decreased food intake, decreased pellet count, Animal is very lethargic, sleepy and may become unconscious.
Diagnosis:
Blood glucose is low – less than 4mmol/L
Treatment:
Start antibiotics or change antibiotics. Give more fluids – subcutaneously or orally. Offer probiotics in support feed. Increase frequency of support feed. Bolus injection by the veterinarian of glucose may assist.
Prognosis:
Guarded as gut may 'shutdown'. Do not persist with animals with > 20% TBSA.

Medications for Burnt Wildlife
Many drug doses for wildlife are extrapolated by allometric scaling. Recent work on pharmacokinetics in the koala by the University of Sydney suggests that the oral route of medication for herbivorous marsupials is unlikely to be effective.

Antibiotics
These are required for a minimum of seven days, and usually two weeks while the necrotic tissue is debrided. They are stopped once healthy granulation tissue is present.

Penicillins: e.g.: Amoxicil/Clavulox (Pfizer) are suitable for kangaroos and Brushtail possums.
• Advantages: It has an excellent spectrum against skin bacteria (such as Staphylococcus) likely to invade the wounds. However, these are only present in the first week (ie before the animal is caught).
• Disadvantages: this drug is not effective against Pseudomonas and is excreted by the kidney. It causes caecal dysbiosis and death in Ringtail Possums and possibly koalas. It is not effective in reptiles.

Fluoquinolones: e.g.: enrofloxacin, (Baytril, Bayer, Enrotril, Troy) by injectable routes, is suitable for koalas, ringtail possums, reptiles.
• Advantages: This group of drugs also has good action against the bacteria that are likely to be present in a contaminated wound – such as Pseudomonas and Enterobacteriaceae. Initial work by University of Sydney suggests that koalas should receive injectable, not oral antibiotics for best absorption.
• Disadvantages: it can be painful when given by injection. It should be diluted 1:1 with sterile saline.

Trimethoprim/sulfas: e.g.: Trivetron (Jurox) was also used for some bacterial infections that were resistant to other medications.

Ceftazidime: third-generation cephalosporin, (Fortum, Glaxo)
• Advantage: effective against Pseudomonas and other likely reptile skin flora. Every third day dosing is less painful than daily.
Gentamicin
- Advantages: is also effective against Pseudomonas.
- Disadvantages: must only be used in well-hydrated patients as it can contribute to kidney failure. If a wound does not appear to be responding, then it may need to be cultured to identify the bacteria present. Cultures are performed on biopsies of burns, not from swabs of the skin for accurate results. Pseudomonas bacteria are a common contaminant and may be resistant to many drugs. However, Flamazine does have action against this pathogen.

Antifungal medication
Oral Nilstat (Nystatin, Sigma) may be required to treat pouch infections in female koalas who have suffered burns to their pouch. Clean the pouch with dilute Betadine first.

Antifungal cream – such as Daktarin ointment for athlete’s foot may be required to be placed around the nail beds if a fungal infection of the nail bed is suspected.

Anti-inflammatory medication
Ensure the animal is well-hydrated prior to use. This means a delay until rehydration – ie not to be used in the field or even at first treatment.
- Dexamethasone has been used occasionally. Its use in smoke inhalation pneumonia is controversial in domestic animal and humans and its use should only be undertaken with caution as its mode of anti-inflammatory action is unknown. Ideally, a short-acting cortisone: Solu-Delta-Cortef could be used instead. It works quicker and is excreted quicker than Dexamethasone. Side effects to cortisone use include overwhelming sepsis from bacterial or fungal infections, drinking more, urinating more, and suppression of the immune system and slowed healing.
- Non-steroidal anti-inflammatory drugs: e.g.: Meloxicam has been used successfully for pain relief. Pain relief is required until the skin reforms – whereupon the nerves are protected. The duration of pain relief needs to be assessed on an individual basis but many individuals were treated for 7 – 14 days as required. Side effects to this medication in other species include nausea, gastric ulceration, and kidney failure. It is unknown if these side effects occur in marsupial species. Meloxicam has been shown to have only a one hour duration of effect in koalas, and thus is not recommended. Other NSAIDs, such as carprofen may be effective. Future work may reveal the effectiveness of tolfenamic acid and tramadol in assisting with pain relief.

Vitamins
Vitamins are recommended as they have a demonstrated role in reducing healing times in humans.
- Stressed koalas benefit greatly from B group vitamins. However, any animal that has been starving will also benefit. This is provided as a Vitamin B complex injection. It is given daily for the first 3 – 5 days. It could then be repeated weekly.
- Vitamin A is required in making healthy skin. Ideally the vitamins will be found in the diet offered but these animals may not be eating sufficient food initially to meet their requirements. There are not readily available sources of Vitamin A that can be used. However, milks and natural foods will contain this vitamin.
- Vitamin C has been documented to reduce the time to healing. It can be given as an injection daily for the first 3 – 5 days.
- Vitamin E has antioxidant properties. It is available as Selvite/E and should be given no more frequently than once a week, for 4 – 6 weeks until healing is complete.

Eye ointments
- Conoptal eye ointment can be used for the treatment of eyes if ulcerated 3 – 4 times a day.
- Avoid using an ointment with cortisone in it if a corneal ulcer is suspected.
- Celluvisc eye drops (from the chemist) are useful to keep the eyes of dehydrated animals lubricated.

Sedation and anaesthesia
Sedation (and preferably anaesthesia) is recommended for at least the first three weeks of bandage changes as the dressing changes are very painful. Anaesthesia will need to be performed by a veterinarian. As healing progresses, the animal may no longer need sedation. Diazepam (Pamlin, Ilium), Alfaxalone (Alfaxan, Jurox) and Zoletil (Virbac) have been successfully used in koalas and other wildlife species. Full gaseous anaesthesia may be required to change the dressings of possums and birds.

Click here for drugs mentioned in the text. Note (i) that this is not exhaustive and other texts may provide more details and (ii) you will be taken to the AVA Library & will need to log in.
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Clearing the Hurdle - Communicating the cost of veterinary care

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Introduction
Veterinarians currently practice in an environment where the majority of pet owners pay for veterinary care out-of-pocket. As a result, the discussion of cost (or lack thereof) is likely to have a significant day-to-day impact on the decisions owners make and the veterinary care patients receive. Research has identified cost discussions within veterinarian-client-patient interactions to be an area of potential contention for veterinarians and pet owners. A series of four veterinarian focus groups identified that the discussion of cost is a source of unease for many veterinarians. In comparison, pet owners participating in six independent focus groups expressed concern toward inadequate discussions of cost between veterinarians and their clients. Across the pet-owner focus groups, the participants indicated they expected their veterinarian to initiate cost conversations upfront because they felt a failure to discuss costs leads clients to make decisions which ultimately overextended them financially. Interestingly, a recent study found 53% of pet owners identified that the costs of veterinary care are usually much higher than they expect.

Research suggests that a failure to discuss the cost of veterinary care upfront can contribute to client suspicion and mistrust. Although there will never be a magical solution for making cost conversations easy for veterinarians or their practice teams, it is important for veterinary personnel to develop communication skills that can be used to facilitate cost conversations with clients and preserve client trust. The first step is ensuring the costs of veterinary care are communicated in a way that attends to the client's perception of value. Utilizing specific communication skills that convey understanding of the client's perspective and offer partnership with the client in managing the cost of veterinary care can assist veterinary personnel in overcoming many of the hurdles that can exist to communicating the cost of veterinary care.

Understanding the client's perception of value
One of the inherent hurdles that can exist when discussing the costs of veterinary care is the potential conflict of interest that exists with respect to the fact that veterinarians directly influence the care patients receive, and the fact they receive more compensation by providing more care. It has been found that a general atmosphere of suspicion exists among some pet owners in relation to the motivations behind veterinary-care recommendations. This suspicion appears to arise from the conflict between pet-owners' perceptions of veterinary medicine as a health-care profession versus veterinary medicine as a business. To address clients' concerns that a recommendation may be driven by business motivations rather than the health-care needs of the animal, it becomes extremely important that veterinarians proactively educate clients to the value of a recommendation in a manner that attends to the client's perception of value.

Research suggests when costs are discussed within veterinarian-client-patient interactions, veterinarians and clients often approach the discussion of cost from different perceptions of 'value', with veterinarians in many situations not framing their discussions of costs in a manner that attends to a pet owner's perception. It has been found that clients' perception of value is closely aligned with the importance to the overall health and wellbeing of their animal whereas veterinarians often discuss the cost of veterinary care in relation to the time and service they are providing the client and their animal. An observational study involving 20 companion-animal veterinarians and the analysis of 200 video-recorded veterinarian-client-patient interactions found 29% of the interactions included a discussion of cost. Of the interactions, 66% included at least one cost discussion framed by the veterinarian in a manner that only conveyed value in relation to the veterinarian's time or service being provided whereas 17% involved a discussion of cost that was related to the future health and wellbeing of the animal. To communicate the costs of veterinary care in a way that is relevant and meaningful to clients, veterinarians should consider going beyond simply conveying the cost of their time and service to communicating the value of their time and service to the overall health and wellbeing of the client's animal. For example, instead of communicating to a client "The bloodwork will run 150 dollars" taking the discussion of cost another step to include the value of the bloodwork (i.e., service) to the overall health and wellbeing of the patient is likely to lead to greater client understanding and in turn investment in the recommendation (e.g., "The bloodwork will run 150 dollars; it is a general health profile which is more than the last time when we did the surgery … if it indicates an issue with her kidneys we can discuss changing her food … in that case, changing her food should decrease the stress on her kidneys and prolong her life.")

A tool that is used by veterinarians to assist with...
communicating the cost of veterinary care is a written estimate. A written estimate can be an excellent way of initiating a discussion relating to the costs of veterinary care. However, without appropriate discussion a written estimate may fall short of effectively communicating the cost of veterinary care in a manner that attends to the client’s perception of value. When using a written estimate to facilitate a cost discussion with a client, it becomes important that the veterinarian not only present the estimate (an itemized list of the veterinarian’s time and service) but that they also explain the value of the veterinarian’s time and service to the overall health and wellbeing of the patient. At the end of the day, a written estimate is only an itemized list of the veterinarian’s time and service; therefore, using an estimate without further conversation is likely to fall short of attending to the client’s perception of value.

Communication skills for facilitating cost conversations with clients

It has been identified that pet owners expect veterinary medicine to be a profession where the care of the animal takes precedence over monetary considerations. This potentially positions a veterinarian in a challenging role, given pet owners also expressed the expectation that veterinarians be the one to initiate cost discussions upfront. Communicating the costs of veterinary care upfront within an often emotionally charged situation can be difficult as it can be easy for the veterinarian to be construed as non-caring. Developing and utilizing a number of communication skills that can convey care within an emotionally charged environment is important for veterinarians in communicating costs in a caring manner. A number of specific communication skills have been identified in medicine for carrying out respectful conversations with clients about the costs of care.

Empathy statements

Empathy has been described as a key ingredient in the discussion of out-of-pocket costs. It is a communication skill that conveys understanding on the part of the veterinarian. Using empathy in relation to the costs of veterinary care can be broken down into a 2-step process. First, the veterinarian must gain an understanding and appreciation for the client’s cost awareness, the client’s financial limitations, and the client’s general beliefs with respect to the costs of the proposed care. Second, the veterinarian must verbally communicate this understanding and appreciation back to the client.

Partnership statements

By using words such as “us”, “let’s”, “together” or “we” a practitioner can convey a sense of partnership with their client in an attempt to prevent the client from feeling completely isolated and alone at a time when the cost of care may seem unmanageable. Using partnership statements does not mean the veterinarian is assuming responsibility for the cost of the patient’s care; rather, it is meant to be a reassuring signal to the client that the veterinarian is willing to work with the client to try to find a manageable solution to the situation.

“I wish…” statements

It has been suggested that “I wish…” statements allow a practitioner to enter the client’s world during times of unrealistic hope in order to diminish potential conflict between the practitioner and the client. During situations of unrealistic financial hope, most often the veterinarian involved also wishes the circumstances were different, and communicating this feeling to the client can be powerful in acknowledging the emotional impact of the financial situation.

References


Examples of empathy statements:

“I can see that you are really upset about what has happened to Rory and you are worried about the costs associated with his care; let’s take a few minutes and revisit some of the other options available to us.”

“I know you indicated earlier that the costs associated with the surgery are a concern for you; may we take a few minutes now to discuss these costs?”

Examples of partnership statements:

“I understand you did not expect to encounter these costs when you came in with Magic this afternoon; let’s explore what solutions we might be able to come up with together in order to try to manage this unexpected expense.”

“I can see you really care for Riley and you do not want anything to happen to him; to ensure you are not caught off guard by the cost of his care, let’s sit down and go through the estimated costs together.”

An example of an “I wish…” statement:

“I wish there were a less expensive alternative in terms of treating Max’s fracture. However, given the x-ray findings, I do not think splinting the leg is a practical or safe option for Max.”
Avian Radiology—taking and interpreting avian radiographs

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Radiology is a valuable diagnostic tool in avian medicine, but is surprisingly under-utilised. This may reflect the clinician’s ‘comfort level’ with avian radiology - a lack of training and experience, the apparent difficulty in obtaining good quality images, and a reluctance to use radiography in such a small patient. The advent of digital radiography may go a long way towards overcoming these problems but the basic principle – do it right the first time – is as true in birds as it is in other species.

Equipment

Good avian radiography requires short exposure times (to minimise the effect of ‘blurring’ due to the patient’s relatively rapid respiratory rate) and a combination of high detail screens and films. These requirements mean that a relatively powerful X-ray machine is needed, with the ability to produce a high mA with a short exposure time. Most x-ray machines used in veterinary practices will fulfill these requirements. Non-screen film can be used but requires a higher exposure time. The screens that are used for radiographs of the extremities in man, cats and dogs are also excellent for birds. Mammography cassettes, screens and film are also very useful and give excellent detail but processing the film is more critical than with other films. (Mammography film/screen combination gives higher line pair per mm resolution, therefore excellent detail.)

Digital radiography is becoming more obtainable in many private practices. With the ability to obtain and manipulate high definition images as well as storing them electronically, high definition digital radiography offers major advancements in avian radiology. The author finds that, for small patients (<50g), a combination of digital plates and a dental X-ray machine achieves excellent images that were previously difficult to achieve using film, or even using DR or CR equipment with conventional x-ray tube or machine. For birds over 100g, DR or CR equipment with conventional x-ray tube or machine produces high quality images. Having a Picture Archiving and Communication System (PACS) that allows the clinician to more closely examine images, measure parts of it, annotate it and then communicate these images with colleagues and clients via email or CD makes for huge leap in the quality of avian diagnostic imaging.

Contrast

Contrast studies can add greatly to the diagnostic value of radiology. Contrast media such as barium, iohexol and diatrizoate have all been used in avian radiology.

Gastrointestinal

Gastrointestinal contrast studies utilising iohexol or diatrizoate are often comparable to those using the more routinely recommended barium sulphate. Barium and iohexol can be used undiluted, or diluted with 1:1 with water. (Higher dilutions may result in poor contrast.) Diatrizoate has a high osmolality; this hypertonicity may cause dehydration in small birds. Care should therefore be taken when using diatrizoate, but it may be safer than barium if a gastrointestinal perforation is suspected.

The dose is based on the estimated size of crop volume (approximately 25-30 ml/kg for parrots). In addition to time-zero survey radiographs, additional two-view images are typically taken at 30 minutes, 1-, 2-, 4-, 8- and 24-hour intervals. The timing of these images will vary with species and age. In small species, images may be made at 15-, 30-, 60- and 90-minutes, with additional images taken on an as needed basis. It is recommended to fast a parrot for 3-4 hours before a gastrointestinal contrast study, but transit time does not appear to be affected by anaesthesia.

Urography

The patient should be fasted for about 2 hours before the contrast medium is given. It may be necessary to aid emptying the gut by introducing liquid paraffin into the cloaca. For urography, the organic iodine compounds are warmed to body temperature and injected under anaesthesia slowly intravenously, usually into the basilic vein. The dose is 2 ml per kg body weight, as a 70-80% solution of organic iodine compound containing 300-400 mg of iodine per ml (800 mg/kg) intravenously. The quality of the contrast obtained depends on the concentrating capacity of the kidneys, on the preparation used, and on the iodine concentration of the medium. The aorta, heart, and pulmonary arteries are demonstrated 10 seconds after the injection, kidneys and ureters are shown 30-60 seconds after injections, and the cloaca and terminal gut are visualized 2-5 minutes after the injection. Urography must not be performed in dehydrated or severely renal compromised birds.
Sinography
To visualize the infra-orbital sinuses and nasal cavity, iodinated compounds are instilled directly into the sinuses to demonstrate the flow of contrast medium into the nasal cavity. From 0.1 to 1.0 mL of 15-20% iodine agent is installed directly in the nares or in the sinus. After taking the radiographs, the contrast medium should be flushed out with sterile saline to minimize local reaction after radiography has been performed. (Side effects have been described in some birds, including oedema and periorbital swelling.)

Restraint and positioning
Whether using conventional or digital radiography, positioning of the patient is absolutely vital for the accurate interpretation of an exposed radiograph. Correct positioning is best obtained under anaesthesia; only very tame (or very sick) patients may be positioned consciously in a plexiglass restraint device or similar restraints. Often, however, anaesthesia is less stressful and therefore safer than manual restraint. The time of anaesthesia is generally brief (less than 10 minutes). Ideally, birds should be fasted for several hours before performing radiographs to prevent regurgitation and aspiration, whether or not anaesthesia is used. Small birds, such as cockatiels and budgies, should be fasted for 1-2 hours, while larger birds should be fasted for 2-6 hours. If fasting is not possible, or regurgitation is a concern, the head should be elevated above the level of the crop during the procedure. If possible, the patient should be intubated.

The lateral view is taken with the patient in right lateral recumbency, with the wings extended dorsally and the legs pulled caudally. The limbs can be held in position with adhesive tape. When examining the resultant image, the clinician should first assess that the acetabulae are superimposed, as should the coracoids. The ventro-dorsal view is taken with the patient in dorsal recumbency with the wings extended laterally and the legs caudally alongside the tail, with the femurs ideally parallel to the spine and each other. The keel should be superimposed over the vertebrae – a thin air space in the carina (seen as a thin black line) is used to check this.

Normal anatomy
As with any species, it is important to become familiar with the normal gross and radiographic anatomy of birds. Reviewing all systems with a systematic approach in all studies will increase the diagnostic yield of each study, while improving the clinician’s comfort and familiarity in interpreting avian radiographic images.

a. Musculoskeletal system. The anatomy of the musculoskeletal system is illustrated below. Reviewing the radiograph should include the following:
   i. Conformation of the skeleton
   ii. Density and thickness of the bone cortices
   iii. Radio-opacity of the medullary cavities, including that of the pneumatic bones (humerus and femur)
   iv. The presence of internal struts in the humerus and other long bones
b. Cardiovascular system. The size and shape of the heart is best assessed in a VD view. The maximum width of the cardiac silhouette should be equal to 51% - 61% of the maximal width of the thorax. The shape of the heart should be symmetrical, broader at the base than the apex, and there should be no clear distinction between the heart and the liver (the cardio-hepatic shadow). On a lateral view the aorta can usually be visualised leaving the base of the heart and coursing caudally, below and parallel to the spine.
c. Respiratory system. The cervical and proximal thoracic trachea can be readily visualized. The distal trachea and syrinx can be difficult to evaluate due to the overlying ribs, soft tissues and great vessels. Thorographic interpretation of the lungs requires orthogonal views because a significant proportion of the lungs are covered by the cardiac silhouette on the VD view. On the lateral view, the right and left lung fields are superimposed rendering the localization of unilateral lesions impossible. Careful consideration of both views may allow for the detection and localization of pulmonary lesions. The normal radiographic appearance of the avian lung is somewhat honeycomb-like (due to the appearance of end-on parabronchi). The air sacs can be visualised around the pectoral joints (clavicular) and caudal to lungs, lateral to the liver (thoracic and abdominal). Healthy air sacs have little or no radio-opacity, with no lines visible between adjacent air sacs.
d. Digestive tract. The crop is usually empty, although small amounts of ingesta are sometimes present. Gas or fluid should not be present. The oesophagus passes over the dorsal aspect of the heart and proximal liver and becomes the proventriculus about one-quarter of the way along the dorsal hepatic surface. In health, a narrow air sac space can often be identified between the proximal portion of the dorsal hepatic silhouette and the oesophagus/proventriculus. The oesophagus and proventriculus typically course on an approximately 40–45° angle from the thoracic vertebrae before entering the ventriculus (or gizzard). The ventriculus is seen as a spherical organ, often filled with slightly radio-opaque grit. On a VD view it lies on the left side of the spine, between the coxofemoral joints. On a lateral view it lies on the ventral coelomic floor between the stifle joints of the extended legs. On the dorsal side of the proventriculus-ventriculus junction lies the spleen. The intestinal tract lies caudal to the ventriculus, with individual loops usually indistinguishable. It terminates in the cloaca, usually visible as a small dome-shaped soft tissue density at the base of the tail.
e. Liver. The heart and liver are contrasted against the
thoracic and abdominal air sacs. In general, the silhouette is of an hour-glass shape on the VD view with the hepatic waist being marginally wider than that of the heart. The lateral margins of the liver should not extend beyond a line joining the pectoral and coxofemoral joints on each side. The proventriculus lies on the left side, sometimes lateral to the liver; contrast media may be required to differentiate it from the liver. On the lateral view, the liver is caudal to the heart and fills approximately 1/3 of the ventral coelom, tapering caudally and ventrally at about 15-20° from the heart base. There is often a small space between the dorsal liver and the ventral proventriculus.

f. Urogenital system. The kidneys are best assessed on the lateral view, despite superimposition. They are difficult to assess on the VD view because of overlying bone and soft tissues (although the cranial margin of the cranial division of the kidneys can occasionally be visualised). The kidneys are surrounded by the abdominal air sac, including dorsal diverticula of the abdominal airs sacs which lie between the kidneys and the synsacrum. On the lateral view, with both acetabula superimposed, the kidneys should extend below a line drawn through the ventral acetabular rim, parallel to the spine. The ovary or testes may be visible immediately cranial and slight ventral to the cranial division of the kidney. The oviduct is generally not distinguishable from the intestinal tract, unless it contains an egg.

Radiographical abnormalities

a. Musculoskeletal system. Abnormalities seen include

i. Developmental abnormalities such as kyphosis, scoliosis and bowing of the long bones are often seen in juvenile birds on a poor diet, or whose parents were on a poor diet. Metabolic bone disease (usually nutritional secondary hyperparathyroidism) is characterised by these changes, as well as decreased cortical thickness and the presence of large numbers of internal struts in the metaphyseal regions of the long bones.

ii. Fractures and dislocations. These are commonly seen in older birds, malnourished birds, or those that have been subject to trauma. Care must be taken to ensure that subtle changes are not overlooked when obvious fractures or dislocations are seen. Coracoid fractures in particular, can be easily overlooked.

iii. Arthritis is common in older birds although septic arthritis can occur at any age. The amount of bony proliferation with degenerative joint disease in birds is less obvious radiographically than in mammals. Septic arthritis in birds often presents radiographically as an enlarged joint space and requires arthrocentesis to confirm.

iv. Osteomyelitis typically presents as osteolysis and periosteal reaction. It is distinguished from osteosarcoma by its diffuse nature, often affecting several adjacent bones.

v. Neoplastic changes in the bones usually appear lytic, although periosteal reactions and remodelling of the bone can be frequently seen. Osteosarcomas in bird do not appear to metastasise as quickly as they do in mammals.

vi. Polyostotic hyperostosis. Under the influence of oestrogen, calcium is laid down in the medulla of the long bones as a reservoir for egg formation. This gives the bones a patchy or solid radio-opaque appearance. This condition is also seen in oestrogen-secreting Sertoli cell tumours.

vii. Osteopaenia is seen as a reduced radio-opacity of the bones, often with a patchy appearance in the medullary cavity.

b. Cardiovascular system. Abnormalities seen include:

i. Cardiomegaly is occasionally seen, but it requires determination of the heart width: thoracic width ratio (see above) to distinguish absolute cardiomegaly from a relative cardiomegaly seen with microhepatica (see below).

ii. Pericardial effusions can be seen as a globoid cardiac silhouette, but ultrasound is needed to definitively visualise fluid in the pericardial sac.

iii. Atherosclerosis can be seen as increased radio-opacity of the great vessels, especially the aorta. In more advanced cases these vessels can demonstrate a patchy mineralised appearance.

c. Respiratory system. Abnormalities seen include:

i. Pneumonia and pulmonary contusions can result in a generalized decrease in the prominence of the parabronchi.

ii. Air saculitis has a spectrum of severity, and can present with variably radio-opaque lines highlighting thickened air sacs, through to near complete loss of coelomic detail.
iii. Tracheal foreign bodies can occasionally be visualised, although care must be taken not to confuse ingesta in the crop with a tracheal foreign body.

iv. Hyperinflation of the air sacs occurs with chronic respiratory disease and is seen as relatively over-inflated air sacs, extending down around the cloaca and caudal intestinal tract.

v. Subcutaneous emphysema occurs with air sac rupture associated with either trauma or chronic infection. Air can be seen under the skin anywhere on the body.

d. Digestive system. Abnormalities seen include:

i. Crop stasis. Although it is common to have a small amount of ingesta in the crop, large quantities of fluid and ingesta, distending the crop, are considered abnormal.

ii. Proventricular dilation. The proventriculus is usually empty and compact when examined radiographically, with a clearly defined isthmus where it enters the ventriculus. The presence of gas, ingesta or grit in the proventriculus is abnormal.

iii. Ventricular impaction. While it is common to see a small amount of radio-opaque material in the ventriculus, it should not be tightly compacted or extending cranially into the proventriculus or duodenum.

iv. Intestinal ileus. Large, gas-filled loops of intestine are suggestive of intestinal ileus.

v. Cloacal impaction. The cloaca should be visible as a soft tissue density dome-shaped termination of the rectum. Distension or the presence of radio-opaque material is abnormal.

vi. Coelomic effusion. Loss of detail in the coelom is suggestive of fluid. On a lateral view the ventral abdominal wall between the end of the sternum and the pubic bones should be slightly concave; a convex ventral wall is suggestive of coelomic distension due to effusion, organomegaly or excessive coelomic fat.

e. Liver. Abnormalities seen include:

i. Hepatomegaly. An enlarged liver extends laterally past the lines drawn between the shoulder and acetabulum. On a lateral view the space between the dorsal liver and the ventral proventriculus disappears, the proventriculus maybe pushed dorsally and the ventriculus caudally.

ii. Microhepatica. It is normal in some species e.g. macaws to see a liver that is much smaller in appearance than expected. This is usually not a clinical condition.

iii. Traumatic injuries. Blunt force trauma e.g. collisions with windows and cars can lead to rupture of the air sacs and air leaking out into the coelom. This is seen as a separation of the liver ventrally from the sternum, cranially from the liver, and caudally from the ventriculus.

f. Spleen. Splenomegaly is readily apparent on the lateral view and occasionally on the VD view. While it usually suggests an infectious process, splenomegaly can also be seen with leukaemic diseases such as lymphoma or lymphosarcoma.

g. Urogenital system. Abnormalities seen include:

i. Nephromegaly. The kidneys are normally surrounded by air and lie above a line through the ventral acetabular rim and parallel to the spine. Extension ventral to this line and loss of the surrounding air space is suggestive of nephromegaly.

ii. Renal mineralisation, seen as increased radio-opacity of the kidneys, is uncommon.

iii. Urolithiasis is rarely seen. Radio-opaque densities lying between the caudal division of the kidney and the cloaca are very suggestive of uroliths. Other findings include an atrophic ipsilateral kidney with a normal to hypertrophic contralateral kidney. In some cases a dilated ureter obstructed with one or more urate stones may be visible radiographically.

iv. Testicular neoplasia may present as increased mass-effect in the area of the cranial division of the kidney. It must be distinguished from enlargement associated with normal seasonal hormonal activity. The degree of this enlargement is somewhat species-specific e.g. in ducks there is a marked enlargement. If a Sertoli cell tumour is present, the resultant hyperoestrogenism may produce polyostotic hyperostosis.

v. Ovarian enlargement will also produce an increased mass-effect in the area of the cranial division of the kidney. Large cysts may cause a loss of coelomic detail and must be distinguished from a coelomic effusion by ultrasound.

vi. Egg binding is usually readily apparent as an egg in the caudal coelom. If it has been present for more than a few days the shell may become thickened and roughened in appearance. Soft-shelled eggs may be more difficult to visualise, requiring ultrasound to detect.

vii. Retained eggs present radiographically as either very thick-shelled eggs or collapsed radio-opaque shapes that are not readily recognisable as an egg.

Conclusion

Radiology is a useful diagnostic tool in avian medicine. Correct positioning of the patient and knowledge of the normal radiographical anatomy are essential elements in its use. The abnormalities described here are representative of the more common problems seen in avian practice, and there are many other abnormalities that can be seen.
Compassion Fatigue

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Meet Kelly. Kelly is an experienced Veterinary Nurse in a mixed animal practice. This week Kelly has worked approximately 50 hours. The week has included three emergencies (two subsequent patient deaths), running puppy school and managing the influx of sick pets. She has chosen to ignore the mild headache that has persisted all week as well as the knowledge that the rosters for next month are still not done. She had hoped to join a webinar in the week about practice marketing but work took her through to 7pm. Kelly is tired and so is the rest of her team. Between farm visits, the surgical schedule, supporting clients in the clinic and caring for patients, Kelly and the professionals around her are very vulnerable. Why? Because compassionate, empathetic people are vulnerable to compassion fatigue ....

Compassion fatigue can be described as the ‘cost of caring’. It is a physical and emotional exhaustion that can harden the most experienced veterinarians, Nurses, receptionists and allied practice members. It can be triggered by a singular traumatic event, such as a cruelty case, or by chronic generalised exposure to the stressors of veterinary life. Additional contributing factors can include a dramatic change or traumatic event in the practice, limited funding and equipment to do the job, unsupportive network in which to talk to, society’s attitudes towards animals and pet care and additional concerns at home with family and finances.

The physical symptoms of compassion fatigue can range from insomnia, backache (adrenal fatigue), chronic headaches, exhaustion and persistent ill-health. Stress, and the feeling of being ‘in demand’; creates a biological hyper-vigilance state leading to anxiety, intrusive thoughts and sleep disturbances. Mentally and behaviourally, those who experience compassion fatigue can display irritability and anger, poor concentration, impatience and dread of working with some clients. Long-term, veterinary professionals may display signs of hyper-sensitivity or alternatively, an emotional detachment from their work and those around them.

Left unchecked, compassion fatigue can poison personal relationships. Some Veterinary Nurses may experience disinterest in intimacy and have little tolerance for their partners and children. Compassion fatigue can erode practice teams and lead to self-neglect. Because we are so committed to helping our clients and getting the work done, we forget to take care of ourselves. We can forget to keep the balance. In a constant ‘fight-or-flight’ state, we disengage the higher functioning part of our brain and, overwhelming, we feel we have no control over our circumstances.

What is known is that compassion fatigue operates on a continuum throughout a professional career. At some point, Veterinary Nurses may be more immune to its affects, and at other times, beaten down.

But can compassion fatigue be treated, mitigated and transformed? Yes it can. Can it be prevented? Some say no. The important thing to remember is that compassion fatigue needs to be normalised. Compassionate Nurses are susceptible to compassion fatigue. There is nothing ‘wrong’ with those who experience it. However, each one of us will experience it in different ways and to different degrees. How we experience compassion fatigue, and for how long, can be in our control.
Personal Strategies for Veterinary Nurses

Whilst it may seem obvious, improved self-care practices are the cornerstone of mitigating compassion fatigue. Unfortunately, it is our compassion nature that often sees us putting our own needs last and feeling guilty if we take time for ourselves.

The first step is to be mindful. Do you ever stop, just for 30 seconds, and listen to what your mind and your body are telling you? Your body is often ringing the alarm bell while your mind is busy elsewhere. Each one of us has a set of behavioural, emotional and cognitive warning signs. What are your warning signs? Is it backache you are trying to ignore? Is it sudden irritability with the practice team? Or perhaps it’s insomnia as you lay awake reviewing all the patients of the day? Take note of your warning signs and share them with your team and your family. Establishing a “danger zone” and permission for others to support you is the first step in keeping compassion fatigue at bay.

We know that sleep/rest, healthy balanced diet, regular varied exercise and taking annual leave have been shown to work in protecting mental and physical health. Activities that replenish, rather than drain, are also important. These are things that are enjoyable, calm the mind and help keep the balance. For some people this is creative endeavours, sports, walking the dog or just having a beer with friends before heading home. All too often we can give up what we love because we can’t do it in the same way as we have previously done. A bit of creative thinking can go a long way to re-installing renewing activities.

A friend of mine recently said that working on Saturdays had taken away her weekly golfing day. She felt she had had to “give up her favourite thing”. After talking about it, I suggested she didn’t have to be ‘all or nothing’ about golf. Perhaps she could instead spend just an hour or two at the driving range on a week night to reclaim some time for herself. The important thing is to do something that makes you feel balanced …that is only for you.

Make a point to manage your ‘trauma inputs’ outside of work. We know we see enough trauma during the working day! Trauma inputs are the unhealthy images, stories, activities and relationships that we can absorb. Think about a typical day. Do you start it watching the news, listening to the radio or reading the paper or stories on the internet? Note how many disturbing images and stories you experience. Does this exposure continue after the working day too? Whilst I’m not suggesting you refrain from keeping current with world events, it is important to understand that we absorb large amounts of traumatic information in 24 hours. Think about how you spend your free time - is it contributing to, or hindering, your ability to self care? Finally, consider your transition from work to home. Do you find yourself irritable when you walk through the door? Are you immediately greeted by pets, children, bills or your partner and barely have a second to breathe? How you ‘transition’ mentally and physically from your workplace (even if your workplace is a vehicle!) can be important. Many Veterinary Nurses I know have established a ‘10 minute’ rule at home. They get 10 minutes worth of space to come in, shower, change and breathe. This creates a better state of mind to enjoy the kids jumping on them and to communicate with their partners.

Nursing Team Strategies

There are many simple strategies that can be employed within the veterinary practice to work through compassion fatigue. Simply fostering an open dialogue and acknowledging that compassion fatigue occurs can help normalise it.

Stop verbally ‘sliming’ each other in the workplace

Veterinary Nurses should implement open discussion during the ‘new employee’ induction phase. The probationary period is a crucial time to set the scene for new “baby Nurses” and demonstrate openness. Let them know that it’s normal to have bad days, it’s normal to be affected by certain cases and that it is normal to put your hand up and say ‘I’m not okay’. In rural practices, where the owner is often away, it is even more important to create support networks for all staff, encouraging regular breaks, using appropriate debriefing techniques and making regular check-in times.

Prioritise online learning and face-to-face networking opportunities. Ensure all Veterinary Nurses get adequate exposure to other Nurses to whom they can share their stories and seek support. Professional isolation is one of the key ingredients for developing compassion fatigue. The simple act of talking and normalising can make a huge difference to our abilities to cope.

Stop verbally ‘sliming’ each other in the workplace. Françoise Mathieu, a compassion fatigue specialist, describes ‘slimming’ as the action of traumatising our colleagues without their consent. We share gory stories, tell everyone about the aggressive client but we never stop to check our colleagues are okay to hear it. Informal
debriefing or low impact debriefing is an excellent way of gaining support but protecting our teams. Low impact debriefing involves first ‘fair warning’ and ‘consent’. You need to ensure the person is prepared to hear the information by saying "I need to talk to you about XYZ. It’s a pretty gory story. Is that okay and is this a good time?" Let the listener choose. Perhaps they too are

Don’t forget to celebrate the good stuff

having a bad day and don’t need another layer of trauma. If they do say ‘sure’ start with the least traumatic parts of the story first. Let them decide when they’ve heard enough.

And finally, don’t forget to celebrate the good stuff. In the day to day communications of the practice, we spend greater amounts of time focussing on what is not working, rather than what is. Make team meetings a balanced, and ultimately, more positive experience. Share positive client feedback, thank-you cards, successful patient outcomes and personal achievements. If one member of the team spends a lot of time on the road, take the time to call them and check on them. Don’t ask about the work, ask them how are they are. Having someone to talk to immediately lessens the burden of an issue. For Nurses, receptionists and allied staff, don’t assume the boss is bullet-proof just because they are “the boss”. Excellent online resources and support personnel are available to regional and rural professionals. Make use of industry associations, online counselling and other mental health resources.

In summary, compassion fatigue amplifies and diminishes based on our current life circumstances, our working conditions and the nature of the work we do. Remember that self-care strategies that have been shown to work are deceptively simple. The real test is whether we are prepared to make a commitment to change. How many times have we seen a runner glide past and thought “I really should get in shape” or had a great day with the kids and thought “We really should do this more often”. Thinking is not the same as acting. As an individual, and as a team, take a blank piece of paper and make a few points under the headings ‘Commitment to change I could make in the next week/month/year’. You’d be surprised, looking at the aspects of your personal and practice life, how many great ideas you can come up with to make small changes that can work. The real test is our commitment to change to ensure we all enjoy long and healthy Veterinary Nursing careers.

Mad Paws is a new Airbnb-style website aiming to put the purist of pet people in touch with animal owners needing accommodation for their pets.

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Have a PAWsome day!!
Ross River Virus Predictive Modelling in Victoria: bringing human, horse, mosquito & environmental data together

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Abstract
Ross River virus is a mosquito-borne virus endemic to Australia. Human infection causes arthritis, myalgia and rash lasting 3–6 months. Horses can also be clinically infected, their role in amplifying the virus is unclear. The disease has a complex epidemiology including vertical transmission in several species of mosquitoes and maintenance in wildlife reservoirs. In Victoria, a long-term average of 150 human cases are notified in non-epidemic years. In 2010/2011, an outbreak in humans coincided with reporting of equine cases across Victoria. Outbreak years coincide with climatic conditions conducive to mosquito population growth and thus increased transmission of disease. We developed two local prediction models for human RRV notifications in Victoria and analysed the spatiotemporal distribution of reported equine RRV cases.

Detailed multivariable modelling findings are presented and the implications explained. The results advance understanding of the drivers of Ross River virus activity in Southern Australia and inform estimation of the anticipated effects of climate and environmental change.

Background
Ross River virus (RRV) is the most common mosquito borne virus in Australia, with the largest burden occurring in the tropical north. In Victoria, most cases occur during summer and early autumn, so human notifiable disease RRV reporting typically refers to financial years rather than calendar years. Symptoms in humans include debilitating fatigue, muscle and joint pain that persist between 3–6 months, and up to a year in some cases, leading to significant morbidity and economic loss. However, 70–90% of cases are asymptomatic. Between 2005–10, a mean of 214 human cases were notified in Victoria per year, with the majority acquiring infection in the Murray Valley and coastal Gippsland.1 Outbreaks have occurred in 1992/1993, 1996/1997 and more recently in 2010/2011 when 1312 cases were notified in that 12 month period (23.3 per 100,000 people).2

The epidemiology of RRV is complex because the disease is maintained in wildlife reservoirs and transmitted to humans by mosquitoes, with human-mosquito-human transmission potentially occurring during outbreaks.3 The virus has been isolated from over 40 different mosquito species however only a small number are thought to be competent vectors, and those important vary by location and season.4 The major reservoir species also vary by ecological niche, and are thought to be macropods, but other marsupials, rodents and flying foxes may also be involved, particularly in urban areas. Horses can also be clinically infected, their role in amplifying the virus is unclear.

Due to the climatic dependence of wildlife and mosquito populations prediction models using climate and/or entomological variables to predict RRV disease may be helpful for informing disease control activities and forecasting the impact of climate change. Models incorporating entomological variables and tailored to conditions at the local level have tended to have better predictive capacity.5 Previous models have modelled entomologic and climatic data separately for Victoria, and have not attempted to predict monthly incident rates of disease.

In 2010/2011 an outbreak of several arboviral diseases in humans and horses across Victoria followed heavy rainfall and extensive flooding across south and eastern Australia, with subsequent increases in mosquito and wild bird populations.6 Notified human arbovirus cases in 2011 were increased 2.5-fold on 2010 numbers, mainly due to RRV. Murray Valley encephalitis (MVE) infection rates were higher in 2010/11 compared with previous years, with 16 cases confirmed (including 2 deaths). No cases of MVE were notified in Victoria in 2010/2011, however a 69-year old man from Mildura in the Murray Valley presented to hospital in March 2011 with symptoms clinically consistent with MVE, diagnostic testing was unable to confirm the clinical
Nearly 1000 clinical equine cases were reported across Australia, with 473 from Victoria of which 39 horses died. The majority of affected horses showed signs consistent with encephalitis and other neurological signs (including ataxia, depression, muscle fasciculations, hypermetria and hyperaesthesia). RRV, MVE virus and West Nile virus (Kunjin strain) were all isolated from equine cases in Victoria by the Victorian government Department of Environment and Primary Industries (DEPI) veterinary diagnostic laboratory. Five times the number of RRV equine serological submissions were received by the DEPI laboratory in 2010/11 compared with the year before of which 50% were of samples were positive. Previously, there have been few reports of these viruses being associated with disease in horses in Australia.

Through the Victorian Arbovirus Disease Control Program (VADCP), local councils across Victoria implement surveillance and control strategies on vector mosquito populations during the peak season of November and April each year when most human arbovirus notifications are received. This program has been providing standardised mosquito monitoring and sentinel chicken surveillance since 1991 in a true One Health model of collaboration. DEPI manages the VADCP and provides virological and entomological support, funded equally by the Victorian Department of Health (DH) and the local councils involved, and overseen by a multidisciplinary Task Force.

Before each season of arboviral activity, the VADCP analyses three broad environmental predictors for MVEV activity based on the occurrence of certain climatic events in order for environmental conditions to be considered suitable for MVEV activity in South-Eastern Australia. These consider rainfall in the catchment basins of the four main river systems in Eastern Australia, and proxy measures for the Southern Oscillation Index (SOI) and La Niña evens. No predictions are routinely made for increased RRV, with public health interventions being informed by routine notifiable disease surveillance.

The aim of this analysis was to develop predictive models for monthly incidence rates of human notified RRV cases in a Victorian inland and coastal location and to undertake spatiotemporal analyses of reported equine RRV cases during the 2010/2011 outbreak year.

Methods
Human RRV case notification, mosquito surveillance and climatic data for the period Jan 2000–June 2012 were provided by the DH, DEPI and Bureau of Meteorology. Data from 2000/2001 to 2010/2011 were used to train prediction regression models for monthly human RRV incidence rates, for two local government areas (Mildura LGA in the Murray Valley and Wellington LGA on the Gippsland coast). These models were then used to predict notified human RRV cases in 2011/2012.

Climatic variables were selected following a review of previous predictive models. Mosquito trapping data on six mosquito species were considered including two thought to play a major role in Victoria in RRV transmission (Aedes camptorhynchus and Culex annulorostris) one in amplification in wildlife reservoirs (Cx. Australicus) and three further species with possible roles in transmission (C. notoscriptus, Coquillettidia linealis, Cx. globicoxitus). Climate and entomologic variables were lagged by 1–12 months and the most predictive lag for each variable selected using univariable regression models (negative binomial for Mildura LGA and logistic regression for Wellington LGA, based on model fit to the data). Lagged predictive variables were entered into multivariable models if they were crudely associated with RRV case count at a liberal P-value threshold (P<0.15). Multivariable models were then trimmed for parsimony using manual backwards-stepwise regression to P<0.20, tested for goodness of fit and serial auto-correlation. The final predictive models were validated for accuracy of prediction internally with a rotational method3 based on the training dataset then externally against data from the 2011/2012 financial year (not used in their development).

Epidemiological and laboratory testing data provided by DEPI on reported equine cases of Ross River virus and other arboviruses in 2011 were analysed temporally using epidemic curves and compared to human RRV notifications, and spatially with maps of incidence by fortnight of estimated date of onset.

Results
Modelling of human Ross River virus cases:
In Mildura LGA, monthly case counts were associated with counts of two species of mosquito (Ae. camptorhynchus and Cx. annulorostris) and several lagged climatic variables (mean monthly minimum temperature, days of rainfall and the southern oscillation index). The prediction model for case counts in Mildura LGA was highly accurate predicting 26.5 cases (95% CI: 15.5, 37.6), when 27 were reported, and correctly predicting the 2 months in which months reports exceeded the outbreak threshold.
Wellington LGA had a relatively low case count and poor fit with count-based models. After applying logistic regression, the probability of ≥1 case being reported in each month was found to be associated with counts of two species of mosquito (Cx. Australicus and Ae. camptorhynchus) and several lagged climatic variables (rainfall, saturated vapour pressure, the southern oscillation index, sea surface temperature and level). The model was 75% accurate at predicting months with any cases in for Wellington LGA in 2011/2012.

Spatiotemporal analysis of equine Ross River virus cases: Data was obtained on 280 premises that reported horses with clinically compatible illness between 1 January and 30 June 2011. Of these, horses on 111 premises had laboratory testing undertaken (PCR assay, ELISA, virus isolation or viral neutralisation test) to pursue a diagnosis. Horses on 63 premises (56.8%) were confirmed to have been infected with Ross River virus, 26 premises (23.4%) with West Nile virus (Kunjin strain) and eleven (9.9%) with MVE virus. The estimated date of onset of the first laboratory confirmed equine case of RRV on 10 February 2011 was more than 2 weeks after the outbreak had been detected in human RRV notifiable disease surveillance data. Laboratory confirmed equine cases of RRV, MVE and West Nile virus (Kunjin strain) were highly correlated in time and space, clustering first in the Northwest and central regions of the State in mid February, then by late March and early April into peri-urban regions around Melbourne.

Discussion and Conclusions

The findings of this analysis support ongoing vector monitoring and control in the two local government areas studied and the positioning of the traps. They also provide potential ‘triggers’ for interventions to prevent RRV infection in humans such as spraying and public health messaging, based on counts of specific mosquitoes in each region (Ae. camptorhynchus and Cx. annulorostis in Mildura, Ae. camptorhynchus and Cx. Australicus in Wellington). The importance of Ae. camptorhynchus in Mildura is of particular interest because normally this RRV vector is present in low counts, but increases to >30% in some years. In such years of high Ae. camptorhynchus abundance we need to be aware of the increased risk of Ross River virus.

As clinical and laboratory confirmed equine cases closely followed the trends in human notifications during the 2011 outbreak year, equine practitioners may find Department of Health human notifiable disease surveillance reporting informative as it may provide early warning of increased risk in horses of RRV and other arbovirus infections.

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Abstracts of interest

Development of a Behaviour-Based Measurement Tool with Defined Intervention Level for Assessing Acute Pain in Cats
Calvo, G., Holden, E., Reid, J., Scott, E.M., Firth, A., Bell, A., Robertson, S. and Nolan, A.M.

OBJECTIVES: To develop a composite measure pain scale tool to assess acute pain in cats and derive an intervention score.

METHODS: To develop the prototype composite measure pain scale-feline, words describing painful cats were collected, grouped into behavioural categories and ranked. To assess prototype validity two observers independently assigned composite measure pain scale-feline and numerical rating scale scores to 25 hospitalised cats before and after analgesic treatment. Following interim analysis the prototype was revised (revised composite measure pain scale-feline). To determine intervention score, two observers independently assigned revised composite measure pain scale-feline and numerical rating scale scores to 116 cats. A further observer, a veterinarian, stated whether analgesia was necessary.

RESULTS: Mean ± sd decrease in revised composite measure pain scale-feline and numerical rating scale scores following analgesia were 2.4 ± 2.87 and 1.9 ± 2.34, respectively (95% confidence interval for mean change in revised composite measure pain scale-feline between 1.21 and 3.6). Changes in revised composite measure pain scale-feline and numerical rating scale were significantly correlated (r = 0.8) (P < 0.001). Intervention level score of ≥4/16 was derived for revised composite measure pain scale-feline (26.7% misclassification) and ≥3/10 for numerical rating scale (14.5% misclassification).

CLINICAL SIGNIFICANCE: A valid instrument with a recommended analgesic intervention level has been developed to assess acute clinical pain in cats that should be readily applicable in practice.

Treatment in Canine Epilepsy - a Systematic Review
Charalambous, M., Brodbelt, D. and Volk, H.A.
BMC Veterinary Research, 10:1-32 (2014)

Various antiepileptic drugs (AEDs) are used for the management of canine idiopathic epilepsy (IE). Information on their clinical efficacy remains limited. A systematic review was designed to evaluate existing evidence for the effectiveness of AEDs for presumptive canine IE. Electronic searches of PubMed and CAB Direct were carried out without date or language restrictions. Conference proceedings were also searched. Peer-reviewed full-length studies describing objectively the efficacy of AEDs in dogs with IE were included. Studies were allocated in two groups, i.e. blinded randomized clinical trials (bRCTs), non-blinded randomized clinical trials (nbRCTs) and non-randomized clinical trials (NRCTs) (group A) and uncontrolled clinical trials (UCTs) and case series (group B). Individual studies were evaluated based on the quality of evidence (study design, study group sizes, subject enrolment quality and overall risk of bias) and the outcome measures reported (in particular the proportion of dogs with ≥50% reduction in seizure frequency). Twenty-six studies, including two conference proceedings, reporting clinical outcomes of AEDs used for management of IE were identified. Heterogeneity of study designs and outcome measures made meta-analysis inappropriate. Only four bRCTs were identified in group A and were considered to offer higher quality of evidence among the studies. A good level of evidence supported the efficacy of oral phenobarbital and imepitoin and fair level of evidence supported the efficacy of oral potassium bromide and levetiracetam. For the remaining AEDs, favorable results were reported regarding their efficacy, but there was insufficient evidence to support their use due to lack of bRCTs. Conclusions Oral phenobarbital and imepitoin in particular, as well as potassium bromide and levetiracetam are likely to be effective for the treatment of IE. However, variations in baseline characteristics of the dogs involved, significant differences between study designs and several potential sources of bias preclude definitive recommendations. There is a need for greater numbers of adequately sized bRCTs evaluating the efficacy of AEDs for IE.

Comparison of Primary Vaccination Regimes for Equine Influenza: Working Towards an Evidence-Based Regime
Cullinane, A., Gildea, S. and Weldon, E.

Vaccination is crucial to the control of equine influenza (EI). The study was conducted in an effort to lay the groundwork for achieving international harmonisation of regulatory requirements based on scientific evidence of performance of different vaccination regimes. The objectives of this study were: to evaluate the...
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effectiveness of 3 different primary vaccination regimes: vaccination with the minimal intervals permitted by the racing authorities; vaccination in accordance with the manufacturer’s instructions and vaccination with the longest intervals permitted by the racing authorities. The 55 seronegative unvaccinated horses in this study were subdivided by age and randomly allocated one of the 3 vaccination regimes. All groups were sampled each time a group was vaccinated and 3–5 weeks post vaccination. Horses were vaccinated with a subunit immune stimulating complex-based vaccine (Equip FT). Antibodies against EI were measured by single radial haemolysis. Lengthening the vaccination intervals increased the immunity gaps between first (V1) and second (V2) doses, and V2 and third dose (V3) but did not inhibit the response to V2 and V3. The response to V2 and V3 was similar irrespective of the regime. Poor responders to V1 were identified in all age groups included in this study but the greatest number of poor responders was among the yearlings. The 2- and 3-year-old horses responded better to vaccination than the weanlings or yearlings. Longer vaccination intervals permitted by racing authorities increase the periods of susceptibility to EI but they may facilitate strategic vaccination prior to times of increased risk of exposure to virus. The study provides the type of evidence-based data necessary to commence meaningful discussion of international harmonisation of EI vaccination requirements.

Spread and Impact of the Schmallenberg Virus Epidemic in France in 2012-2013


BMC Veterinary Research, 10:1-23 (2014)

The Schmallenberg virus (SBV) emerged in Europe in 2011 and caused a widespread epidemic in ruminants. In France, SBV emergence was monitored through a national multi-stakeholder surveillance and investigation system. Based on the monitoring data collected from January 2012 to August 2013, we describe the spread of SBV in France during two seasons of dissemination (vector seasons 2011 and 2012) and we provide a large-scale assessment of the impact of this new disease in ruminants. Results SBV impact in infected herds was primarily due to the birth of stillborns or deformed foetuses and neonates. Congenital SBV morbidity level was on average moderate, although higher in sheep than in other ruminant species. On average, 8% of lambs, 3% of calves and 2% of kids born in SBV-infected herds showed typical congenital SBV deformities. In addition, in infected herds, farmers reported retrospectively a lower prolixity during the vector season, suggesting a potential impact of acute SBV infection during mating and early stages of gestation. Conclusions Due to the lack of available control and prevention measures, SBV spread quickly in the naive ruminant population. France continues to monitor for SBV, and updated information is made available online on a regular basis [http://www.plateforme-esa.fr/%5D. Outbreaks of congenital SBV are expected to occur sporadically from now on, but further epidemics may also occur if immunity at population level declines.

The Interrelationship of Lameness, Saddle Slip and Back Shape in the General Sports Horse Population

Greve, L. and Dyson, S.J.


Saddle slip is usually blamed on saddle fit, crooked riders or horse shape, but may reflect hindlimb lameness. There are no studies of the frequency of occurrence of saddle slip and risk factors within a tested sample population of the general sports horse population. The objective of this study was to quantify the frequency of saddle slip and to describe the association with lameness, thoracolumbar shape/symmetry, crooked riders and ill-fitting saddles. Five hundred and six sports horses in normal work were assessed prospectively. Thoracolumbar shape/symmetry were measured at predetermined sites; the presence of lameness (in hand and/or ridden) and saddle slip was recorded. Descriptive statistics, univariable and multiple logistic regression were performed to assess the relationship between horse–saddle–rider factors and saddle slip. The frequency of lameness, quadrilaterally reduced cranial phase of the stride or stiff, stilted canter was 45.7%, saddle slip 12.3%, left–right thoracolumbar shape asymmetries ≥ coefficient of variance of 8% (1.2 cm) 0.6%; and 103 of 276 riders (37.3%) sat crookedly. The saddle consistently slipped to one side in 24.4% of horses with hindlimb lameness alone, 45.5% of horses with concurrent hindlimb and forelimb lameness, compared with 5.4% with forelimb lameness, 17.4% with stiff, stilted canter, 20% with quadrilaterally reduced cranial phase of stride and 5.5% nonlame horses. Nineteen horses (30.6%) with saddle slip had no detectable hindlimb lameness; however, 14 had a gait abnormality, particularly in canter. Multivariable analysis revealed that saddle slip was significantly associated with hindlimb lameness and gait abnormalities (odds ratio [OR] = 52.62, 95% confidence interval [CI] 17.3–159.7), a saddle fitted with even contact and uniform flocking (OR = 15.49, 95% CI 1.9–125.5), riders sitting crookedly (OR = 6.32, 95% CI 2.9–13.7), a well-balanced saddle (OR = 3.05, 95% CI 1.4–6.9) and large back shape ratio at
T18 (OR = 1.2, 95% 1.1–1.3). Many horses with hindlimb and/or forelimb lameness go unrecognised. Saddle slip may be a sign of hindlimb lameness. Education of the equestrian population to identify lameness and saddle slip is required. The Summary is available in Chinese – see Supporting information.

Colour Measurement of Colostrum for Estimation of Colostral IgG and Colostrum Composition in Dairy Cows
Gross, J.J., Kessler, E.C. and Bruckmaier, R.M.

Instruments for on-farm determination of colostrum quality such as refractometers and densimeters are increasingly used in dairy farms. The colour of colostrum is also supposed to reflect its quality. A paler or mature milk-like colour is associated with a lower colostrum value in terms of its general composition compared with a more yellowish and darker colour. The objective of this study was to investigate the relationships between colour measurement of colostrum using the CIELAB colour space (CIE L*=from white to black, a*=from red to green, b*=from yellow to blue, chroma value G=visual perceivedcolourfulness) and its composition. Dairy cow colostrum samples (n=117) obtained at 4•7±1•5 h after parturition were analysed for immunoglobulin G (IgG) by ELISA and for fat, protein and lactose by infrared spectroscopy. For colour measurements, a calibrated spectrophotometer was used. At a cut-off value of 50 mg IgG/ml, colour measurement had a sensitivity of 50•0%, a specificity of 49•5%, and a negative predictive value of 87•9%. Colostral IgG concentration was not correlated with the chroma value G, but with relative lightness L*. While milk fat content showed a relationship to the parameters L*, a*, b* and G from the colour measurement, milk protein content was not correlated with a*, but with L*, b*, and G. Lactose concentration in colostrum showed only a relationship with b* and G. In conclusion, parameters of the colour measurement showed clear relationships to colostral IgG, fat, protein and lactose concentration in dairy cows. Implementation of colour measuring devices in automatic milking systems and milking parlours might be a potential instrument to access colostrum quality as well as detecting abnormal milk.

Linear Versus Non-Linear Gastrointestinal Foreign Bodies in 499 Dogs: Clinical Presentation, Management and Short-Term Outcome
Hobday, M.M., Pachtinger, G.E., Drobatz, K.J. and Syring, R.S.

OBJECTIVES: To compare clinical signs, clinicopathological abnormalities, imaging findings and outcome of dogs with linear and non-linear foreign bodies in the gastrointestinal tract.
METHODS: Retrospective review of case records of dogs with a confirmed diagnosis of gastrointestinal foreign body. Signalment, history, clinical signs, clinicopathological data, diagnostic imaging studies, surgical and endoscopic procedures, hospital stay, costs and outcome were compared between groups.
RESULTS: A total of 176 dogs had linear and 323 had non-linear foreign bodies. Dogs with a linear foreign body were more likely to have a history of vomiting, anorexia, lethargy and pain on abdominal palpation. They were also more likely to have the foreign body anchored in the stomach and continuing into the small intestine, experience intestinal necrosis, perforation and peritonitis, and require intestinal resection and anastomosis. The duration of hospitalisation was longer for dogs with linear foreign body (3 versus 2 days), and the cost of treatment was 10% higher. However, in both groups, 96% of dogs survived to hospital discharge.
CLINICAL SIGNIFICANCE: Dogs with a linear foreign body had more severe clinical signs and gastrointestinal pathology, and an increased duration of hospitalisation and cost of care. However, overall survival rates were not different in dogs with linear and non-linear foreign bodies.

Evaluation of Facial Expression in Acute Pain in Cats
Holden, E., Calvo, G., Collins, M., Bell, A., Reid, J., Scott, E.M. and Nolan, A.M.

OBJECTIVES: To describe the development of a facial expression tool differentiating pain-free cats from those in acute pain.
METHODS: Observers shown facial images from painful and pain-free cats were asked to identify if they were in pain or not. From facial images, anatomical landmarks were identified and distances between these were mapped. Selected distances underwent statistical analysis to identify features discriminating pain-free and painful
Comparison of Magnetic Resonance Imaging with Standing Cervical Radiographs for Evaluation of Vertebral Canal Stenosis in Equine Cervical Stenotic Myelopathy

Janes, J.G., Garrett, K.S., McQuerry, K.J., Pease, A.P., Williams, N.M., Reed, S.M. and MacLeod, J.N.

The sensitivity and specificity of lateral cervical radiographs to evaluate horses suspected of cervical stenotic myelopathy (CSM) are limited by the assessment being restricted to the sagittal plane. The objective of this study was to determine whether magnetic resonance imaging (MRI) allows for a more accurate identification of stenosis than lateral cervical radiographs in horses with CSM. Nineteen Thoroughbred horses with CSM (17 males, 2 females, age 6–50 months) were compared to 9 control Thoroughbreds (6 males, 3 females, age 9–67 months). Ante mortem, the subjects had neurological examinations and standing cervical radiographs with sagittal ratios calculated from C3 to C7. Intact cervical column MRI scans and histological examinations of the spinal cord were performed post mortem. Morphometric parameters were measured on the vertebral canal, spinal cord and intervertebral foramen. Radiographic cervical canal height measurements categorised by standard minimal sagittal diameter intravertebral and intervertebral ratios produced several false positive and false negative determinations of canal stenosis as defined by spinal cord histopathology. Post mortem MRI measurements of canal area and cord canal area ratio more accurately predicted sites of cord compression in CSM cases. No differences in spinal cord measurements were observed when comparing CSM to control horses, but each of the vertebral canal parameters achieved significance at multiple sites. Vertebral canal area and cord canal area ratio are better parameters to predict the location of cervical canal stenosis compared to only the sagittal plane of canal height. Additional visual planes and measurements obtained by MRI, specifically vertebral canal area and the cord canal area ratio, will provide a more accurate method to identify regions of canal stenosis than lateral cervical radiographs. The development of MRI or computed tomography equipment capable of evaluating the cervical column of mature horses may substantially enhance evaluation of CSM patients.

Murmur Intensity in Small-Breed Dogs with Myxomatous Mitral Valve Disease Reflects Disease Severity

Ljungvall, I., Rishniw, M., Porciello, F., Ferasin, L. and Ohad, D.G.

OBJECTIVES: To determine whether murmur intensity in small-breed dogs with myxomatous mitral valve disease reflects clinical and echocardiographic disease severity.

METHODS: Retrospective multi-investigator study. Records of adult dogs under 20 kg with myxomatous mitral valve disease were examined. Murmur intensity and location were recorded and compared with echocardiographic variables and functional disease status. Murmur intensities in consecutive categories were compared for prevalences of congestive heart failure, pulmonary hypertension and cardiac remodelling.

RESULTS: 578 dogs [107 with “soft” (30 Grade I/VI and 77 II/VI), 161 with “moderate” (Grade III/VI), 160 with “loud” (Grade IV/VI) and 150 with “thrilling” (Grade V/VI or VI/VI) murmurs] were studied. No dogs with soft murmurs had congestive heart failure, and 90% had no remodelling. However, 56% of dogs with “moderate”, 29% of dogs with “loud” and 8% of dogs with “thrilling” murmurs and subclinical myxomatous mitral valve disease also had no remodelling. Probability of a dog having congestive heart failure or pulmonary hypertension increased with increasing murmur intensity.

CLINICAL SIGNIFICANCE: A 4-level murmur grading scheme separated clinically meaningful outcomes in small-breed dogs with myxomatous mitral valve disease. Soft murmurs in small-breed dogs are strongly indicative of subclinical heart disease. Thrilling murmurs are associated with more severe disease. Other murmurs are less informative on an individual basis.
Factors Associated with Survival to Hospital Discharge Following Endoscopic Treatment for Synovial Sepsis in 214 Horses


REASONS FOR PERFORMING STUDY: To determine risk factors involved in survival to hospital discharge of cases of synovial sepsis.

OBJECTIVES: Investigate pre-, intra- and post operative factors involved in short-term survival of horses undergoing endoscopic treatment for synovial sepsis.

STUDY DESIGN: Retrospective case series.

METHODS: Clinical data were obtained for horses (>6 months old) undergoing endoscopic surgery as part of management for synovial sepsis over a 7-year period in a single hospital population. Descriptive data were generated for pre-, intra- and post operative variables. Multivariable logistic regression analysis was used to develop 3 models related to presurgical, surgical and post surgical stages of management with outcome defined as survival to hospital discharge.

RESULTS: Two hundred and fourteen horses were included. In Model 1 (preoperative variables), increased preoperative synovial fluid total protein (TP) was associated with nonsurvival (OR 0.88, 95% CI 0.83 – 0.94, P < 0.001) whereas the presence of a wound on admission was associated with survival (OR 4.75, 95% CI 1.21 – 18.65, P = 0.02). Model 2 (intraoperative variables) revealed that factors associated with decreased survival were anaesthetic induction outside of normal working hours (OR 0.36, 95% CI 0.15 – 0.88 P = 0.02) and presence of moderate/severe synovial inflammation at surgery (OR 0.28, 95% CI 0.12 – 0.67, P = 0.004). Model 3 (post operative variables) showed that increased post operative synovial fluid TP (OR 0.94, 95% CI 0.90 – 0.98, P = 0.013) and undertaking more than one endoscopic surgery for treatment (OR 0.19, 95% CI 0.05 – 0.70, P = 0.005) were associated with nonsurvival. Cut-off values for predicting survival were 55 – 60 g/l for preoperative and 50 – 55 g/l for post operative TP measurements.

CONCLUSIONS: This study has identified factors associated with altered likelihood of survival to hospital discharge following endoscopic surgery for synovial sepsis. Prognosis for survival to hospital discharge can be based on evidence from this study at the key stages of management of horses with synovial sepsis.

The Use of Rigid Endoscopy in the Management of Acute Oropharyngeal Stick Injuries

Robinson, W., Shales, C. and White, R.N.


OBJECTIVE: To evaluate the use of rigid endoscopy in the management of oropharyngeal stick injuries.

METHODS: Retrospective analysis of case records between 2011 and 2013 from a large referral hospital. Data regarding signalment, clinical presentation, treatment options and final outcomes were recorded.

RESULTS: Nine dogs were identified with acute oropharyngeal stick injuries. There were seven males and two females and the dogs were of various breeds, ages (1 - 5 to 9 years) and weights (11 - 9 to 38 - 4 kg). The time from injury to referral was between 1 and 3 days (median: 2 days). All dogs were anaesthetised and the tracts explored using a 30° forward-oblique, 2 - 7-mm-diameter, 18-cm-length rigid endoscope with corresponding 14 - 5 Fr sheath. The endoscopy was performed under saline irrigation. Foreign material (>1 mm in size) was removed using grasping forceps fed through the sheath. Subsequently, the tracts were re-inspected and flushed with further saline to confirm that all foreign material had been removed. All dogs recovered uneventfully and had excellent outcomes with no cases representing with chronic manifestations of oropharyngeal stick injuries.

CLINICAL SIGNIFICANCE: Rigid endoscopy is an effective method for the diagnosis, assessment and, in certain cases, treatment of acute oropharyngeal stick injuries in dogs.

Comparison of Peribulbar and Retrobulbar Regional Anesthesia with Bupivacaine in Cats


American Journal of Veterinary Research, 75:1029-1039 (2014)

OBJECTIVE: To compare effectiveness and complications associated with peribulbar and retrobulbar anesthesia with bupivacaine in cats.

ANIMALS: 6 healthy adult cats.

PROCEDURES: Cats were sedated with dexmedetomidine and received a peribulbar injection of 0.5% bupivacaine (1.5 mL), iopamidol (0.5 mL), and saline (0.9% NaCl) solution (1 mL) or retrobulbar injection of 0.5% bupivacaine (0.75 mL) and iopamidol (0.25 mL) in a crossover study with ≥ 2 weeks between treatments. The contralateral eye was the control. Injectate distribution was evaluated with CT. After atipamezole administration, periocular and corneal sensations, intraocular pressure (IOP), and ocular reflexes and appearance were evaluated for 24 hours.
RESULTS: All peribulbar and 3 of 6 retrobulbar injections resulted in CT evidence of intraconal injectate. Corneal sensation and periocular skin sensation were absent or significantly reduced relative to that for control eyes for 3 hours after peribulbar injection. Mean ± SD IOP immediately after injection was significantly higher for eyes with peribulbar injections (33 ± 12 mm Hg) than for control eyes or eyes with retrobulbar injections (both 14 ± 4 mm Hg) but 10 minutes later decreased to 18 ± 3 mm Hg. Exophthalmos, chemosis, and ptosis were evident in most injected eyes, and irritation was evident in 3 of 6 peribulbar-injected and 1 of 6 retrobulbar-injected eyes. All conditions resolved within 14 hours.

CONCLUSIONS AND CLINICAL RELEVANCE: Peribulbar injection resulted in intraconal deposition of bupivicaine in a higher percentage of cats than did retrobulbar injection and induced notable anesthesia relative to that for the control eye; however, IOP increased temporarily.

Computed Tomographic Findings in 44 Dogs and 10 Cats with Grass Seed Foreign Bodies
Vansteenkiste, D.P., Lee, K.C.L. and Lamb, C.R.

OBJECTIVE: To supplement recent reports of computed tomographic (CT) findings in dogs and cats with grass seed foreign bodies.

METHODS: Retrospective review of cases that had CT scan and subsequent retrieval of a grass seed during the same period of hospitalisation from a site included in the scan.

RESULTS: Records of 44 dogs and 10 cats were reviewed. Most were presented in the months July to December. Median duration of clinical signs was 4 weeks (range 2 days to 2 years). The most frequent clinical signs were soft tissue swelling (30% cases), coughing (28%), sneezing (28%) and discharge (26%). Grass seeds were retrieved from the thorax (35% cases), nasal cavity (31%), ear (7%), other sites in the head and neck (22%), sublumbar muscles (2%) and pelvic limb (2%). The grass seed was visible in CT images in 10 (19%) cases. Secondary lesions were visible in CT images of 52 (96%) cases, including collection of exudate (37%), abscess (24%), enlarged lymph nodes (22%) and pulmonary consolidation (20%). CT images appeared normal in 4% animals.

CLINICAL SIGNIFICANCE: Grass seeds within the respiratory tract are frequently visible in CT images, but in general CT appears to be more useful for localisation of secondary lesions than as a method of definite diagnosis.

Effectiveness of a Steam Cleaning Unit for Disinfection in a Veterinary Hospital
American Journal of Veterinary Research, 75:1083-1088 (2014)

OBJECTIVE: To evaluate whether the application of steam to a variety of surface types in a veterinary hospital would effectively reduce the number of bacteria. Sample 5 surface types.

PROCEDURES: Steam was applied as a surface treatment for disinfection to 18 test sites of 5 surface types in a veterinary hospital. A pretreatment sample was obtained by collection of a swab specimen from the left side of each defined test surface. Steam disinfection was performed on the right side of each test surface, and a posttreatment sample was then collected in the same manner from the treated (right) side of each test surface. Total bacteria for pretreatment and posttreatment samples were quantified by heterotrophic plate counts and for Staphylococcus aureus, Pseudomonas spp, and total coliforms by counts on selective media.

RESULTS: Significant reductions were observed in heterotrophic plate counts after steam application to dog runs and dog kennel floors. A significant reduction in counts of Pseudomonas spp was observed after steam application to tub sinks. Bacterial counts were reduced, but not significantly, on most other test surfaces that had adequate pretreatment counts for quantification.

CONCLUSIONS AND CLINICAL RELEVANCE: Development of health-care associated infections is of increasing concern in human and veterinary medicine. The application of steam significantly reduced bacterial numbers on a variety of surfaces within a veterinary facility. Steam disinfection may prove to be an alternative or adjunct to chemical disinfection within veterinary practices.
Let Vet Students do research and your lunch will never taste the same

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Abstract
Pathogens such as Salmonella spp., Campylobacter spp., Listeria monocytogenes and Escherichia coli are responsible for up to 5.4 million cases of foodborne infection in Australia each year. "Ready-to-eat" deli meats are highly susceptible to cross-contamination with these pathogens and, additionally, favour pathogen growth.

The present study was designed by DVM students as part of their final year Veterinary Public Health rotation and was aimed at quantifying the microbial flora of 174 samples of various, "ready-to-eat" deli meats, purchased from supermarket delicatessens in the greater-Adelaide area. A combination of Oxoid culture media and 3M® Petrifilm were used to grow the potential pathogens. Individual microorganism levels were then compared with levels in the FSANZ Guidelines for the microbiological examination of "ready-to-eat foods".

No recognised pathogens were confirmed from the 174 samples of ready-to-eat, deli-sliced meats tested in this study. However, the total bacterial counts for 134 (77%) of the samples exceeded the level for "satisfactory" classification, as defined by the FSANZ guidelines.

The results of this study concluded that hygienic food handling and HACCP protocols were not being practiced at some greater-Adelaide area supermarket delicatessens.

Introduction
Cases of foodborne illness in Australia total up to 5.4 million each year, including over 15,000 hospitalisations and 120 deaths.1,2 Pathogens such as Salmonella spp., Campylobacter spp., Listeria monocytogenes and Escherichia coli are commonly responsible for foodborne gastroenteritis as well as other potentially more debilitating sequelae, including reactive arthritis, irritable bowel syndrome and even death.1 Although regulatory agencies, published legislation and guidelines to help reduce foodborne illnesses have existed for some time, reported cases continue to escalate annually both worldwide and in Australia demonstrating a considerable cause for concern.1,2

The microbial flora of food, including pathogens, may prove a significant challenge to food producers worldwide.1 For an industry generating over $29 billion a year, surveillance and testing surrounding foodborne pathogens prove just as important as that of individual consumers' health.1 Of particular concern and identified as 'high risk', Level 1 foods 3 are ready-to-eat deli meats which are consumed by 20-50% of the Australian population every day.4 The FSANZ Food Standards Code defines ready-to-eat deli meat as meat products (including poultry) intended to be consumed without further cooking or heating.5 These meats have the ability to act as a superb growth media for the aforementioned pathogenic microorganisms, which aside from causing major public health concerns also generate associated economic losses due to product recalls, food spoilage, legal enquiries, doctors' visits, medical bills and lost work days.1,2,5

The survival of microorganisms and foodborne pathogens such as those found in ready-to-eat deli meats, is affected by a variety of different factors including intrinsic (within the food), extrinsic (outside food and in the surrounding environment) and processing factors.5 1Intrinsic factors include the nutrients found in the food, the pH, redox potential and water activity of the food; extrinsic factors include the relative humidity, temperature and gaseous atmosphere around the food; and processing factors include slicing, washing, packing, irradiation and pasteurisation.6 Ready-to-eat deli meats, by definition, are cooked before purchase, meaning that the presence of pathogenic microorganisms often reflect processing factors. These factors include poor food hygiene and handling techniques such as multi-use slicers and multi-use gloves, poor storage, and cross-contamination during purchase at the delicatessen.4,7,8 However, these meats can still be cross-contaminated during initial
processing and certainly may not have been cooked, stored or transported appropriately. Given the exacting implementation of legislation, guidelines, quality control, HACCP and auditing within the food processing areas (pre-processing and processing) however, environments such as delicatessens are more than often responsible.4, 8

Ready-to-eat deli meats may therefore be more prone to cross-contamination, simply because they are increasingly handled between processor and consumer and because of the way in which they are handled and/or stored. The pathogens present on these meats are also more likely to survive and proliferate because of suitable intrinsic and extrinsic factors that the foods themselves possess.6 In general, foodborne illness-causing pathogens often thrive with average water activity, optimum pH (average pH 7), and high salt or sugar environments, however they can also survive over wider ranges of these factors and some can even survive without oxygen (Table 1).6, 9 Storage under refrigeration may inhibit many food spoilage bacteria; however it does not inhibit the growth of many foodborne illness-causing pathogens that are able to survive at even lower temperatures.6

Many of the factors favouring pathogen growth are found within “ready-to-eat” deli meats. This provides a suitable protein-rich environment for pathogens making it difficult to inhibit them without changing factors that may impact on food quality and palatability.6 Consequently, rather than changing a single factor to the greater-Adelaide area. Purchases were stored under refrigeration in the original packaging until laboratory processing occurred.

Sample processing
The temperature of the “ready-to-eat” deli meats were taken before analysis, using a thermometer probe inserted into the middle of each sample. Samples were then analysed using Oxoid culture media and supplements as well as 3M® Petrifilm.

Sample enrichment, spread plating and petrifilm
Three 25g samples of each of the “ready-to-eat”, deli-sliced meats were measured out aseptically and homogenised in 225ml of three different enrichment broth media (Oxoid one broth - for Salmonella spp., Oxoid one broth - for Listeria monocytogenes and Oxoid Peptone water 0.1% - for Campylobacter spp., Escherichia coli/coliform and standard plate counts) using a stomacher (Seward Stomacher® 400 circulator) for two minutes at high speed. For each of the five samples, the homogenates containing Oxoid Salmonella and Listeria broths were incubated at 420C for 16-20 hours and 300C for 24 hours respectively.

For each of the samples, the homogenates containing Oxoid Peptone water 0.1% were used for detection and count of aerobes (standard plate count), Campylobacter spp. and Escherichia coli. 1ml of the homogenate was serially diluted in 9ml Oxoid Peptone water 0.1% for use as needed. For standard plate counts, 1ml of each of 10-1, 10-2, 10-3, 10-4 and 10-5 solutions were placed on Aerobic Count (AC) 3M® Petrifilm. For detection of Escherichia coli, 1ml of the 0.10 and 0.12 solutions was placed on E. coli/Coliform 3M® Petrifilm. For detection of Campylobacter spp., 0.1ml of the 10-1 and 10-2 solution was spread in duplicate onto Oxoid Brilliance CampyCount Agar plates. The spread plates were incubated at 41.50C for 48 hours in a micro-aerobic atmosphere and the Petrifilm were incubated at 370C for 48 hours.

Results
Out of the 174 samples tested in this study, no recognised pathogens were confirmed. The total bacterial counts for 134 (77%) samples exceeded the level for satisfactory as defined by the FSANZ guidelines (Table 2). The highest proportions of bacterial counts exceeding the satisfactory threshold were found in sliced salami (14/15; 93.3%), “Fritz” (8/10; 80%) and Roast pork (22/25; 88%) while the lowest proportions of bacterial counts found to be exceeding the threshold to marginal were found in

### Table 1: Intrinsic and extrinsic factors and their effects on foodborne pathogens in ready-to-eat meats (adapted from Toldra 2009) 9

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Probability of growth at 4°C</th>
<th>Probability of growth at lower pH</th>
<th>Probability of growth at lower water activity</th>
<th>Probability of post-processing contamination (from environment/staff)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmonella spp.</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>1/+/</td>
</tr>
<tr>
<td>Campylobacter spp.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1/+/</td>
</tr>
<tr>
<td>Listeria monocytogenes</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>+/++/+</td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>-</td>
<td>++</td>
<td>-</td>
<td>-/-</td>
</tr>
</tbody>
</table>

Materials and Methods

Sampling
Thirty five final year students collected five individual samples of supermarket deli-purchased “ready-to-eat” meats throughout the year from March to September 2013, each from five randomly selected locations in the extreme (i.e. decreasing pH and producing a sour tasting deli meat), many small changes involving numerous factors are commonly instituted during processing (i.e. decreasing pH slightly, decreasing water activity slightly, increasing salt content slightly) in combination with good hygiene, storage and handling practices post-processing.5, 8, 10, 11
of ready-to-eat deli meat in Australia in the past 20 years, but not all have tested for every food pathogen reported in this study. Between them however there have been reports of samples positive for Listeria monocytogenes and Escherichia coli.4, 16

The current study did not find pathogens specifically linked to foodborne gastroenteritis within the samples analysed. Nevertheless, microorganisms and standard plate counts were reported that could likely indicate a developing problem or point towards the potential for these pathogens to be present but not reported due to the design of the study.

More than three quarters (77%) of the “ready-to-eat”, deli meat samples exceeded the thresholds of the guideline for Level 1 ready-to-eat food. A higher proportion of sliced salami exceeded those limits however it was sometimes difficult in the commercial retail environment to ascertain whether the salami meats sold were heat-treated or raw-fermented, where thus the levels of the total flora might be expected to be higher. In comparison, other meats exceeded the threshold of >10^4 more regularly, in the case of roast pork in almost 9 out of 10 cases.

While no pathogens could be confirmed, there was evidence of coliforms in 15.5% of samples, particularly in roast beef and ham.

The high level of samples exceeding the acceptable thresholds suggests that process hygiene is compromised and that storage conditions, product handling and turnover should be subjected to further investigation.

“Ready-to-eat”, Deli meats are sold at a premium in retail supermarkets in the Adelaide area, yet some of the samples drawn reached total counts of >10^8 and may have spoiled at ambient temperatures, even in winter conditions, within the hour. Such out-of-control processes are also susceptible to contamination with pathogens, and while they were not detected in the present study, the presence of coliforms suggests that they may well be quite easily susceptible.

As a direct consequence of the present results, further regulation and auditing could be implemented within the sampled premises to ensure good food handling and hygiene practice are being implemented. Further to this, the surfaces with which “ready-to-eat” deli meats make contact (slicers, staff hands, display cabinets, bench tops) could be swabbed and analysed to indicate the potential for cross-contamination. After completion of such investigations, staff and management at each premises could be presented with the data and information collated. This would enforce to them the need to apply precautionary microbiological analyses as well as food hygiene training and Hazard Analysis and Critical Control Points (HACCP), thereby ensuring food and customer safety.13, 15 Similar audits and microbiological analyses could be applied at regular intervals to ensure compliance and allow a visual/numerical improvement in both pathogen and spoilage organism numbers reported.

Discussion

Ready-to-eat deli meats are consumed daily by 20-50% of the Australian population.4 As these meats are not further heat treated or cooked before consumption, their safety and microbiological quality should be of utmost concern.1,2, 4 Unsatisfactory microbiological quality ready-to-eat deli meat can be due to both processing and post-processing factors, and while the initial load is important it is often prevented and monitored for through hygiene training, legislation, audits and the implementation of Hazard Analysis and Critical Control Points (HACCP).9, 12-15

The importance of factors such as handling, slicing, cross-contamination and storage of these meats therefore remains paramount in minimising the presence of foodborne illness-causing pathogens.4, 7, 8

There have been some published microbiological surveys

Table 2: FSANZ Guideline levels for determining the microbiological quality of a Level 1 ready-to-eat food (CFU/gram) 3

<table>
<thead>
<tr>
<th>Test</th>
<th>Satisfactory</th>
<th>Marginal</th>
<th>Unsatisfactory</th>
<th>Potentially Hazardous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmonella spp.</td>
<td>not detected in 25g</td>
<td>-</td>
<td>-</td>
<td>detected</td>
</tr>
<tr>
<td>Campylobacter spp.</td>
<td>not detected in 25g</td>
<td>-</td>
<td>-</td>
<td>detected</td>
</tr>
<tr>
<td>Listeria monocytogenes</td>
<td>not detected in 25g</td>
<td>detected but &lt;10^2</td>
<td>-</td>
<td>≥10^2</td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>&lt;3**</td>
<td>3-100</td>
<td>≥100</td>
<td>***</td>
</tr>
<tr>
<td>Standard Plate Count</td>
<td>&lt;10^3</td>
<td>&lt;10^5</td>
<td>≥10^5</td>
<td></td>
</tr>
</tbody>
</table>

** Detection of L monocytogenes in ready-to-eat foods prepared specifically for at risk groups (elderly, immunocompromised, infants) should also be considered as potentially hazardous.

*** Pathogenic strains should be absent. This project will not be specifically testing for these strains however.

ham (19/30; 63%) and roast chicken (20/30; 66.6%).

Twenty-seven (15.5%) samples had coliform counts, and 5 (2.9%) showed evidence of Staphylococci spp.
Food hygiene training and hazard analysis systems have, in the past, been reported to make a significant improvement to the microbiological quality of ready-to-eat foods.12 It remains difficult, however, to implement HACCP with many retail establishments viewing the protocols as a burden.13, 14 Nevertheless, greater emphasis on HACCP should reduce public health risks associated with ready-to-eat deli meats. 13, 15 The aforementioned protocols and systems will not work alone however, and need to be implemented in conjunction with safety control measures during processing and transportation.

CONCLUSION

The results of this study concluded that hygienic food handling and HACCP protocols are not being practiced at some greater-Adelaide area supermarket delicatessens. Food processors should understand that implementing quality control (HACCP) and hygiene protocols will not only keep public health risks at a minimum, but also reduce economic losses. Although gaps in knowledge still exist and further larger sample size studies are needed, the results of the current study provide valuable information indicating the need for the design and implementation of microbiological monitoring and surveillance programs for ready-to-eat deli meats at the retail level. Ultimately, ready-to-eat deli meats should be retailed to the public as high-quality, microbiologically safe products.

References