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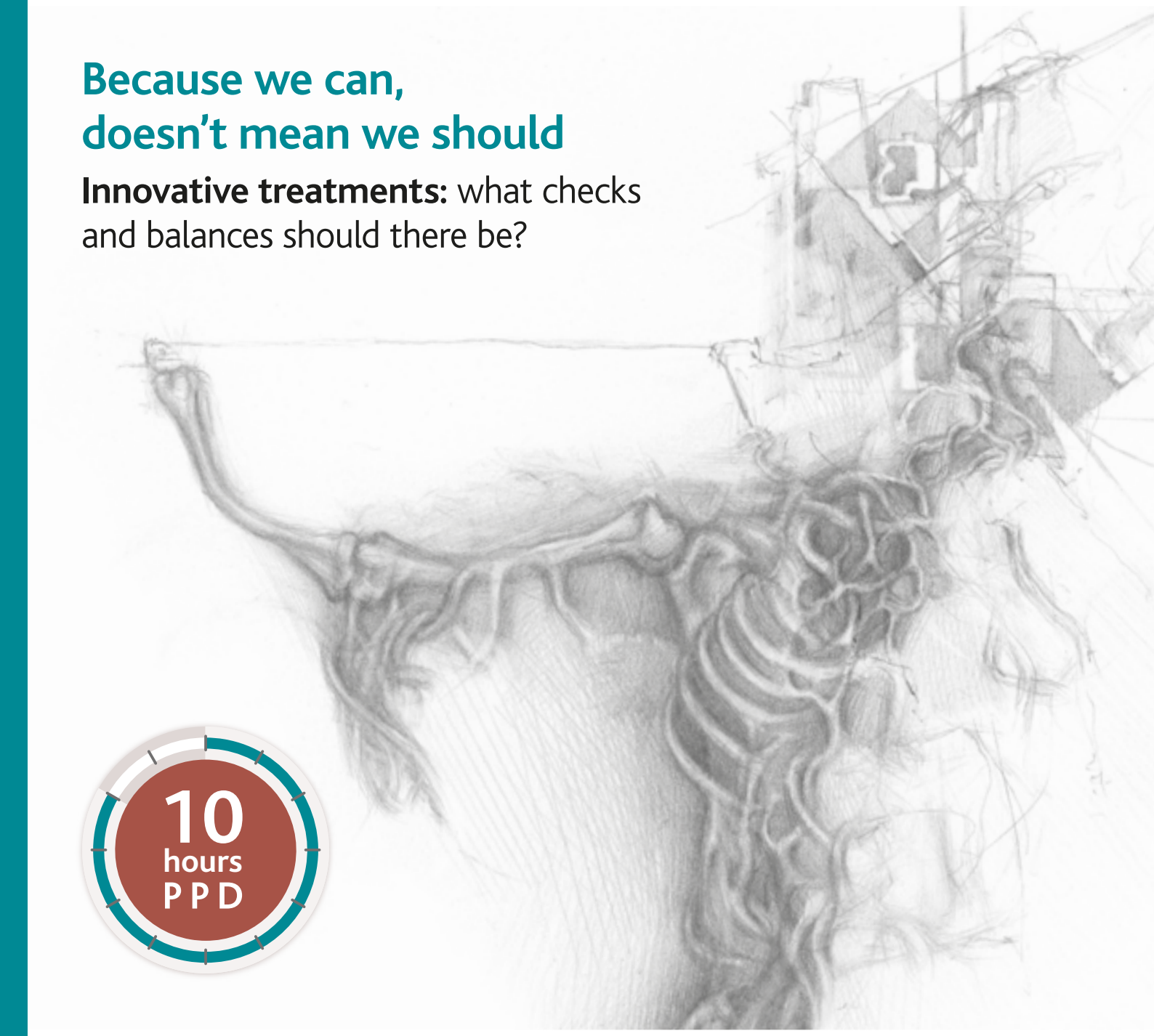
Veterinary PracticeToday

THE JOURNAL FOR PERSONAL & PROFESSIONAL DEVELOPMENT

Because we can, doesn't mean we should

Innovative treatments: what checks and balances should there be?



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UP FRONT...

Primum non nocere... Easy. Everybody knows that one. "First do no harm." It was the phrase coined by the 'father of Western medicine', Hippocrates, in the 5th century BC.

Well actually, no. Rather than being of ancient origin as is usually assumed, the specific expression, and its even more distinctive associated Latin phrase, *primum non nocere*, is now attributed to Thomas Sydenham, an English physician who lived between 1624 -1689. Oh well. Useful for the pub quiz anyway.

The original 325-word Hippocratic Oath actually began: "I swear by Apollo, the healer, Asclepius, Hygieia, and Panacea, and I take to witness all the gods, all the goddesses, to keep according to my ability and my judgment, the following Oath and agreement:

"To consider dear to me, as my parents, him who taught me this art; to live in common with him and, if necessary, to share my goods with him; to look upon his children as my own brothers..."

That's a bit scary – the concept of being responsible for the care of our college lecturers in their dotage, together with their offspring! But then, perhaps more usefully, the Oath continues:" I will prescribe regimens for the good of my patients according to my ability and my judgment and never do harm to anyone..."

On admission to membership of the RCVS, and in 'exchange for the right to practise', every veterinary surgeon and registered veterinary nurse makes a much shorter declaration of similar sentiment, the second half of which runs: "ABOVE ALL, my constant endeavour will be to ensure the health and welfare of animals committed to my care." And it is the implications of that last phrase that we do well to revisit from time to time.

In his article, 'Cos we can, don't mean we should', Dr James Yeates, chief veterinary officer of the RSPCA and leading expert in animal welfare, ethics and the law, challenges us to re-examine our responsibilities with respect to the options we offer clients, the recommendations we make, and the underlying reasons we make them. It might just make uncomfortable reading.

David Watson
Editor

Readers may have noted our move from using the term CPD to PPD. Continuing professional development is an essential part of being a good vet, nurse or manager; yet to be a fully rounded professional, an element of personal development is essential in the context of work too.

We feel then that PPD – personal and professional development – reflects more closely what our journal represents. Scholarly articles and practical advice, mixed with critical and thought-provoking comment on both the humdrum and the hype.

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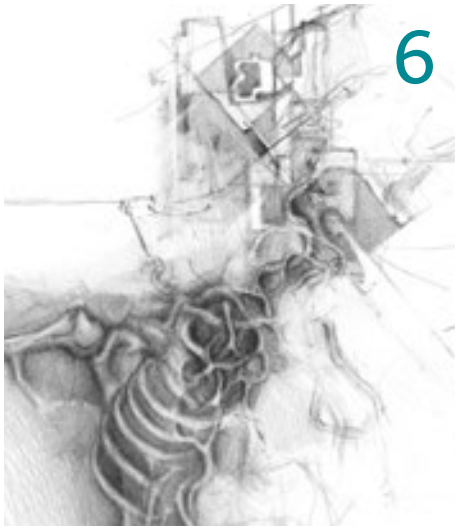
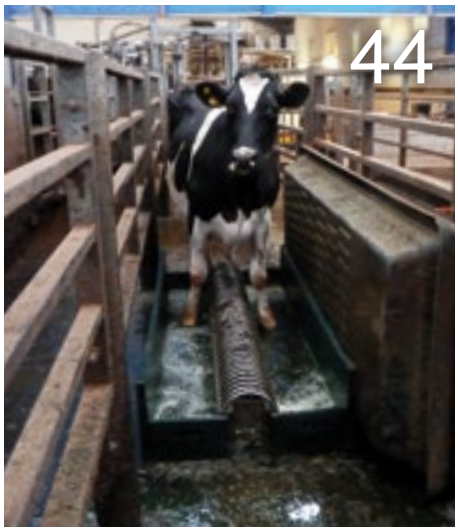


Comments

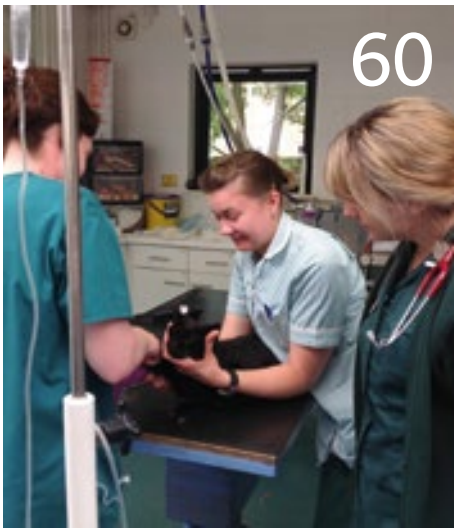
Small animal

Equine

Large animal



Wildlife and exotics



Industry

Management

Featured contributors

Lucy Preece
MA VetMB GPCert(SAM) MRCVS

After graduating from Cambridge University in 2006, Lucy has worked mainly in small animal practice. She passed the European School of Veterinary Postgraduate Studies GP Certificate in Small Animal Medicine in 2012. She runs the radioactive iodine referral unit at Bishopton Veterinary Group, Ripon, and has an interest in feline geriatric medicine.

Ivan Croatz
BVetMed MRCVS

Ivan graduated from the Royal Veterinary College and has been working in general practice in the UK for the last 15 years developing a large rabbit caseload made up of first opinion, second opinion and rescue work. He is the lead veterinary researcher on the new rabbit v-gel airway system and teaches internationally on rabbit airway management and anaesthesia.

Owen Atkinson
BVSc DCHP MRCVS

Owen has worked in farm animal practice since 1994, mainly with dairy cows. His interests in rumen health, cattle foot care and lameness reduction led him to do an increasing amount of training and advisory work. In 2013, Owen left practice to found Dairy Veterinary Consultancy Ltd, to better pursue his vision for preventive health management and strategy.

Jo Webster
VN

Jo has been working as a nurse for more than 20 years. She qualified as a VN in 1996 and for the past 10 years has been head of nursing at Stowe Veterinary Group. As well as managing a large team of nurses, Jo has been heavily involved in vet nurse training for several years.

join the **conversation**

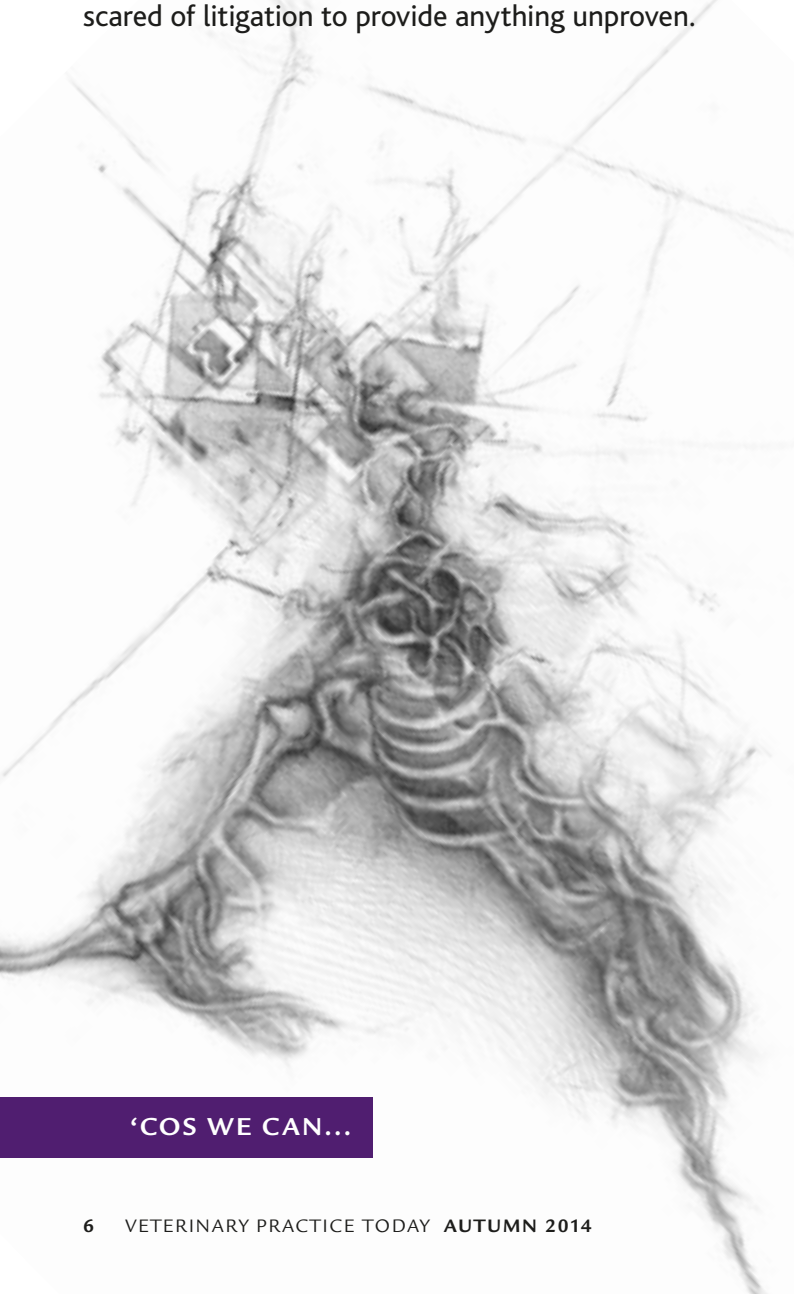
If you have thoughts on any of the articles featured in Veterinary Practice Today please let us know by contacting **editor@veterinarypracticetoday.com**

'Cos we can, don't mean we should

James Yeates
BVSc CertWEL DWEL MRCVS

Dr James Yeates is chief veterinary officer of the RSPCA, RCVS Registered Specialist in Animal Welfare Science, Ethics and Law, editor of the Journal of Animal Welfare Science, Ethics and Law and previously chair of the BVA Ethics and Welfare Group and honorary secretary of the SPVS.

The House of Commons recently introduced a Medical Innovation Bill to 'encourage responsible innovation in medical treatment [for humans]'. At time of writing, it is not an Act, so it is not law (yet). But it expresses a concern that doctors are too scared of litigation to provide anything unproven.



'COS WE CAN...

In veterinary practice, we are at the other end of the spectrum. We are also constantly developing new treatments/drugs/techniques and there may be a tendency – especially for newer graduates – to feel obliged/under pressure to use the most advanced techniques because they think they are 'the best', and that if they don't, they may be criticised/sued. (Of course, the comparative size of litigation in veterinary practice is tiny – an even bigger ratio than that of doctors' to vets' salaries!)

Humans and other animals

The main difference is the number of safeguards to ensure that treatment is aimed at the patients' best interests. In fact, the whole set-up is different. Human patients have human rights, legal standing and the NHS. Plus they are considered to be (usually) autonomous beings who can understand, consent or refuse, and can decide what is in their own interests.

In comparison, animals have only protection against abuse (ignoring especially widespread forms), no legal standing to press civil claims (at least in the UK), and a few hard-pressed charities helping out. Additionally, they are considered to be the property of their owner who has power of life and death, and they have to rely on their owners to determine their best interests – owners who have had no training, competency tests or licence. The only thing on the animals' side is the skill and empathy of veterinary surgeons.

Vets and other doctors

Even here there are differences. Doctors are given clear NICE (National Institute for Health and Care Excellence) guidelines, whereas veterinary surgeons must rely on non-systematic reviews in textbooks, and their peers.

Medical regulatory bodies monitor standards of clinical care; whereas the RCVS appears to focus on professional matters, with limited monitoring of clinical outcomes. I'm not suggesting it should, but it is another safeguard not found for animals. Few veterinary institutions have clinical ethics committees, whereas these are common in human medicine.

Checks and balances

These differences place a heavy responsibility on individual veterinary surgeons. It is up to the veterinary surgeon to provide his or her own checks and balances— their own brakes to stop them going off into the big wide unknown of innovative treatment.

Temptations

And such innovation can be tempting. It can be tempting, of course, to help the patient. That is an entirely legitimate – indeed highly praiseworthy – motivation. But it can also be tempting for other reasons.

Human interest

One is to help other patients or human patients. But this is dangerous. Just as in human medicine, I would not want to be experimented upon (without my consent); so too I think the responsibility of a vet for his or her patient is to its welfare not for expanding wider knowledge. Beloved pet guinea pigs should not become medical 'guinea pigs'.

Published studies may be a valuable 'spin-off' of treatment, but they should not be the aim. Furthermore, carrying out

procedures on a patient in order to learn is effectively 'animal research'. There is a place for such research – where there are legally-controlled safeguards in place in research institutions under animal research legislation (even if this is incomparable directly to the rules protecting human research subjects).

Doing research outside of the legal structures is not only legally risky, but cuts under all the protection to animals that such regulation is intended to provide.

Four per cent interest

Another reason could be profit. Some veterinary surgeons are on profit-related pay. Others have invested in the business and want a reasonable return. I think – and hope – that veterinary surgeons very rarely consciously perform treatment with profit in mind. I would suggest that the day one does is the day to change profession.

Of course we need to earn a living, but this again should be a spin-off. I won't talk more about this, given its rarity...

I need (to be) a hero

Another reason is heroism. I enjoy being heroic. I slow my car if I pass a rabbit or bird to check it doesn't need emergency care. I place a firm guiding hand in front of my wife to stop her running out into traffic. I've read *The Iliad* and watched *Game of Thrones*. Maybe veterinary medicine is not the exciting 'Herriotesque' work it used to be, with all these published papers on established and tested procedures. Where have all the 'good vets' gone and where are all the gods?

It is nice to look like heroes in front of clients, in front of our peers and in front of ourselves. (God is perhaps the only one who's not impressed; whereas Satan's probably quite pleased with the ambition). Again, perhaps it can be a legitimate spin-off but it is a risky one – risking that one's motivation is subconsciously deviated into self-aggrandisement.

Under pressure

Another reason is owner pressure. Owners can be persuasive. Some try to force your hand in an obnoxious way. But the really difficult ones, where you are really tempted to go further with a patient, are the owners whose animal is the main thing in their life. Losing their pet would be losing everything, and they will do anything to keep it.

But even in these cases, most owners would not want to put their animals through treatment that is not in their best interests. True love is unselfish. And do we have a duty to our human clients that can override our responsibility to our animal patients? Many of us would say "No". Our duties to our client (not defrauding them, for instance) may constrain our treatment choices but they cannot constitute them.

All the options?

We might go further. Veterinary surgeons are often concerned – I know I was – with being sued for failing to provide obtained informed consent. As veterinary surgeons, we find the concept slightly confusing and hard to take seriously. It is, after all, a model inherited from human medicine that doesn't really fit with veterinary practice, beyond being a legalistic process to follow by rote without any real engagement.

Part of the informed consent mantra is 'to provide all the options' and 'do not unduly influence the patient'. This creates a problem for us in practice: we offer all the options and then the owner chooses the wrong one. What do you do then? Refusing to give it seems even more risky.

Reason for reasonableness

I will not speak here of the legal aspects. But of the moral elements, I can. It could be argued that we do not have a responsibility to provide inappropriate treatments that are not in the patient's interests. Indeed, we arguably have a responsibility to save animals from such suffering. And in fact, in practice, we never offer all the options.

Certainly I have never offered to cover a patient with lemon juice and float them in a balloon. We offer the reasonable options that have a chance of success. And that is exactly what we should do. If a cast horse should not be winched, then we should not offer it. If a cat would be better getting conservative medical treatment and palliative analgesia, rather than radical surgery, then we should offer only the former.

Primum non nocere

The very worst thing a veterinary surgeon can do is to make an animal worse off than it would have been otherwise. That is my understanding of 'first do no harm'. It cannot simply mean cause no outweighed harm because medicine nearly always needs some harm that is outweighed.

Sometimes one is unlucky, but can rest assured that one gave the patient the best chance you could – but we need to be pretty sure that we did give it the best chance. We cannot do something highly risky and then just chalk the suffering up to bad luck. *We* choose the odds.

Ethics and other methods

So how can we ensure we are not going too far?

Perhaps we can learn from the safeguards for humans. Clinical ethics committees can involve many people with differing views to consider, enriching clinicians' decision-making through discussion and reflection. Quality-of-life assessment and patient charters can ensure patients are monitored and cared for, based not on biological markers but on what matters to them.

Owner consent can be thought of as a guardian's permission rather than an owner's dictat. And perhaps most of all, practitioners can ensure that every case, every day, is 100 per cent patient-focused.

Perhaps in time there will be a Veterinary Innovation Bill, because we have gone too far in safeguarding patients from excessive treatment. I'll look forward to arguing the other way then. But we are a long way from that now. ■

Useful Reading

Medical Innovation Bill (2014) gov.uk/government/uploads/system/uploads/attachment_data/file/285325/The_Medical_Innovation_Bill.pdf

Yeates J (2013) Animal Welfare and Veterinary Practice UFAW: Wiley-Blackwell

join the conversation

If you have thoughts or comments on this article, please let us know by contacting editor@veterinarypracticetoday.com
We will publish a selection of views in the next copy of Veterinary Practice Today and on our sister website MRCVS.co.uk

The elephant in the room

In the last issue of Veterinary Practice Today (Vol 2 Issue 2) we asked readers for their thoughts on the article 'Combatting stress in practice: the elephant in the room'. The piece elicited a variety of responses and there are clearly strong views about the issue of stress in practice – particularly how we select our future veterinary surgeons.

Hannes Tanzer MRCVS comments:

Thank you very much for the brilliant article on what seems a very important issue in our profession.

Work-related stress and lack of support within the profession are often blamed for vets struggling in practice. At the same time, more pressure is put on the profession by the independent regulator acting in the public interest.

Our chosen profession contains a unique combination of academic and physical skills that then have to be exercised under the scrutiny of the general public. In essence we have chosen a very tough, physically and mentally demanding job.

Selecting future veterinary surgeons with an overemphasis on academic aptitude – almost irrespective of common sense, social skills and dexterity – is a recipe for disaster. These poor creatures are trained to succeed on paper/online, but in reality are programmed for disaster from the moment they leave the protected habitat of a university.

A new, more practice-orientated selection process for future veterinary students should allow for better prepared, happier and more stress-resistant graduates who thrive on the challenges that the reality of veterinary life throws at them. They will still get hurt, they will struggle and fail at times, but they will grow and become stronger and better veterinary surgeons because of it.

Intelligence, initiative and the willingness to solve your own – and other peoples' – problems should be higher on the agenda when applying for a place at veterinary school. Self-reliance ought to feature strongly next to the ability to be part of a team, whilst sometimes being able to lead that same team in a different situation too.

A scientific background will always have to form the basis of our profession, but people skills that stretch beyond the socioeconomic background of your upbringing are required, combined with the dexterity that can convert thoughts into practical action.

A new approach to find the right people to join us in our profession is required. High levels of stress and the sad issue of suicide are clear indicators that the current system does not work.

Neil McRae BVM&S CertVA MRCVS was unhappy about the suggestion to employ psychometric tests when interviewing applicants and wrote:

I was left feeling a bit uncomfortable by your comment piece in Veterinary Practice Today, suggesting that psychometric testing should be carried out on applicants for veterinary education. You seem to suggest that potential students should be assessed for communication skills, empathy, practical application and resilience.

As a young man with unaddressed Asperger's syndrome, as I was back in the 70s, I suspect I would have failed these tests miserably had they been in place then, as (no doubt) the people assessing me would have been judging me by neurotypical standards and would not themselves have been able to empathise with someone on the autistic spectrum – not that those distinctions were understood back then.

The problem with assessing 'people skills' is that such assessments tend to be discriminatory against people with the many different types of Asperger's – and other – autism spectrum conditions, unless those doing the assessing have some insight into those conditions. I believe that people with Asperger's bring a lot to our profession, and it would be all the poorer without us.

Laura Kidd BVMS MRCVS would like to see more support for the new graduate. She writes:

The selection process is really hard and there is no easy way. Academic qualifications are important, but I think that those who tend to do well at university and in practice are those who are 'all-rounders'.

These are the students who are already used to juggling their time, prioritising and often communicating with people outwith their peer group. They may also be more familiar with rejection, disappointment and have developed coping strategies – not being selected for the U18 hockey squad, for instance.

Lots of 'A grade' students also have hobbies/interests as well. It is regrettable, however, that many of them have to restrict their hobbies/interests in 5th/6th year to devote that time to trying to show they are the 'perfect' vet student for the selection process. I think this is one of the reasons that fewer boys currently apply to vet school.

My assessment in practice of the vet students we see is that, generally, the selection process is working well. However, I do think as a profession we should support new graduates better and have a more 'official' process akin to medical students and junior doctors.

I think it would be good for all new graduates to do the equivalent of a medical junior house officer job for the first year – not necessarily in a vet school but a mentored role in a practice or several practices on rotation.

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Professor Holger A. Volk
DVM DipECVN PhD PGCAP FHEA MRCVS

Holger is clinical director of the RVC Small Animal Referral Hospital, the head of the neurology and neurosurgery service, and Professor of Veterinary Neurology and Neurosurgery at the Royal Veterinary College. He is also currently the vice-president of the European College of Veterinary Neurology (ECVN).

He graduated from the Veterinary School of Hanover in June 2001. Following this, he started a German National Academic Foundation funded three-year PhD programme in neuropharmacology about the underlying mechanisms of pharmacoresistant epilepsy, which was rewarded with the Domagk Prize. He then completed an internship and a residency in neurology and neurosurgery at The Royal Veterinary College in September 2007.

**Suggested Personal & Professional Development (PPD)*

EPILEPSY

Epilepsy in the cat

Epilepsy in cats – as is the case in dogs – is characterised by the propensity of recurrent seizures and it remains the most common feline neurological condition seen in first-opinion practice. Seizures can easily be confused with other paroxysms such as syncope, transient vestibular attacks, neuromuscular disease, pain disorders and compulsive behaviour episodes. In the diagnosis of feline epilepsy, the history should focus on confirming that the episodic events do represent epileptic seizures. The diagnosis of idiopathic epilepsy is a diagnosis of exclusion and is less common than in dogs.

In most cats with recurrent seizures, an underlying disease process can be identified. The investigation of the inter-ictal period should focus on excluding any underlying causes. Fundamental for the diagnosis of idiopathic epilepsy in cats is an unremarkable interictal physical and neurological examination, routine blood and urine tests that are within normal limits.

As part of this diagnostic investigation, advanced diagnostic imaging is not always required, but should be considered if the cat does not respond to the initial treatment or the presentation of the cat changes indicating intracranial disease. In addition to antiepileptic drug treatment, the underlying disease process – if identified – should be treated to maximise drug response.

Cats are not small dogs; however, as there remains a lack of data for cats, we need to extrapolate some of the knowledge we have from dogs, to cats. As in dogs, epilepsy appears to be the most common chronic neurological disorder in cats (Smith Bailey and Dewey, 2009) and is characterised by recurrent seizure activity. The prevalence in dogs is estimated to be 0.6 per cent in first-opinion UK practices (Kearsley-Fleet et al, 2013). The prevalence in cats is unknown.

Table 1. Clinical characteristics of paroxysmal disorders

Discriminator	Cardiac syncope	Neuromuscular weakness	Feline oestrous behaviour
Inter-episodes	-	- / show signs of weakness, cat rests more commonly	- / more affectionate
'Trigger'	Exercise, excitement	Exercise, excitement	Male cats
Pre-episode	-	-	-
Episode			
Description	Brief sudden collapse and recovery	Elevated scapulae, low head carriage, stiff stilted gait prior to collapse	Rolling vocalisations, search behaviour, lordosis
Level of consciousness	Unconsciousness	-	-
Autonomic signs	Heart rate/rhythm changes possible	-	-
Muscle tone	Flaccid	- to flaccid	-
Lateralising signs	-	-	-
Duration	Seconds	Minutes to hours	Minutes to hours
Post-episodic changes	-	-	-
Further comments	-	-	-

'-' = normal, none or not shown

Most of the recurrent seizure disorders in dogs are the consequence of idiopathic or primary epilepsy. Cats' seizure disorders are often secondary to underlying disease processes (symptomatic epilepsy). Only a quarter to a third of the cases are diagnosed with idiopathic epilepsy (Quesnel et al, 1997; Schriefl et al, 2008; Pakozdy et al, 2010).

It is assumed that idiopathic epilepsy in dogs is usually genetic in origin. This assumption is based mainly on a higher prevalence of epilepsy in certain dog families or breeds. Only a few causative genes have been identified in canine epilepsy. In cats, some have suggested that the European Shorthair cat might be overrepresented (Pakozdy et al, 2010). Despite the lack of evidence, it is likely that certain cat strains will have a genetic predisposition, e.g. recently, a laboratory feline strain was characterised to be a potential model for human genetic epilepsy (Kuwabara et al, 2010).

Every brain has a certain seizure threshold, which can be altered by a variety of factors; and an increased susceptibility based on one's genetic make-up is just one of them. Therefore, the clinician has to use a methodical, logical diagnostic work-up successfully to reach a definitive diagnosis in the patient with recurrent seizures (Volk, 2014).

Is it a seizure?

As veterinary surgeons, we often have to rely on the owner who witnesses the paroxysmal events, so a detailed history is of pivotal importance. Videos of the episodes can help, but they do not replace the need for good history taking. Before embarking on further diagnostics, define the presenting complaint as well as possible and then refine the problem as you pursue your diagnostic work-up.

Cardiac syncope, neck pain, vestibular attacks, neuromuscular weakness, paroxysmal behaviour changes, feline hyperaesthesia, orofacial pain syndrome and seizures are paroxysms that share some similarities (Chandler and Volk, 2008; Penning et al, 2009) (**Table 1**).

Most of these disorders can be relatively easily differentiated from focal motor seizures by clear observation of the character of the episodes, absence of identifiable preceding aura (sensory seizure activity usually lasting a couple of minutes just prior to the motor seizure activity), absence of autonomic signs (hypersalivation, for example) and no generalisation of motor activity (generalised tonic or tonic-clonic seizure, for instance) or impairment of consciousness.

The most useful question by which to assess whether or not animals have an impaired consciousness is to ask the owner if the animal can look in their eyes during an event.

Increased muscle tone is far more common in seizures than decreased tone. Ask the owner if the animal was 'stiff' or 'floppy' during the episode. Cats often show either – only or as part of – the generalised seizure orofacial automatisms. Classically, in a tonic-clonic generalised seizure, the animal first becomes rigid (tonic phase), loses proprioception and lays in lateral recumbency.

Paroxysmal behaviour changes (compulsive disorder)	Vestibular attack	Orofacial pain/ hyperaesthesia syndrome	Seizure
-	-	- / sensitive to touch	- (idiopathic epilepsy) / Abnormal neurological exam (Structural epilepsy, reactive seizures)
Behavioural triggers (e.g. noise)	-	- / touch	- / flashing lights / from sleep
-	-	-	Pre-ictal behaviour changes (prodrome [hours to days] and / or aura [minutes] such as starring, vocalisations, freezing, attention seeking, fear
Pacing, vocalisations, licking, chasing imaginary objects	Head tilt, nystagmus, collapse/fall towards side of head tilt	Automutilation, acute oral discomfort, 'twitching of skin'	Depending on seizure focus, focal or generalised tonic-clonic movements most common, orofacial automatisms ('chewing gum seizure')
-	- / impaired (disorientated)	-	Impaired / unconscious
-	-	-	Hypersalivation, defaecation, urination
-	Unilateral decrease in extensor muscle tone	-	Tonic (hypertonicity) / Tonic-clonic alternating movement (convulsions)
-	Yes	-	Asymmetrical seizures (structural epilepsy)
Minutes to hours	Seconds to hours	Minutes	Seconds to minutes / status epilepticus (10 minutes)
-	-	-	Yes, such as behaviour changes, ravenous appetite blindness, gait abnormalities, disorientation
-	Subtle signs of vestibular disease might persist	-	Head / facial muscles often involved

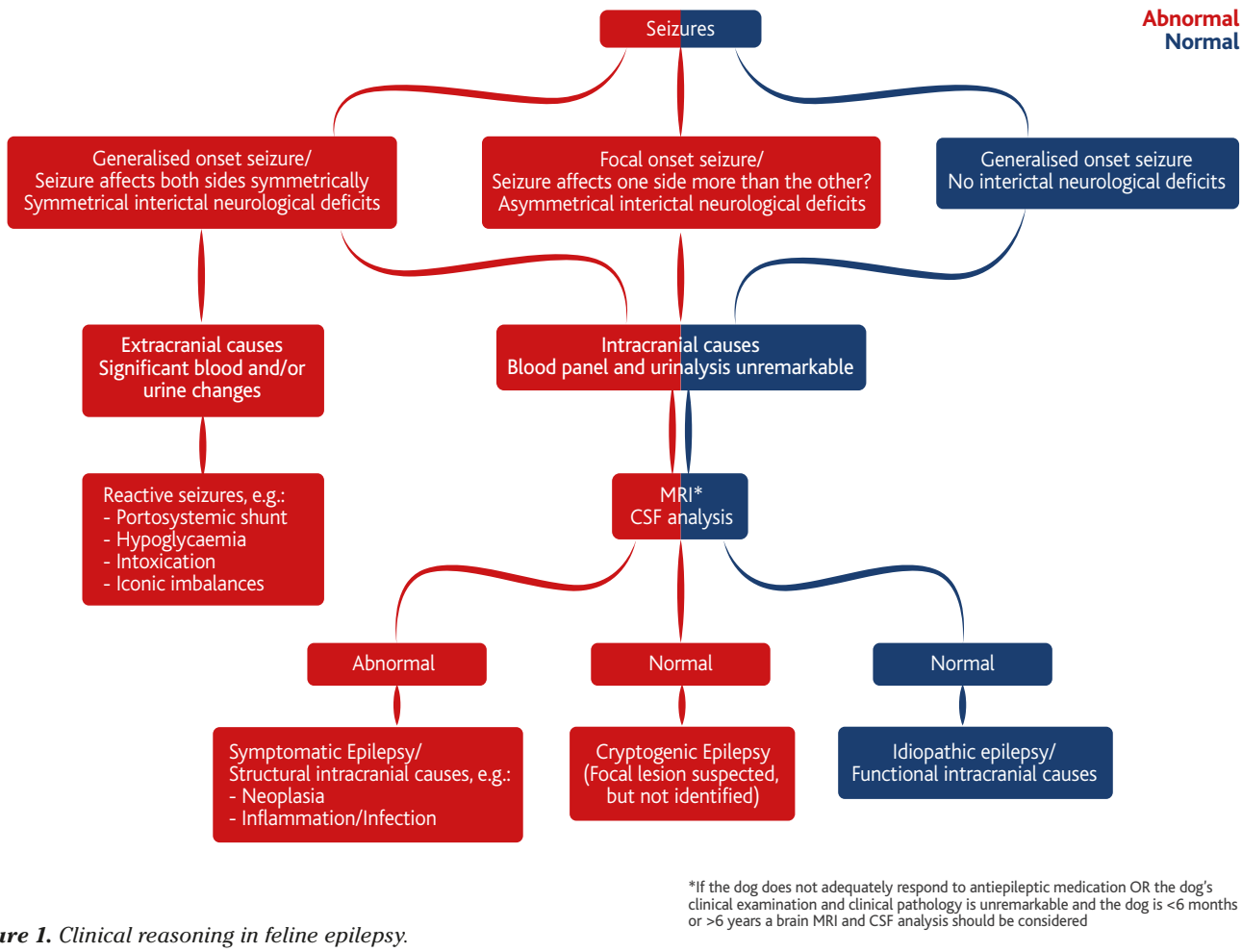

Figure 1. *Clinical reasoning in feline epilepsy.*
Epilepsy can be caused by a plethora of diseases. Following a step-by-step approach can help you to tackle even the most challenging clinical presentation.

Seizures typically last around one minute; but there are often several stages: preictal behaviour changes (prodrome [hours to days] and/or aura [minutes], ictus, postictal behaviour or neurological deficits [hours to days]). They usually occur out of sleep – most often out of non-REM sleep – or rest and are not exercise related. Most of the seizure disorders will at least initially respond to antiepileptic treatment.

The golden standard to differentiate a seizure from other episodic events remains an ictal electroencephalographic recording (EEG). However, this is rarely possible, although interictal recordings can also be useful.

Cats appear to be different to dogs as focal seizures occur with nearly equal frequency in idiopathic and symptomatic epilepsy (Quesnel et al, 1997; Schriefl et al, 2008; Pakozdy et al, 2010). Practically speaking that means that if a cat presents with focal seizure it does not necessarily mean that it has structural brain disease (symptomatic epilepsy).

Table 2. Diagnostics to be considered for cats presenting with seizures

Extracranial Work-up	Intracranial Work-up
Complete blood cell count	Advanced imaging ▪ NRI (CT less than ideal)
Serum biochemistry	Cerebrospinal fluid analysis ▪ nucleated cell count ▪ protein concentration ▪ PCR (*Toxoplasma gondii*, FCoV)
Urinalysis	EEG
Dynamic bile acids testing / ammonia	
Depending on age and clinical presentation: ▪ blood pressure and/or ECG ▪ serology/PCR for *Toxoplasma gondii*, FeLV/FIV, FCoV (also consider albumin: globulin ratio, 1-α-acid glycoprotein, haematology for diagnosis of FIP) ▪ thyroxine	

Focal seizures can appear symmetrical or asymmetrical. Asymmetrical focal seizures usually start in one focal part of the brain prior to spreading and involving other brain areas. This can result in motor activities affecting first – or continuously – one side of the animal more than the other. Asymmetrical seizures are an indication of structural pathology, such as neoplasms.

Cats, however, can also have rather symmetrical-looking orofacial automatisms. The affected cat will usually hypersalivate, show facial twitching, lip-smacking and swallowing movement ('chewing gum fit'). These seizures can generalise secondarily; and it is thought that many of them do originate in the temporal lobe (Pakozdy et al, 2014b).

Diagnostic work-up

Cats with recurrent epileptic seizures – and where no interictal neurological deficits or abnormalities on routine diagnostic tests are evident (**Figure 1 & Table 2**) – can be defined as having 'idiopathic epilepsy'. Idiopathic epilepsy is not one single disease, but a disease category describing cats with epilepsy for which the underlying cause was not identified and which results from a complex interaction between epilepsy susceptibility genes (genetic predisposition), intrinsic metabolic and extrinsic environmental factors.

Idiopathic epilepsy is a diagnosis of exclusion causes you can identify. Seizures might be secondary to extracranial (can be accompanied with symmetrical clinical signs and neurological deficits) or intracranial disease processes (**Table 3**).

Intracranial causes can be further subdivided into functional disorders (idiopathic epilepsy with no gross structural changes of the brain and, therefore, unremarkable interictal neurological examination); and structural diseases (presence of gross structural changes of the brain, causing asymmetrical neurological deficits – for example,

Table 3. Diseases to be considered in cats presenting with seizures

Category	Subcategory	Possible aetiologies	Interictal neurological deficits possible? Progressive? Symmetrical/Asymmetrical
Idiopathic	Genetic	- / Gene defect (susceptibility/ causative)	-
Symptomatic	Degenerative	Hippocampal necrosis* Storage diseases	- Yes & Progressive & Symmetrical
	Anomalous	Hydrocephalus Lissencephaly	Yes & Progressive & Symmetrical Yes & Progressive & Asymmetrical
	Neoplastic	Primary (e.g. Meningioma, glioma [rare], lymphoma [rare]) Secondary/metastatic (e.g. lymphoma)	Yes & Progressive & Asymmetrical
	Inflammatory	VGKC-associated limbic encephalitis Meningoencephalitis of unknown aetiology	- / can have behaviour changes Yes & Progressive & Asymmetrical
	Infectious	*Toxoplasma gondii* Feline immunodeficiency virus Feline infectious peritonitis Rabies Fungal infections	Yes & Progressive & Asymmetrical
	Traumatic	Trauma	Yes & Static/Improving & Asymmetrical
	Vascular	Hypertensive encephalopathy Feline ischaemic encephalopathy Thromoboembolic diseases Haemorrhage Polycythemia	Yes & Progressive & Symmetrical Yes & Static/Improving & Asymmetrical Yes & Improving & Asymmetrical Yes & Progressive & Asymmetrical Yes & Progressive & Symmetrical
Possible symptomatic epilepsy	Postraumatic (long-term) Posthypoxic encephalopathy Postencephalitic seizures	Trauma General anaesthesia, reduced brain perfusion after dental procedures	- Yes & Static/Improving & Symmetrical
Reactive seizures	Metabolic	Hepatic encephalopathy Renal encephalopathy Thiamine deficiency Hypoglycaemia Electrolyte imbalances	Yes & Waxing/Waning or Progressive & Symmetrical
	Toxic	Organophosphate, ethylene glycol, pyrethroids, lead	Yes & Improving & Symmetrical

*See text for details as hippocampal necrosis could be cause or consequence of seizures and be caused by multiple aetiologies
'-' usually not present 'VGKC' voltage-gated potassium channel complex antibody

Idiopathic epilepsy in cats

- Idiopathic epilepsy occurs in around one third of cats presenting with seizures
- It is a diagnosis of exclusion
- Cats with idiopathic epilepsy are younger than cats with symptomatic epilepsy, but there is an overlap
- Interictal neurological examinations are unremarkable
- Seizures are usually 'symmetrical' in appearance
- Unremarkable haematology, serum biochemical profile, dynamic bile acids and urinalysis (Note: epileptic seizures can cause a transient increase in creatine kinase activity secondary to muscle exertion)
- Unremarkable magnetic resonance imaging findings
- Unremarkable cerebrospinal fluid analysis

neoplasms, inflammatory/infectious causes, vascular accidents, cerebral anomalies).

Seizures are caused by a disorder affecting the forebrain. Your neurological examination will, therefore, need to focus on evaluation of forebrain function. It is important, however, not to ignore the rest of the neurological examination, because the identification of multifocal or widespread neurological disease will alter your clinical reasoning approach.

Watch out for the presence of interictal neurological deficits and the aforementioned lateralisation of the seizure activity, as this will guide your clinical reasoning to perform further diagnostics and (**Figure 1, Tables 2 & 3**) if no lateralisation can be identified and especially if symmetrical interictal neurological deficits can be identified, then your work-up should initially focus on extracranial causes; whereas asymmetrical neurological deficits or seizures are more suggestive of an intracranial cause. One exception is hydrocephalus which may cause symmetrical clinical deficits.

An important 'take-home' message is that a normal interictal neurological examination is one of the most important criteria for the diagnosis of idiopathic epilepsy in the dog and this is also the case in the cat.

Be aware of postictal neurological deficits. These changes can be observed for hours to days after the seizure. Therefore, repeat the neurological examination if you found deficits shortly after the seizure. In dogs, brain seizures have been shown to cause transient postictal changes visible on brain magnetic resonance imaging (MRI) scans (Mellema et al, 1999) and a mild increase in the cerebrospinal fluid cell count (Goncalves et al, 2010). It is to be expected that the same occurs in cats.

Extracranial causes

Extracranial causes should always be considered and be excluded in the diagnosis of idiopathic epilepsy. The main extracranial causes to be excluded are metabolic disorders, intoxication or changes in blood perfusion.

Perfusion changes in the cat are not uncommon and can be secondary to polycythaemia and hypertension. Hypertensive encephalopathy is more common than expected and the author advises clinicians to check blood pressure in elderly feline patients. These differentials can be relatively easily assessed by blood and urine test in any veterinary setting (**Table 2**).

Acute intoxications are usually accompanied by clinical signs other than seizures and clinical pathology changes. They are characterised by a rapid onset of seizures (cluster seizure and status epilepticus).

Intracranial structural diseases are not uncommon in cats. If you suspect an intracranial structural disease, then MRI scanning of the brain and cerebrospinal fluid analysis should be considered. Compared to dogs, cats have a higher involvement of the hippocampus in seizure generation and propagation.

Table 4. Summary of the antiepileptic drugs available to treat epilepsy in cats

Antiepileptic drug	Initial dose	Therapeutic range	Potential adverse effects	Comments
Phenobarbital	2-3 mg/kg q 12-24hrs	10-30 mg/dl	Sedation, ataxia, hepatotoxicity, blood dyscrasias, skin eruptions	Currently considered first line antiepileptic drug in the UK
Diazepam	5-10 mg q 8-12hrs	500-700 ng/ml (nordiazepam)	Acute hepatic necrosis, sedation	Currently not recommended for chronic treatment, should only be used for acute seizures*
Levetiracetam	10-20 mg/kg q 8-12hrs	?	Inappetence, sedation, hypersalivation	Considered second line*
Zonisamide	5-10 mg/kg q 12-24hrs	?	Sedation, vomiting, diarrhoea, hepatotoxicity	-
Gabapentin	5-10 mg/kg q 8-12hrs	?	Sedation, ataxia	No clinical studies published
Pregabalin	2 mg/kg q 12hrs	?	Sedation, ataxia	No clinical studies published
Topirimate	12.5-25 mg q 8-12hrs	?	Sedation, inappetence, weight loss	No clinical studies published

*Author's opinion
Please consider the cascade regulation when prescribing antiepileptic drugs

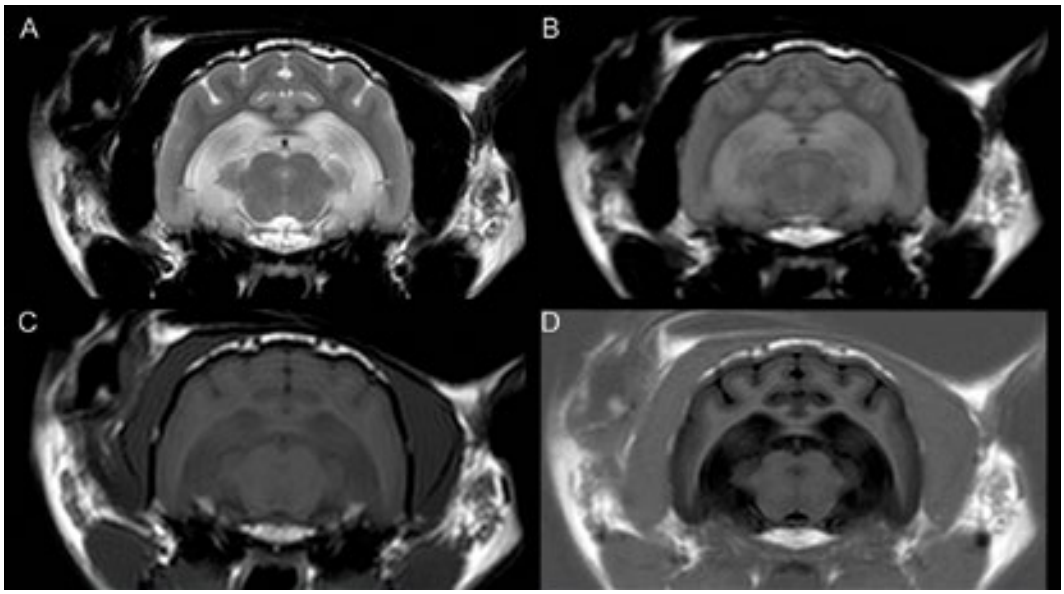

***Figure 2**. Magnetic resonance imaging changes in a cat with temporal lobe epilepsy. The magnetic resonance images of the brain of a cat with seizures shows changes in both hippocampi. The hippocampi appear 'oedematous' (enlarged, hyperintense on T2 weighted [A] and FLAIR [B] images, hypointense on T1 weighted [C] and inversion recovery [D] images).*

Hippocampal and pyriform lobe necrosis is not uncommon in this species. It has been associated with worse treatment success and outcome (Fatzer et al, 2000). Pakozdy and colleagues have done some fantastic work in characterising this pathology in more detail (Pakozdy et al, 2014a; Pakozdy et al, 2011; Pakozdy et al, 2014b; Pakozdy et al, 2013; Pakozdy et al, 2010).

This pathology is usually reported in cats presenting with acute cluster seizures. Seizures can be focal or generalised. Focal seizures are often symmetrical and characterised by orofacial automatisms. Behavioural changes, such as aggression, are not uncommon.

Magnetic resonance imaging can reveal bilateral hippocampal T1 hypointensity and T2 and FLAIR hyperintensity (Pakozdy et al, 2011; Schmied et al, 2008) (**Figure 2**).

Hippocampal necrosis is not a disease identity in itself. It is a pathological process and can be caused by a variety of diseases – inflammatory, neoplastic, vascular and toxic disease processes – and as mentioned earlier, by seizures (Pakozdy et al, 2014b). In human medicine, the term commonly used is 'hippocampal sclerosis' and the debate will continue as to whether this is a cause or a consequence of seizures; or both.

> "Epilepsy is the most common chronic neurological disease in cats, with symptomatic epilepsy being seen more often than idiopathic epilepsy"

It is generally accepted that patients with hippocampal sclerosis are frequently more difficult to control pharmacologically and that surgical removal of the mesial temporal lobe improves pharmaco-response. Cats do appear to have similar pathological changes of their hippocampus when compared with human patients with temporal lobe epilepsy (Pakozdy et al, 2014b).

The 'Pakozdy group' also found that some cats with temporal lobe epilepsy had evidence of voltage-gated potassium channel (VGKC) complex antibody (Pakozdy et al, 2013; Klang et al, 2014). This is an interesting finding which could provide another explanation of why some of these cats do not respond adequately to antiepileptic drug treatment.

Treatment and outcome

There remains a lack of reliable data about the best treatment regimen for cats (**Table 4**). This results in neurologists advising different treatment regimens and advice as to when to initiate treatment. Most would not start antiepileptic treatment after a single epileptic seizure, but would start treatment if an animal presents with cluster seizures or status epilepticus. There is some evidence in dogs that treatment can be discontinued when the acute seizures are controlled and were caused by intoxication (Jull et al, 2011).

The strategy for chronic antiepileptic drug treatment that is most frequently suggested is to start treatment when an identifiable structural aetiology is identified, status epilepticus has occurred, two or more isolated seizures have occurred within a six-month period, and if seizures deteriorate in frequency and severity.

The prognosis for treatment success is always based on the suspected underlying aetiology. Symptomatic epileptic patients should not only be treated for seizures, but also the underlying disease process. Cats with idiopathic epilepsy are usually started on phenobarbital (**Table 4**).

Around 40 per cent of treated cats with idiopathic epilepsy become seizure-free, 40 per cent have a decrease of more than half of their seizures, and 20 per cent do not respond to treatment (Pakozdy et al, 2014b). The cats that do respond to treatment usually remain seizure-free for many years, unless the treatment is stopped. Cessation of treatment can result in the majority of cats having a recurrence of their seizures.

Conclusion

Epilepsy is the most common chronic neurological disease in cats, with symptomatic epilepsy being seen more often than idiopathic epilepsy. In most cases, the diagnosis of idiopathic epilepsy does not require advanced diagnostic imaging; although this should be considered if the epilepsy deteriorates.

Cats with a normal physical and interictal neurological examination, generalised onset seizures, unremarkable routine blood and urine tests, and of younger age are highly likely to have idiopathic epilepsy.

If the cat does not respond to treatment, the cat is middle-aged or elderly, the cat has (asymmetrical) focal seizures and interictal neurological deficits, then intracranial structural disease needs to be considered. ■

PPD Questions

1. Which is the most common epilepsy type in the cat?
2. Idiopathic epilepsy in the cat is a diagnosis of exclusion. True or False?
3. Which adverse effect has been reported to be potentially life-threatening in cats treated chronically with diazepam?
4. Which drug is currently considered to be the first-line treatment in cats?
5. Cats with idiopathic epilepsy can become seizure-free on treatment. How high was the reported percentage in a recent study?

Answers
1. Symptomatic epilepsy 2. True 3. Acute hepatic necrosis 4. Phenobarbital 5. 40 per cent

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**Suggested Personal & Professional Development (PPD)*

HYPERTHYROIDISM

Feline hyperthyroidism with concurrent chronic kidney disease

Hyperthyroidism is the most common endocrinopathy of cats, with 95 per cent of cases occurring over the age of eight years. Chronic kidney disease (CKD) is also commonly identified in older cats. It is not surprising, therefore, that hyperthyroidism and CKD are often observed concurrently. This article will examine how the presence of CKD affects hyperthyroidism, including the management of cases. The effect of hyperthyroidism on CKD is also discussed, but for a full discussion of the treatment of CKD another reference should be sought.

Hyperthyroidism is the most common endocrinopathy of cats. According to Peterson and Broome (2014), 95 per cent of cases occur over the age of eight years, and 97 to 99 per cent of cases are caused by benign adenomatous hyperplasia, with carcinomas in up to three per cent of cases (Harvey et al, 2009).

Chronic kidney disease (CKD) is also commonly identified in older cats; so it is not surprising, therefore, that hyperthyroidism and CKD are often observed concurrently. The prevalence of pre-existing CKD in hyperthyroid cases is reported to be 14-40 per cent (van Hoek and Daminet, 2009).

The life expectancy of cats with pre-existing kidney disease at the time of diagnosis of hyperthyroidism is six months to two years, in comparison with an average of three-and-a-half years in cats with no concurrent CKD (Mckelvey, 2014).

Figure 1. *The reduced muscle mass seen in hyperthyroid cats causes decreased serum creatinine.*

Effect of hyperthyroidism on CKD

Increased serum concentrations of thyroidal hormones cause an increase in renal blood flow, through increased cardiac output (van Hoek and Daminet, 2009). This occurs owing to positive chronotropic and inotropic effects, decreased vascular resistance and increased activity of the renin-angiotensin-aldosterone system (RAAS) leading to increased blood volume.

Glomerular filtration rate (GFR) is increased via several mechanisms, including increased glomerular hydrostatic pressure. An increased GFR will reduce both serum urea and creatinine concentrations. The reduction in overall muscle mass seen in hyperthyroidism also decreases serum creatinine concentration (**Figure 1**). On average, creatinine is 22 per cent lower (Wakeling et al, 2008).

Through these processes, hyperthyroidism can mask CKD, but can also potentially induce kidney damage (Reynolds and Lefebvre, 2013).

Figure 2. *It is important to monitor blood pressure regularly in cats with hyperthyroidism and chronic kidney disease.*

Proteinuria, a negative prognostic indicator in CKD, is observed in hyperthyroidism and may be a consequence of glomerular hypertension and hyperfiltration. The proteinuria will improve, or potentially resolve, following treatment for hyperthyroidism (Williams et al, 2010). It cannot, therefore, be used in identifying CKD progression, although its presence does correlate with decreased survival time.

Effect of CKD on hyperthyroidism

CKD and other non-thyroidal illnesses cause decreased serum thyroid hormone concentrations (van Hoek and Daminet, 2009). This is referred to as euthyroid sick syndrome. Total T4 and T3 are affected with free T4 less affected. Thyroid stimulating hormone (TSH) is also decreased in patients with CKD and hyperthyroidism, but can be elevated in patients with CKD and hypothyroidism.

Blood pressure

Both hyperthyroidism and CKD can cause hypertension **(Figure 2)**. The prevalence of hypertension in hyperthyroidism is shown, in various studies, to be between five and 87 per cent, and the prevalence in CKD is 19 to 46 per cent (Brown et al, 2007).

Furthermore, hypertension can cause progression of CKD. The presence of hypertension correlates with decreased survival times (Williams et al, 2010).

It has not yet been proved that treatment of hypertension has an effect on survival times, although it is recommended – to minimise the risk of retinal damage and its effect on quality of life, for instance.

Urinary tract infections

Twelve per cent of cats with hyperthyroidism and 22 per cent of cats with CKD have urinary tract infections (Mayer-Roenne et al, 2007). Most of these cases showed no clinical signs of feline lower urinary tract disease (FLUTD), so urine culture is recommended even in the absence of clinical signs.

No underlying link between hyperthyroidism and urinary tract infections has been identified yet. Cats with CKD are at increased risk through a number of processes, including the loss of the defence of concentrated urine. Together with the increased risk of urinary tract infections seen in CKD patients, the urinary tract infection can lead to pyelonephritis which may cause further kidney damage (Reynolds and Lefebvre, 2013).

Diagnosis of hyperthyroidism

In a large proportion of cats, diagnosis of hyperthyroidism can be made based on a raised total T4 concentration in conjunction with consistent clinical signs. However, approximately 10 per cent of hyperthyroid cases will have total T4 (tT4) concentrations within the higher end of the normal range owing to non-thyroidal illness, or early investigation of mild cases where the daily fluctuation of T4 crosses the upper limit of the reference range (**Figure 3**).

Hyperthyroidism should be suspected in cats with CKD and tT4 measurements greater than 30nmol/l (Wakeling et al, 2008). In these cases, a free T4 (fT4) measurement can aid diagnosis. A fT4 on its own may be increased in approximately 10 per cent of euthyroid cats, but a diagnosis of hyperthyroidism can be made in cats with high fT4 in conjunction with high-normal tT4 (Wakeling et al, 2008).

Figure 3. *In some cases, total T4 can be within the upper half of the reference range in hyperthyroid cats.*

Table 1. IRIS Staging Guidelines for CKD (IRIS, 2013)

STAGE	Blood Creatinine (µmol/l)	Comments
At risk	<140	History suggests the animal is at increased risk of developing CKD in the future because of a number of factors (e.g. exposure to nephrotoxic drugs, breed, high prevalence of infectious disease in the area, old age).
1	<140	Non-azotaemic. Some other renal abnormality present (e.g. inadequate urinary concentrating ability without identifiable non-renal cause, abnormal renal palpation or renal imaging findings, proteinuria of renal origin, abnormal renal biopsy results, increasing blood creatinine concentrations in samples collected serially).
2	140 - 250	Mild renal azotaemia (lower end of the range lies within reference ranges for many laboratories, but the insensitivity of creatinine concentration as a screening test means that animals with creatinine values close to the upper reference limit often have excretory failure). Clinical signs usually mild or absent.
3	251 - 440	Moderate renal azotaemia. Many extra-renal clinical signs may be present.
4	>440	Increasing risk of systemic clinical signs and uraemic crises.

Low TSH in conjunction with high fT4 can also aid diagnosis. TSH is measured using canine assays, as a feline-specific assay is not presently available. The cTSH reference range in older cats is defined as 0.03ng/ml – 0.15ng/ml (Wakeling et al, 2008).

A T3 suppression test, TRH stimulation test or thyroid scintigraphy could be performed, but their use is limited for practical reasons, cost and availability.

Treatment of hyperthyroidism

Current treatments available for hyperthyroidism are oral medication, transdermal medication (off-licence use via the cascade system), restricted iodine diet, surgical thyroidectomy and radioactive iodine.

Reversible treatment using oral carbimazole, oral thiamazole, restricted iodine diet or transdermal methimazole gel, is advised initially. Once euthyroidism has been achieved, renal parameters can more accurately be assessed, alongside cardiac assessment. The changes in renal parameters occur within a month of the resolution of hyperthyroidism.

If renal parameter changes occur, on average these will be equivalent to advancing by one IRIS stage (International Renal Interest Society) guidelines (IRIS, 2013) (**Table 1**). The parameters then remain relatively stable.

Studies have investigated ways of predicting which cats will develop renal insufficiency after treatment of hyperthyroidism with some potential, but currently this cannot be accurately predicted (van Hoek and Daminet, 2009). It is important to note that unmasking of CKD will occur whatever treatment is instituted; but initial reversible treatment allows for future therapy to be tailored to the patient in a way that cannot be done if permanent treatments are used initially.

Once the patient is stable, non-reversible treatments can be considered. The most appropriate treatment varies between patients, depending on age, renal function and owner circumstances. However, all treatment options should be discussed with the owners in every case.

Ideally, patients with no current evidence of CKD – and aged less than 15 years – should be considered for radioactive iodine treatment or surgery (Mckelvey, 2014). These treatments prevent progression of the condition and also prevent compliance problems often seen with long-term medications.

Cats in IRIS stage 2, 3 or 4 at initial diagnosis, or those over the age of 17, should be considered for long-term methimazole or restricted iodine diet (Mckelvey, 2014). This allows for dose tailoring and reduces the risk of iatrogenic hypothyroidism.

> 'Hypothyroid cats may or may not show clinical signs such as lethargy, weight gain and alopecia"

For cats not showing overt renal disease – but which are at risk of developing CKD – the initial stabilisation period is most important to guide decision-making. If renal function does not decline over a four to eight week period, radioactive iodine can be considered. Ongoing methimazole or restricted iodine diet may be continued, and good compliance and regular monitoring are essential.

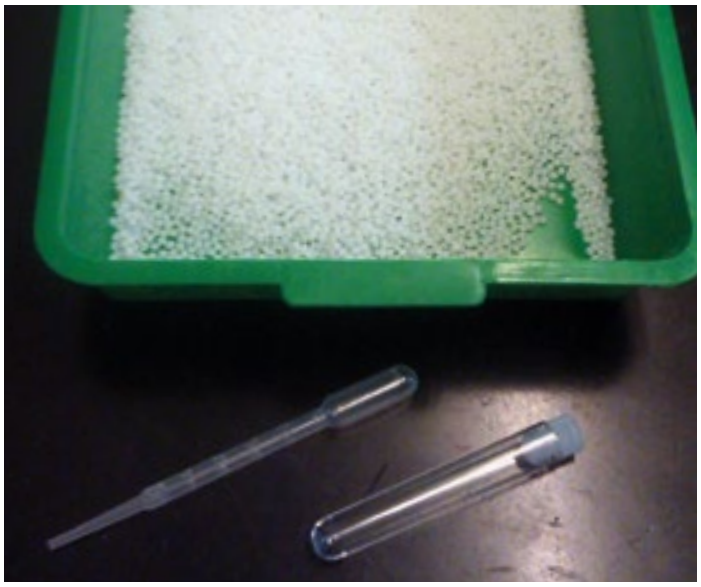

Figure 4. *Regular urinalysis, together with blood sampling and blood pressure measurements, is important in monitoring hyperthyroid patients.*

As discussed above, ongoing hyperthyroidism has the potential to worsen CKD through activation of the RAAS system. Therefore, the idea that keeping T4 levels higher in patients with CKD in order to maintain GFR is outdated. In all patients – whether or not CKD is already present – it is important to maintain tT4 levels in the lower half of the normal range.

Interestingly, studies have found no difference in the survival time of hyperthyroid cats irrespective of whether they develop post-treatment azotaemia (Williams et al, 2010). One important exception to this is iatrogenic hypothyroidism, which leads to reduced survival times when azotaemia is present (Williams et al, 2010).

Hypothyroid cats may or may not show clinical signs such as lethargy, weight gain and alopecia. A low tT4 on its own does not confirm hypothyroidism, as it may be the result of non-thyroidal illness, such as CKD. Rather, a lower tT4 or fT4, in conjunction with increased TSH, is necessary (using the cTSH assay with a feline reference range of 0.03ng/ml - 0.15ng/ml).

Hypothyroidism can be treated by reducing the dose of methimazole/carbimazole/thiamazole. When it is identified post radioactive iodine or surgery, treatment is by L-thyroxine supplementation starting at a dose of 0.1mg once or twice daily.

Iatrogenic hypothyroidism is not reported when restricted iodine diet is used alone (but has been reported when used concurrently with methimazole, so it should be used as a sole treatment). If it occurs, the diet should be stopped and an alternative treatment instituted.

Treatment of concurrent CKD

Tackling concurrent CKD may involve fluid therapy, dietary management with renal diets, phosphate binders, H_2 blockers, ACE inhibitors, ACE receptor blockers, potassium gluconate, calcitriol, and erythropoietin.

Hypertension

Both hyperthyroidism and CKD cases may benefit from anti-hypertensive therapy (**Figure 2**).

The calcium channel blocker amlodipine is the treatment of choice (Brown et al, 2007). ACE inhibitors such as benazepril can also be used. It is important, however, to monitor closely the blood pressure of these patients, as hypotension can cause a precipitous reduction in GFR (IRIS, 2013). Any dehydration/hypovolaemia must be corrected prior to starting anti-hypertensive medication.

Systolic blood pressure should be maintained at greater than 120mmHg. Patients with blood pressure readings under 150/95mmHg do not require treatment at the present time. Treatment should be instituted if reliable readings over 180/120mmHg are seen. Between 150/95mmHg and 180/120mmHg, decisions should be based on the presence/absence of retinal/CNS signs and the control of CKD/hyperthyroidism/other causes of secondary hypertension (Brown et al, 2007).

Urinary tract infections

As discussed above, urinary tract infections should be identified by culture and treated. Clavulanate-potentiated amoxycillin is the first-line antibiotic of choice (Mayer-Roenne et al, 2007), but resistant bacterial strains may be present, so treatment should be based on antibiotic sensitivity testing.

Monitoring

Once the patient is stable, regular monitoring is advised at least every three to six months – more often depending on the stability of the patient's condition. Monitoring of biochemistry, haematology, urinalysis and blood pressure along with tT4 is necessary (**Figure 4**).

Otherwise treatment side effects – leukopenia caused by methimazole/carbimazole, for example – and concurrent disease, may be missed, which can impact on both quality of life and survival times. The results must be interpreted based on clinical findings. For instance, increases in creatinine a few months after stabilising may be the result of increased muscle mass and should not be interpreted as a decline in renal function.

Summary

Diagnosis of hyperthyroidism can be complicated by CKD owing to thyroidal effects on GFR and other renal parameters, and vice versa. Once a diagnosis of hyperthyroidism is made, initial stabilisation by reversible treatment should be instituted prior to a decision on the mode of long-term treatment.

Urea and creatinine will increase initially, through a reduction in GFR and an increase in bodyweight. tT4 should be maintained in the lower half of the reference range in cats with CKD, just as with cats with normal renal function. Iatrogenic hypothyroidism should be avoided. Blood pressure should be routinely monitored. ■

PPD Questions

1. Which of these is false? Hyperthyroidism causes:

   A. Decreased vascular resistance
   B. Increased RAAS activity
   C. Increased GFR
   D. Decreased proteinuria
   E. Increased glomerular hydrostatic pressure

2. Which does NOT require regular monitoring in patients with concurrent hyperthyroidism and CKD receiving carbimazole orally:

   A. TSH
   B. tT4
   C. Blood pressure
   D. Leukocyte counts
   E. Urine specific gravity

3. Which treatments for hyperthyroidism would be recommended for an 11-year-old cat with no evidence of CKD?

   A. Radioactive iodine and restricted iodine diet
   B. Oral thiamazole and methimazole transdermal gel
   C. Radioactive iodine and thyroidectomy
   D. Restricted iodine diet and oral carbimazole
   E. Thyroidectomy and methimazole transdermal gel

4. When concurrent CKD and hyperthyroidism are present, what level of tT4 should be maintained?

   A. Below the normal range
   B. In the lower half of the normal range
   C. In the upper half of the normal range
   D. Slightly above the normal range

Answers

1. D, it actually increases proteinuria 2. A 3. C 4. B

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Victoria is a qualified veterinary nurse with 15 years of experience in both small animal and emergency practice environments.

She has been a lecturer at Warwickshire College for the past 10 years and is currently course manager for Veterinary Nursing. As a practical examiner for the RCVS, Central Qualifications and City and Guilds, she also has the privilege and pleasure of assessing the next generation of veterinary nurses.

Essential notes on first aid and procedures that the RVN can carry out before the vet arrives

In order to deliver the elements of first aid competently, we first need to recognise the aims and limitations that apply. We also need to implement the systems of triage and extensive nursing procedures that can be completed before a veterinary surgeon is available. The qualified Registered Veterinary Nurse should be able to complete nursing triage and emergency procedures, but they must ensure that their skills in emergency triage and care are kept up-to-date through appropriate CPD.

The starting point is the Veterinary Surgeons Act 1966, which prohibits any person from practising veterinary surgery and carrying out operations unless they are a qualified veterinary surgeon and registered with the Royal College of Veterinary Surgeons (RCVS).

Amendments to the Act permit qualified veterinary nurses kept on the List held by the RCVS, and student vet nurses, to carry out minor surgical procedures (not allowed to enter a body cavity) under the guidance of a veterinary surgeon. Nurses are prohibited from performing diagnoses and treatments.

The RCVS Guide to Professional Conduct (2000) stipulates that if an animal is brought to a veterinary practice and requires emergency treatment, the surgery staff must provide first aid care and pain relief, regardless of the species of animal or financial difficulties the owner may have. Under the guidance of the Standards Committee, the RCVS Council has agreed the changes to the Code of Conduct with regard to emergency provision (RCVS, 2014a).

Who can carry out first aid?

There are certain exceptions under the Veterinary Surgeons Act 1966, one of which refers to the carrying out of first aid (Great Britain, 2008). Anyone – including lay persons – can carry out first aid in an emergency to preserve life and alleviate suffering as an interim measure until a veterinary surgeon can attend to the animal.

The aims and rules of first aid are well documented. The three aims of first aid are to:

1. Preserve life
2. Prevent suffering
3. Prevent the situation deteriorating

There are five general rules of first aid:

1. Don't panic – remain calm
2. Assess the situation – is there any danger to you or others? Avoid sudden movements and loud noises
3. Maintain airway – to facilitate breathing
4. Control haemorrhage – to maintain circulation
5. Contact a vet A.S.A.P

Always use the acronym ABC – Airways, Breathing, Circulation (Davis, 2006).

Classification of emergencies

Emergencies are classified into three groups (**Table 1**): life-threatening emergencies require immediate action at home and/or arrival at the veterinary surgery; serious emergencies require immediate attention at the surgery; and in the case of minor emergencies, advice may be given by a veterinary nurse to alleviate suffering until a veterinary surgeon can see the patient.

Evaluation of the first aid patient

Always use the recovery position (unless the injury restricts this):

- Lie the animal on its side, preferably right-side recumbency (again injury-dependant)
- Ensure the head and neck

Table 1. Classification of emergencies

Life-threatening	Serious	Minor
Unconsciousness	Conscious collapse	Insect stings
Conscious collapse – dyspnoea/cyanosis	Dyspnoea	Minor wounds
Severe haemorrhage	Fractures/dislocations	Minor burns
Severe burns	Haemorrhage	Abscess
Prolapsed eye	Gaping wounds	Lameness
Poisoning	Severe dysuria	Haematuria
Gastric torsion	Dystocia	Aural haematoma
Heat stroke	-	-

are straight
- Pull the tongue forward (carefully to avoid being bitten)
- Remove its collar

Vital first aid information includes:
- Owner's name, address, phone number
- Patient details
- Nature of injury
- Time it happened
- Signs and symptoms
- Any change in the animal since injury occurred
- Respiration
- Colour of mucous membranes
- Has the owner administered anything?
- Usual health status
- On any current treatment?

Triage

In most instances, a telephone conversation is the first component of triage. Some owners may resent the veterinary nurse asking questions; but it is important to gather all the relevant information before the end of the telephone call, as this will aid preparation for the arrival of the patient at the surgery.

In the case of poisoning, ensure that the client brings the poison or packet with them to assist with identification of the active ingredient and subsequent selection of the appropriate antidote and treatment.

Owners will need advice on transporting injured animals, so you need to be prepared to offer appropriate advice. If the animal has collapsed or has been involved in a road traffic accident it will require a health check before it is moved (Clawsen, 2014).

Approaching the animal

An injured animal may be scared and shocked, so it might bite or scratch when approached. It is, therefore, important to approach it slowly and calmly, continually reassuring the animal.

The goal of triage is to identify patients with life-threatening conditions that require immediate attention from a veterinary surgeon and distinguish them from patients that are not as ill (Aldrich, 2005; Drobatz, 2010).

The triage assessment should be completed in less than two minutes and should be carried out in a calm, controlled manner in order to ensure enhanced communication with the owner (Aldrich, 2005). The person completing the triage must stay focused on the patient and not be distracted by external factors (Bateman, 2007).

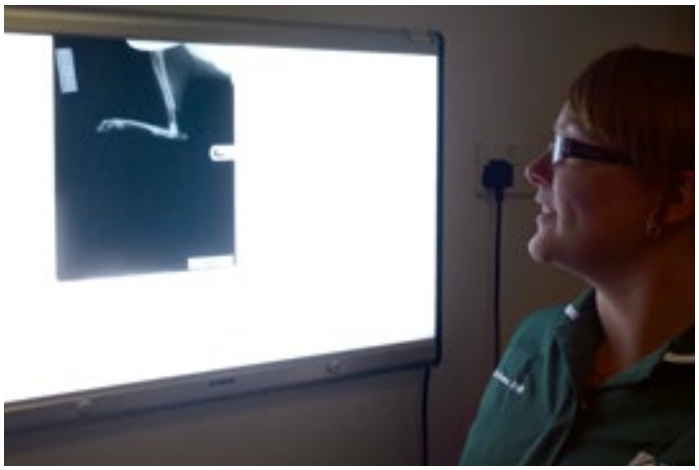
Further assessments will be carried out after triage and these are commonly known as the primary and secondary survey.

The primary survey consists of an initial assessment to ascertain the likelihood of cardiopulmonary arrest (ABC); it should be determined whether the patient is conscious or unconscious. Major body systems – cardiovascular, respiratory and nervous, for example – must then be assessed.

Once the primary survey has been completed and treatment has been given, a general secondary physical assessment can be performed. This involves examination of the nose, mouth, eyes, ears, limbs, thorax, abdomen, external genitalia and tail (Jordan and Brainard, 2011).

Although there are extensive procedures, both within triage and emergency care, that are not covered within this article, the following are first aid procedures the qualified registered veterinary nurse can carry out for a number of different emergencies.

Figure 1. *Radiography is a standard imaging technique for the identification and assessment of fractures.*



Fractures

Clinical signs:
- Pain
- Swelling
- Deformity
- Crepitus
- Loss of function
- Unnatural movements

Treatment:
- Do not 'over handle' the fracture site
- Provide support for the area
- If haemorrhage is present, do not put pressure on the fracture site
- Splint the injured limb, if appropriate
- Apply a Robert Jones dressing, if appropriate, as described in Emergency Procedures for the Small Animal Veterinarian (Plunkett, 2013) (**Figure 1**).

> "The person completing the triage must stay focused on the patient and not be distracted by external factors"

Thermal injury

Burns can be caused by dry heat (fire), corrosive chemicals, electrocution, radiation and excessive cold. Scalds are caused by moist heat and burns by dry heat.

Clinical signs:
- Red moist skin
- Heat in the area
- Swelling of the area
- Pain
- Alopecia

Treatment:

Heat and electrical burns
- Cool the damaged area
- Monitor body temperature – iatrogenic hypothermia can be caused by excessive cooling
- IV fluid therapy
- Clean and dress wound
- Curtail animal's movement (Ford and Mazzaferro, 2012)

Chemical burns
- Gloves must be worn
- Flush area with copious quantities of water
- Wash coat in a mild detergent
- Observe for signs of toxicity (Ford and Mazzaferro, 2012)

Insect stings

Most insect stings are found in the paws or the mouth. Bee and wasp stings cause similar effects but generally are not severe unless patients have been stung in areas where the swelling may cause a problem. On the other hand, some animals may have an allergic reaction and collapse.
Bee stings are acid, so wash the area with dilute bicarbonate of soda and remove the sting, if possible. Wasp stings are alkaline, so bathe the area with dilute vinegar.

Figure 2. *Applying a pressure bandage to a cut 'stopper' pad.*

Figure 3. *Role play is an essential part of preparations for 'real-life' CPCR.*

Haemorrhage

Any blood loss can have serious consequences for a pet animal and should be treated as an emergency. First aid treatment invariably involves application of pressure.

Direct pressure refers to situations in which it is necessary to apply pressure directly to the haemorrhage site. This can either be done using fingers (digital pressure) and/or by using a pressure bandage. If applying a pressure bandage, ensure that dressing material applied to site is non-adherent (**Figure 2**).

Do not remove the dressing if the blood runs through; instead, apply another on top to maintain pressure. If the haemorrhage continues after multiple applications, immediate veterinary attention is required.

Indirect pressure is the use of the 'pressure points' around the body. It is the process of putting pressure on an artery which slows blood flow to the wound. The main pressure points are:

- **Brachial artery:** this lies on the medial side of the humerus. By applying pressure here blood flow to the lower limb will be prevented
- **Femoral artery:** found on the medial aspect of the femur. By applying pressure here blood flow to the lower limb will be prevented
- **Coccygeal artery:** found on the ventral aspect of the tail. By applying pressure here blood flow to the lower tail is prevented

Tourniquets are used to slow blood flow to a limb. They can only be applied for a maximum of 15 minutes and once removed, should not be reapplied for a further one minute (Oakley, 2006).

Cardiac Emergencies

Cardiopulmonary cerebral resuscitation (CPCR)

The basic principles of CPCR are:

- Airway – establish airway
- Breathing – one every 3-5 seconds
- Circulation – 80-120 compressions per minute (Davis, 2006)

It is always beneficial to practise CPCR using 'real-life' scenarios and role play. Doing this as a team will improve competency and help build confidence in dealing with emergency situations (**Figure 3**).

Artificial respiration

Artificial respiration is facilitated during surgery if the animal is intubated. Ensure the tube is cuffed and apply gentle pressure to the re-breathing bag.

If the animal is not intubated, mouth-to-nose resuscitation can begin in the following manner:

- Place patient on its side and extend the neck
- Pull the tongue forward
- Close the mouth firmly
- Blow into the nose (remove mouth when inhaling)
- Blow gently so as not to over inflate the lungs

Cardiac massage

- This technique may also be of use in the collapsed patient when the heart appears to have stopped beating properly
- Place the patient in lateral recumbency, extending the forelimbs forward
- For small animals, place your hands around the chest with finger tips and thumbs on either side (of the chest). Apply even pressure by squeezing the thumb and fingers together. This is repeated 120 times per minute
- For larger patients, use the 'heel' of one hand with the other hand on top, and apply pressure over the region of the heart
- While 'massaging' the heart in this way, stop at regular intervals to observe for a heartbeat. ■

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Ivan graduated from the Royal Veterinary College and has been working in general practice in the UK for the last 15 years. He developed a large rabbit caseload made up of first-opinion, second-opinion and rescue work. He also designs and develops a variety of veterinary products.

Ivan is recognised as an international teacher on rabbit airway management and anaesthesia, as well as maintaining his general practice and second-opinion rabbit work.

**Suggested Personal & Professional Development (PPD)*

RABBIT HUSBANDRY

Basics of rabbit husbandry:
what to talk about in the first consult

Over the last 20 years, pet rabbit keeping in the UK has blossomed. Many people no longer want the responsibility of a dog or the hassle of a cat and rabbits are now the third most popular mammal kept as a pet – and not just 'another exotic'. This article covers some of the 'rules of thumb' that should be discussed with owners in consults. Husbandry is the key to rabbit veterinary medicine and is involved in respiratory disease, most dental problems, spinal disease, virtually all intestinal problems, 'fly strike', sore hocks – the list goes on. A good rabbit GP should be spending the majority of his or her time on preventive health care.

Wild rabbits eat grass – not biscuits, toast, rabbit pellets, cheese, 'Hobnobs', carrots, lettuce... Not a tricky concept; but it is the lack of long stalks of grass or hay in the diet that causes most first-opinion problems. Imagine the clinical problems likely to occur in a pony kept in clean field conditions on natural grazing versus a horse kept stabled permanently and fed only concentrate mix.

Some general concepts

As a 'rule of thumb' diet, every rabbit should be eating a ball of hay of about its body size daily, and have access to fresh grass and wild plants for grazing (**Figure 1**). As a supplement, they should receive a small portion of high quality extruded rabbit pellets (the author recommends one egg-cup full for an average 2kg rabbit) and a small handful of mixed leafy greens.

It is useful to explain that normal dog foods (the RMB diet, notwithstanding) contain what a dog would get in the wild – a mix of meat and vegetable content that happens to be presented in a convenient form. Rabbit pellets on the other hand do not – they represent a high quality, low volume, concentrated nutrition source which sounds great until you realise that this species is designed to thrive on a low quality, high volume nutrition source.

Rabbit pellets are a supplement to assist an animal that cannot access the wide range of plant species that it would have in the wild. The better companies have realised this and are producing a good range of extruded pellets, hays and dried leaves. Extruded pellets help to prevent selective feeding when compared with muesli-type foods, but are still only appropriate to be fed in small volumes.

The rabbit digestive system effectively digests grass and other plants, by utilising bacteria grown in the caecum. Inappropriate food such as yoghurt drops and toast create a 'sugar rush' which will be taken advantage of by pathogenic bacteria. This encourages the development of a subclinical population of fast-fermenting bacteria, just waiting for the opportunity to convert a minor gut problem into a life-threatening bloat episode.

If you want to enjoy giving treats without damaging the gut flora, there are plenty of good products out there – from willow sticks, to dried herbs and other leaves. Other useful tricks are to give the daily pellet ration in cardboard boxes (or

Figure 1. *An appropriate, nutritionally balanced rabbit diet. (Photo: The Hay Experts)*

even the challenge toys made for wild birds) that then have to be solved or ripped apart to release the food. Fresh herbs, especially basil, mint and thyme, are popular and readily available in supermarkets. Grass clippings should not be given – they are often contaminated with oil and also ferment rapidly.

Hay needs to be much better quality than that found in many pet shops and should be stored in a well-ventilated, clean and dry environment (**Figures 2 and 3**). Specialist suppliers are readily available, including online retailers, equine suppliers and local stables or farms.

The bacterial flora in the caecum produce partially digested food that is then passed as a 'packaged' caecotroph. The rabbit swallows this immediately as it is being passed so that the constituents (amino acids, vitamins and volatile fatty acids) can then be absorbed on a second 'pass' through the digestive system. This is a very enjoyable process to explain to children when the family comes in for the first rabbit consult!

If faecal pellets become 'caked' round the backside and tail, something has gone wrong with this process. Any disease that prevents normal grooming (dental disease, obesity, urine scald, spinal pain, osteoarthritis) or anything that alters the intestinal environment (high sugar diets, low fibre levels, rapid diet changes, excessive vegetable content in diet) will produce this. Fly protection should be started immediately as diagnosing and resolving the problems may take many weeks.

Housing

Owners should be encouraged to buy the largest and best built housing that they can. As a bare minimum, rabbits should be able to stand up straight on their back legs, and be able to hop at least three 'decent' hops (over two metres!) in succession; but even hutches of this size are only barely adequate. The standard 'hutch' is a throwback to the days when back garden rabbits were bred for a few months for meat and are not suitable for pets to be kept in for long periods.

> "Owners should be encouraged to buy the largest and best built housing that they can"

Accommodation should be weatherproof and well ventilated, while avoiding draughts at rabbit level. Damp is a problem, especially in the winter, owing to rain and the relatively high amount of fluid that rabbits will get through. Rabbits can cope with reasonably cold conditions when sheltered and well cared for.

The author recommends providing a second roof over a hutch, separated from the hutch roof by about 30cm for airflow and overhanging the hutch on all sides. This prevents rain from soaking the wooden sides and is a fairly simple task to construct. Corrugated plastic roofing material from a DIY shop is an appropriate material for this. Wrapping the hutch in plastic, however, prevents ventilation and encourages mould growth, so should not be recommended.

Garages and tool sheds have poor light levels, making cleaning and checking very difficult. Ventilation is frequently dreadful, which increases the risk of respiratory disease. On top of this, most sheds and garages are full of sharp tools and toxic chemicals – not the ideal environment.

On the other hand, with some alterations, a shed can make a very attractive alternative to a hutch (**Figure 4**). If the shed base is raised, the area underneath should be blocked with wire mesh to discourage rats.

A run should be large enough to allow rabbits to run and play, not just hop. As with hutches, it should be tall enough to allow the rabbit to stand up on its back legs. Free access to the garden is advised against – it can be very difficult to rabbit proof anything other than a small garden against escape, and foxes and cats find

Figure 2. *Good quality hay should be fairly green in colour, with a fresh smell and little or no dust.*

Figure 3. *Both of these samples are of 'Timothy' hay. The sample on the left is of far superior quality. (Photo: The Hay Experts)*

Figure 4. *Outdoor housing based on a garden shed. Playhouses can also be adapted.*

it easy to climb over garden fences. In the rare cases where security can be guaranteed, then obviously greater space and freedom will be beneficial.

Indoor rabbit keeping is gaining popularity. From the point of view of the rabbit, this normally provides more space and freedom than a small hutch and run. Social contact with the owners and the opportunity to display play behaviour is also improved. However, indoor keeping alone is not adequate for rabbits.

Grass-eating animals should have the opportunity to graze and exposure to the ultraviolet component of natural light is critical for vitamin D production and correct calcium metabolism (Fairham and Harcourt-Brown, 1999; Emerson et al, 2014). It is very important to teach owners that their rabbits should have at least intermittent outdoor access all year round – Vitamin D will drop abruptly during a winter spent indoors with obvious metabolic consequences.

"Rabbits should have at least intermittent outdoor access all year round"

It is perfectly practical to allow an indoor rabbit access to a secure outdoor run several times a week, throughout the year, providing that shelter against weather and predators is provided within the run. During unusually cold or during wet conditions, indoor rabbits should not be placed outside.

The alternative is to keep rabbits outdoors in good quality housing and allow them indoors time – again throughout the year – for social contact and play. This appears to work extremely well and gives owners the chance to interact more with their pets.

If rabbits have access to electrical cables, they will chew them. All cables should be well out of reach (rabbits can climb extremely well) or should be housed in conduits. They will also chew wallpaper, woodwork and paint from the walls, so lead poisoning is a differential diagnosis with any non-specific illness where the rabbit is living in an older house.

Bonding

Rabbits are highly social creatures. A lone rabbit in the wild will rapidly get 'picked off' by predators. Without a 'buddy' to watch their back, rabbits can never relax and are constantly monitoring for danger, even in familiar environments (**Figure 5**). Their need for companionship and back-up is very significant indeed and is shown by the reduced rate of post-anaesthetic complications in rabbits presented for surgery in a bonded pair so that the rabbit wakes up with its companion close by.

The author recommends talking to a local rescue centre for bonding – a good rescue group should be affiliated with the Rabbit Welfare Association (see 'Contacts') and will know how to bond rabbits with the minimum of fighting. Owners should be made aware that neglected rabbits have a much higher risk of disease and insurance is sensible, even if they come with a clear veterinary check.

Human contact and contact with other animal species is not sufficient for optimal rabbit welfare and every effort should be made to convince owners of the benefits of a natural social structure. Social contact with predator species, such as cats and dogs, normally causes significant long-term stress (and often acute injury...) even if the owner thinks that the rabbit is "happy".

Vaccination

Both rabbit haemorrhagic disease (RHD) and myxomatosis are commonly found in wild and domestic rabbits across the UK. So rabbits should be vaccinated annually with the appropriate vaccine.

Figure 5. *Bonding is for safety and protection, not just comfort.*

As with all vaccines, if pre-existing disease is present, a risk/benefit analysis should be undertaken to determine whether vaccination is the best course of action for that patient. It is certainly possible for any vaccination to trigger resurgence of a subclinical disease. Such complications should be reported to the Veterinary Medicines Directorate (VMD).

Neutering

Neutering will be covered in more detail in a later article. In the meantime, let's be clear that entire rabbits are not enjoyable to live with – both males and females are frequently aggressive to other rabbits and to the owners.

Male rabbits will spray and urine mark. Uterine adenocarcinomas are horribly common in un-neutered female rabbits; and any mistakes in sexing rabbits come with the bonus of more baby rabbits than you know what to do with!

The author would consider neutering rabbits from about four months of age; although very small female rabbits can be technically difficult to neuter at this age and waiting several months may be beneficial in terms of surgical safety.

And finally...

Owner education is a vital part of maintaining the health of this species and is probably the most important job of a rabbit general practitioner. Curing rabbits is very difficult indeed. Prevention of disease is much easier! ■

Useful contacts

Rabbit Welfare Association – A Hutch is Not Enough. Up-to-date information on rabbit care. Owners and vets can become members of the association, which has a very useful annual rabbit-specific conference, suitable for GPs and specialists.
rabbitwelfare.co.uk

PPD Questions

1. Which of the following statements about appropriate rabbit feeding is not correct?

A. Rabbits should receive a diet consisting of a high volume of food of low energy density
B. Supplement rabbit pellets should be of the extruded rather than muesli type to prevent selective feeding
C. High fibre pellets are nutritionally complete and appropriate foods for pet rabbits
D. Rabbits should receive a supplement of fresh leafy green vegetables daily

2. Which of the answers to the following question is correct as to why ventilation is important when considering appropriate outdoor rabbit housing?

A. A through-flow of air removes smell from the hutch and makes rabbits happier
B. Rabbit fluid requirements are high and badly ventilated living areas rapidly become damp, which promotes respiratory disease
C. Wrapping the hutch in plastic prevents the rabbits from seeing out. As a prey species, this increases stress and hence disease risk
D. Rabbits dislike air movement and fresh air is very bad for them

3. Your patient has adherent caecotrophs caked around its tail base. Which one or more of the following problems should be included on the differential diagnosis list?

A. Dental malocclusion
B. Obesity
C. Diet with insufficient grass and hay content
D. Caecal dysbiosis
E. Spinal pain or joint disease

4. In order to provide for optimal rabbit welfare, which one or more of the following points should be considered vital?

A. Clean, dry and spacious living environment
B. Access to hay and grass for grazing, with small volumes only of vegetables and pellet food
C. Regular access to natural sunlight
D. Living in bonded pairs or groups
E. Protection away from sight, smell and sound of predators (including other pets)
F. Neutering and annual vaccination

Answers
1.C 2.B 3.A-E 4.A-E

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Jane is an information scientist who has worked for the Veterinary Poisons Information Service (VPIS) and the human poisons service at Guy's Hospital on and off since 1984.

She has also worked in the pharmaceutical industry. Jane was a founder of the veterinary service in the 1980s and has recently returned to work for the service in the 24-hour rota team.

**Suggested Personal & Professional Development (PPD)*

POISONS

Season of more than mists and mellow fruitfulness

After the long, hazy (?lazy) days of summer, the arrival of autumn presents a new set of challenges – both natural and man-made – for animals and their owners to face.

Although the hazards of the barbecue may be a distant memory, the annual celebration of Bonfire Night brings its own issues, with fireworks and sparklers, luminous necklaces and dropped onions from hot dogs, all representing potential problems when ingested.

From the natural world, fungi and the fruits of horse chestnuts make their appearance at this time of year.

Autumn fairs

Luminous necklaces, bracelets and sticks are found at many fairs, Halloween parties and Bonfire Night festivities. They often resemble chewy or throw toys and so dogs will play with them, bite them and be exposed to the chemicals that are contained within.

There are normally two components to the mixture – a luminescer and an activator. In the case of the novelty items, these chemicals are usually already mixed; whereas in items such as emergency light sources, for boats, camping and cars, bending the outer plastic tubing mixes and activates these chemicals, producing the luminescence.

Although the chemicals are of low toxicity, they are irritant and cause pain and the clinical features relate to this property. Typically, hypersalivation and frothing at the mouth is seen immediately with possible hyperactivity and aggressive behaviour.

Where ingestion has occurred, we would recommend oral fluids. If the chemicals have entered the eye, irrigate thoroughly with water or saline, stain with fluorescein and treat supportively. For dermal exposure the skin should be washed with warm soapy water and a topical steroid cream used to treat any irritation, if necessary.

Despite large numbers of enquiries over the years, the VPIS has seen no serious cases involving these items.

Fireworks

We do, however, receive many enquiries every year regarding dogs ingesting fireworks – usually spent or discharged ones. Sparklers are more difficult to ingest, but with their usual perseverance, dogs can manage those too!

The contents may include sodium chlorate – which can potentially cause methaemoglobinaemia – potassium nitrate, and small amounts of trace metals and dyes, that are not present in sufficient quantities to cause problems. Dogs will normally present with abdominal discomfort, irritation of the mouth and gums, and in more severe cases, vomiting, diarrhoea (that may be bloody), hypersalivation and tremors.

Supportive care with oral, milky fluids should be all that is required, adding in intravenous fluids and treatment of methaemoglobinaemia, if required.

Onions

Hot dogs and burgers are often on sale at autumn events and the ingestion of onions, whether raw or cooked, can be problematic for dogs.

All *Allium* species – including onions, spring onions, leeks, garlic and chives – contain a variety of organosulphoxides. Trauma to the plants converts these compounds to a variety of organic sulphur compounds that deplete glucose-6-phosphate dehydrogenase (G6PD) within erythrocytes resulting in Heinz body formation and anaemia. Cooking or drying of *Allium* species does not reduce their toxicity.

Clinical effects are sometimes seen within 24 hours, but more commonly after several days, and may include gastrointestinal effects of inappetence, vomiting, abdominal discomfort and diarrhoea. The main concern is Heinz body anaemia, and so presenting signs may also include those associated with anaemia, such as depression, lethargy, weakness, pale mucous membranes, tachycardia and tachypnoea.

Korean and Japanese dogs are more susceptible because of an inherited trait characterised by erythrocytes with high concentrations of glutathione which accelerates the oxidative damage caused by n-propyl disulphide and its derivatives.

Although a toxic dose is hard to establish, treatment would

be recommended for more than 5g/kg, and would include gastric decontamination, activated charcoal, monitoring haematological parameters and ensuring adequate hydration. Prognosis is generally good, although as a consequence of the delay in onset of clinical signs, the owner may have forgotten – or have been unaware of – the ingestion of onions as a potential cause.

Fungi

There are over 4,000 species of larger fungi in the UK. The fruiting body that is normally visible above ground, is the part that is most likely to be ingested.

Identification of fungi is extremely difficult, partly owing to the fact that there can be large variation in shape, colour and size, and that these characteristics themselves can change during the development of a fungus and its later deterioration.

Where an animal is observed to have ingested some fungi, as much information as possible should be gathered, such as where and how the fungus was growing, the description and smell and, if possible, a sample collected. A photograph may greatly assist the identification. Even regurgitated fungal fragments, if correctly stored and prepared, can be useful in determination of the species.

The presence of any of the following features indicate that the specimen may contain amatoxins and cause liver damage, thereby triggering a prompt response with regards to treatment:

White or pale gills – there are edible species with white gills, but unless there is certainty, it is better to err on the side of caution.
Rusty brown or deep pink gills – these features are rare in species native to the UK, although of course brown-gilled mushrooms are readily available from supermarkets and are edible.
Presence or remains of a volva – a structure found at the base of the fungus which encloses some developing forms. Although the volva or cup is obvious, it may not be collected once the fungi are broken.
Presence of a 'stipe ring' which is a frill on the stalk – this, of course, does not apply to commercially grown mushrooms.

If the fungus has brain-like folds, this could indicate a species containing gyromitrin, which cause liver and kidney damage. The edible morels have a similar structure which may be confused with these species, but again, better to be over-cautious if unsure.

As a general rule of thumb, the sooner the onset of clinical effects (within six hours of ingestion), the less toxic the fungus, and may indicate one of the following syndromes:

- gastrointestinal irritant poisoning (generally with no other organ system effects)
- ibotenic acid poisoning
- muscarine poisoning
- psilocybin poisoning

Onset of clinical effects with these fungi can be between 15 minutes and six hours, and may included vomiting, diarrhoea, lethargy, profuse hypersalivation, muscle spasm, ataxia and uncharacteristic behaviour.

Where animals present with late onset of clinical effects – more than six hours post ingestion – one of the following three syndromes should be considered:

- amatoxin poisoning
- gyromitrin poisoning
- orellanine poisoning

Although not all *Amanita* species contain amatoxins, in cases of amatoxin poisoning – classically with *Amanita phalloides* – the animal is typically asymptomatic for between six to 12 hours, with lethargy, gastrointestinal effects and severe hypoglycaemia developing from six to 24 hours.

Apparent recovery then follows, but liver enzymes and prothrombin time may be elevated (24-48 hours post ingestion). Hepatic and renal failure occur from 48-96 hours, with death from five to 16 days.

Gyromitrin poisoning also manifests with gastrointestinal signs at two to 24 hours post ingestion, with hepatotoxicity and renal failure occurring at 48-96 hours.

Orellanine poisoning – most commonly seen with *Cortinarius* species – has a latent asymptomatic phase of 36 hours to 17 days. There is a pre-renal phase (usually around seven days) which is mainly gastrointestinal and neurological, and at seven to 21 days post ingestion, renal failure develops. On account of this potentially very long latent period, there is an increased likelihood of misdiagnosis for this type of poisoning in animals.

These more toxic fungi exposures are fortunately not the norm, and since 1995, the VPIS has only had 45 reports of suspected poisoning with amatoxins, gyromitrin and orellanine, and where follow up has been returned, four deaths have been reported.

Horse chestnuts

Aesculus hippocastanum is a large deciduous tree, commonly found in parks and urban areas. The fruits are large spiny, green, yellow or brown capsules containing one or more shiny brown seeds (conkers), which ripen from August to October. All parts of the plant contain aesculin, a saponin glycoside. The bark, leaves and flowers are the most toxic. The horse chestnut should not be confused with the sweet chestnut.

A common scenario is where a dog presents (one to six hours post-ingestion) having been seen to eat a number of conkers and is now hypersalivating, vomiting and lethargic. The experience of the VPIS shows that most dogs will not develop any more serious clinical effects than this, and recover with supportive care and fluid replenishment.

However, we do have some serious cases in our files, where as few as eight conkers in a 10kg dog resulted in profuse vomiting, collapse and dehydration. He recovered after being rehydrated, given prednisolone, multivitamins, antibiotics and a gastrotomy to remove plant material. However, shortly after surgery, a repeat ingestion was not survived.

The treatment recommendations for more than a trivial amount of conkers would include an emetic, but not activated charcoal, as this is unlikely to be beneficial and may exacerbate obstruction. Supportive care – especially prompt rehydration – may be required, and a bland or light diet should be advocated in the short term; laxatives may help the passage on un-retrieved plant material through the gastrointestinal tract. Surgical intervention may be necessary for an obstructed gut. ■

Matthew Swarbrick

Matthew graduated from Liverpool in 2010 and undertook a two-year internship at Newmarket Equine Hospital, during which time he developed a keen interest in orthopaedics and imaging. After a brief spell travelling and a few months 'locuming' in Cheshire, in 2013 he commenced in his role as assistant in diagnostic imaging at Rossdales Diagnostic Centre.

**Suggested Personal & Professional Development (PPD)*

EQUINE CT

CT and its indications in equine practice

Computed tomography (CT) is a technology that uses computer-processed X-rays to produce tomographic images, or slices, of a patient. The technology was first developed in the 1970s, providing a novel way for the indirect visualisation of organs.

CT in adult horses is limited to the head, neck and limbs – the amount of each depending on the individual system. Under GA necks can be scanned caudally to C4-6 (depending on the size of the patient), forelimbs to mid-proximal radius and hind limbs to mid-proximal tibia.

CT basics

An X-ray tube is spun around the patient and multiple exposures are taken and measured by a detector opposite (**Figure 1**). The X-rays are attenuated to varying amounts by different tissues. The varying attenuation values of tissues, measured in Hounsfield units, enables the construction of a slice.

Slices are then reconstructed into a 'volume' by a computer that can then be used to construct planar images in any direction, called mulitplanar reconstruction. On computer software, it is possible to measure the Hounsfield units so that the likely tissue type can be determined.

CT is best suited to evaluation of osseous structures where it affords excellent spacial resolution, but it also offers superior contrast resolution to radiographs in evaluating soft tissues. CT produces around 4,096 shades of grey and how these are displayed is controlled by altering the 'window level' and 'window width', enabling the reader to look at tissue of different radio-densities.

Additionally, altering the acquisition parameters at the time of scanning, or retrospectively using software, optimises the study for particular tissue types. MRI is superior to CT in evaluation of soft tissues, but the size limit of the body part requiring scanning, longer scan times and geographic availability limit its uses.

Contrast enhanced CT (CCT) can be used in a variety of ways to gain additional information from the CT scan. Intra-articular contrast agents can be useful for assessing cartilage defects while CT fistulography uses contrast agents to evaluate the origin of draining wounds, which is useful for surgical planning.

Standing CT

Despite advantages, there are drawbacks in performing CT on a standing horse compared to an anaesthetised one (**Figure 2**).

Movement is much greater, there is decreasing image quality, and also more risk of injury to the horse or personnel or damage to the machine. Having an experienced and relatively constant team will reduce some of this risk.

Standing CT is limited by how far caudad images can be acquired, this being dependent on the size and temperament of the individual horse. With the most ideal of horses and circumstances, we would only attempt to scan to the region of the C2/C3 articulation as the further the horse's head is in the gantry, the greater the risk of damage or injury.

Dental and sinus disease

Dental and sinus disease are common and of major clinical importance in horses, and this broad category covers a wide variety of specific pathologies and conditions – it is the most common reason for performing standing CT scans at Rossdales Diagnostic Centre.

Radiography is limited in assessing for disease owing to superimposition of the complicated anatomy, poor spatial resolution and lack of contrast for soft tissues. The superiority of CT to study structures in this area is well

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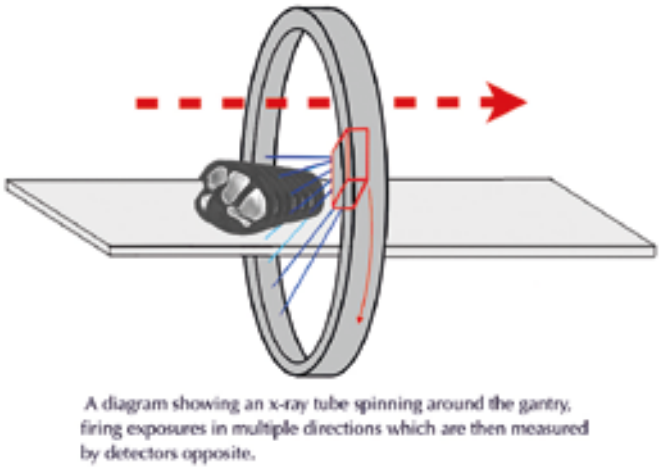

Figure 1. *Schematic diagram of a CT machine.*

reported and a widespread acceptance of its benefits has been crucial in the advancement of our knowledge and understanding of sinus and dental diseases.

The normal CT anatomy and features of dental diseases have been described elsewhere. Common features include:

- widening of the periodontal space
- tooth root lysis and fragmentation
- alveolar bone sclerosis
- apical tooth root gas,
- hypoattenuation within the infundibula

Owing to the close association of the maxillary sinuses with the cheek teeth, sinusitis often results from dental disease, but can also result from trauma, progressive ethmoid haematoma (PEH), sinus cysts and fungal sinusitis.

While a diagnosis of intra-sinus space-occupying lesions may be possible using a combination of radiographs and/or endoscopy, CT is superior for reasons already discussed. The treatment for many of these lesions is surgical excision and a pre-surgery CT also affords excellent surgical planning, enabling the sinostomy to be performed in the most suitable location.

Head trauma

Traumatic injuries to the head are common in horses, especially in younger animals and often result from flipping over backwards during early training. Trauma can cause diverse pathologies including fractures, haemorrhage and traumatic brain injury. Radiography is limited in its ability to accurately assess traumatic injuries of this region and CT has additional benefits in trauma cases.

Figure 2. *A photograph of a pony during a standing CT scan. Note the metal runners on which the bed runs. The runners can be moved to accommodate table for horses under GA.*

CT has the ability to detect signs of brain trauma and enables a fast, accurate evaluation of bony structures and intracranial haemorrhage; it is used as standard procedure for human patients with traumatic brain injuries or major trauma. MRI is superior for evaluation of the soft tissues but lacks the capacity to detect subarachnoid haemorrhage in the acute stage and isn't widely available.

CT features of trauma include:

- intracranial haemorrhage
- mass effect
- brain herniation
- skull fractures,
- change in ventricular size, shape or position
- deviation of the falx cerebri (falx shift)
- focal change in brain opacity

Peripherally injected intravenous iodinated contrast agents will localise to areas of increased perfusion and can enhance areas of bone injury, inflammation and haemorrhage. However, the literature on the use of contrast CT to enhance the assessment of intracranial masses in horses is not definitive and one study (Lacombe et al, 2010) found there to be no advantages over un-enhanced CT.

Neurological including 'head shaking'

CT is commonly used as a diagnostic aid in horses showing neurological signs. The most common neurological presentation for horses undergoing CT in one study (Sogaro-Robinson et al, 2009) was seizure-like activity. However, seizure-like signs as a reason for performing a CT were associated with normal CT results.

Electroencephalography (EEG) was more sensitive for confirmation of seizure activity, consistent with human medicine where MRI and EEG have replaced CT for diagnosis of seizures. In the same study, CT was useful in detecting lesions in horses with cranial nerve deficits – findings including temporohyoid osteoarthropathy, fractures and space-occupying masses.

Despite limitations, CT can be used to rule in intracranial space-occupying masses and is a useful tool in aiding diagnosis of horses showing neurological signs, for which diagnosis often remains a challenge.

Head shaking is a particularly exasperating disorder to diagnose and treat and CT is useful in diagnosis of many diseases which cause head shaking: including temporohyoid osteoarthropathy, middle ear disease, temporal and stylohyoid bone fractures. In our experience, a standing head CT scan can be useful to confirm a specific suspected lesion but is often unrewarding as a screening test, this not being an ideal use of this modality capable of detecting subtle pathology.

CT under general anaesthesia

Orthopaedic

Unlike those affecting the head, many pathologies involving the limbs of horses lend themselves well to standard modalities. Radiography and ultrasonography both have limitations and there are several circumstances where the benefit of a CT scan outweighs the cost and risk of GA. In some cases, however, the CT scan is performed immediately prior to surgery such that these considerations are not entirely relevant.

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Figure 3. *The left-hand image is a lateral radiograph of a right carpus showing multiple fragments from a fracture of the radial carpal bone. The right image is a single reconstructed slice from a CT scan of the same carpus showing the fracture configuration and location of the fragments more clearly.*
Images courtesy of Sarah Powell MRCVS.

Fractures

The added information that a CT scan affords for fractures in comparison to radiographs is vast. The complex nature of comminuted fractures and the superimposition of structures makes radiographic interpretation challenging. Radiographs can also under estimate the severity and extent of fractures and can only provide limited information on the geometric patterns of complicated fractures.

CT is excellent in localising fragments, some of which may not be appreciable on radiographs because of superimposition or lack of resolution, and CT enables surgical planning for their removal (**Figure 3**).

We have found CT very useful in aiding assessment and surgical repair of fractures, where we see a higher proportion of these cases owing to the local population of thoroughbred racehorses.

Keratomas and other space-occupying lesions

Although keratomas are an infrequent cause of lameness, they are a frequent reason for surgery of the equine foot with the treatment of choice being a complete or partial hoof wall resection. Unfortunately, postoperative complications, including formation of excessive granulation tissue, recurrence, hoof crack formation and infection are common – 50 per cent of horses in one study (Boys Smith et al, 2006) had at least one complication.

However, in the same study significantly fewer horses that had a partial hoof wall resection developed complications compared with those that had complete hoof wall resections (25% versus 71%) and had a faster return to work.

By knowing the precise location and extent of the keratoma, it can be fully excised while removing the smallest possible amount of hoof wall. This will reduce likelihood of recurrence and maintain hoof wall stability respectively, reducing likelihood of complications. Determining this is not possible on radiography, while it is on CT and MRI.

With both of these modalities, the use of a marker on the outside of the foot corresponding to the location of the mass is required (**Figure 4**).

It is much more convenient to reposition this marker and re-scan with CT than it is using MRI. Additionally, MRI takes longer and requires more skill to acquire diagnostic images; Getman et al (2011) preferred CT to MRI in assisting partial hoof wall resection for keratoma removal and CT would be the choice at our centre also.

Tarsus

Lesions such as subchondral cyst-like lesions, sequestra, subchondral bone sclerosis and focal degenerative changes of the small tarsal bones can be missed or under-estimated on radiographs and ultrasonography. A recent study by Raes et al (2014) concluded that CT of the tarsus should be considered when conventional modalities are inconclusive or to attain from information in fractures, such as the direction and extent of fractures, and to rule out the presence of comminution or concomitant fractures.

Foals

There are an increasing number of reports about the use of CT in foals for a wide variety of conditions and Barba and Lepage (2013) recently concluded that CT was an excellent tool to aid diagnosis of several conditions. Their weight means they can often go on the fixed CT table as opposed to the one on the frictionless bed, and their size means that it is often possible to scan any anatomical area.

We find CT extremely useful for the evaluation of septic arthritis where the underlying cause cannot be identified or confirmed, especially in the stifle joint, where CT can be used to identify signs of abscesses, osteomyelitis, arthritis and physitis. CT can help to characterise these lesions, but the identification of sites of bacterial deposition before bone damage has occurred remains challenging.

CT has also been extremely useful in cases of suspected or confirmed rib fractures and for foals showing signs associated with thorax disease because the information available from other modalities can be limited in this area.

The future

With CT being increasingly advocated for a variety of conditions, the future for CT in equine veterinary medicine is exciting. A system has been described enabling the use of CT of the foot in the standing horse and after further validation will inevitably become more specific and more widely available.

Positron emission tomography (PET) is a nuclear medicine, functional imaging technique that produces a three-dimensional image of functional processes in the body. The system detects gamma rays emitted by a radionuclide which is injected in combination with a biologically active molecule, much like technicium^{99}-MDP is used in scintigraphy.

Single photon emission computed tomography (SPECT) combines scintigraphy and CT, enabling detection of lesions not detected on planar scintigraphy. Very little has been published regarding the use of SPECT in horses but the technique, widely used in humans, has some attractive prospects for orthopaedic conditions.

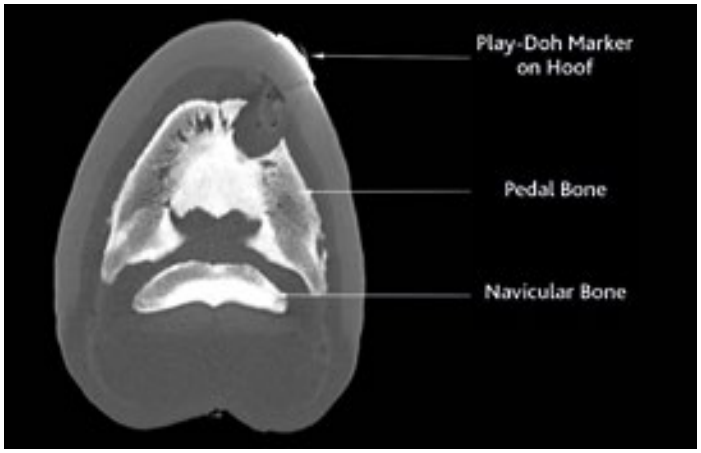

Figure 4. *A reconstructed slice from a CT of foot of an adult horse with a keratoma. There is a well-defined soft tissue opacity replacing the normal bony architecture of the pedal bone. There are also multiple coalescing hypoattenuating areas corresponding to pockets of gas.*
Image courtesy of Sarah Powell MRCVS.

Summary
Conventional imaging techniques will remain the most appropriate choice for first-line diagnostics of many conditions seen in equine practice. However, as the technology, literature and availability of CT progresses, it is becoming a more realistic and attractive option for many veterinary surgeons.

Acknowledgement
Thank you to Sarah Powell MRCVS for her support and use of images. ■

PPD Questions

1. A 5-year-old thoroughbred filly presented with a history of a left-sided nasal discharge and a standing CT was performed. To the right is a reconstructed slice at the level of Triadan 110/210. Left is to the left of the image.

What CT abnormalities can you see? How would you continue with this case?

A. Start a two-week course of broad-spectrum antibiotics and give a good prognosis
B. Perform a maxillary sinusostomy to flush the sinus under standing sedation and do not remove any teeth
C. Perform a maxillary sinusostomy to flush the sinus and attempt removal of 210, under standing sedation in the first instance
D. The horse requires no treatment, resume normal management

---

2. An 18-year-old Warmblood X was presented to the hospital with a history of right-sided haemorrhagic nasal discharge. A CT scan was performed under standing sedation.
To the right is a single reconstructed slice at the level of the orbits.

Describe the abnormalities. What is the likely pathology? What is the most appropriate treatment option for this lesion?

A. Requires no treatment
B. Inject the lesion with formalin via endoscopy
C. Surgically excise the lesion as it is large
D. Perform a maxillary sinusostomy understanding sedation

---

3. To the right is a reconstructed CT slice in a sagittal plane of an adult horse at the level of the pterous temporal bones. There is an area of hypoattenuation at the ventral third of the cerebellum.

What does this area of hypoattenuation represent?

A. A soft tissue mass e.g. a tumour
B. Haemorrhage
C. Beam Hardening Artefact
D. Normal anatomy of the cerebellum at this level

Answers
1. Fluid/soft tissue opacity with small hypoattenuating areas in the left maxillary, frontal and conchofrontal sinus – sinusitis
Buccal slab fracture of tooth 210 Pockets of gas at apical tooth roots within the pulp cavity – pulpitis
Sclerosis/proliferation of the alveolar bone. **C.** Perform a maxillary sinusostomy to flush the sinus and attempt removal of 210, under standing sedation in the first instance **2.** A soft tissue opacity sitting within the nasal cavity near the ethmoid labyrinth. It is distorting the septum and ethmoids Ethmoid haematoma C. Surgical removal is the preferred treatment, especially for large lesions such as this one **3.** C. Beam Hardening Artefact caused by the temporal bones. Also called the interpetrosal lucency or Hounsfield Bar

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A basic guide to handling horses

Horses have evolved as a flight species. Therefore, any handler should remember that horses will try to escape from any uncomfortable situation by running away. In situations where the horse feels unable to escape, it may resort to kicking or biting as a form of defence. This highlights the importance of specific equine knowledge when it comes to handling horses safely, especially in unfamiliar surroundings such as a veterinary practice. This article will discuss the correct, safe techniques to use when handling horses.

The key to handling horses is to be able to anticipate what they are likely to do by 'reading' their body language and facial expressions (Ackerman, 2006). **Table 1** summarises the behavioural characteristics for happy, frightened and aggressive horses.

Horses are strong animals whose behaviour can be violent and unpredictable at times, so an awareness of their natural behaviour will help to prevent accidents (Ackerman, 2006). As an equine handler it is sensible to wear appropriate personal protective equipment (PPE) and this should include steel toe-capped boots, gloves and a safety helmet.

The majority of horses will behave better if handled with firm kindness. However, horses will always be able to detect a lack of confidence in a handler and will take advantage of this. Always stand close to the horse near to its head and away from the hind legs – the closer you are, the less force of any movement or kick (Ackerman, 2006).

Approaching and catching

Approach slightly to one side of the horse's head because horses cannot see directly in front or directly behind them and will be startled if approached from this angle (Ackerman, 2006). Speak to the horse gently using a low tone as you get near. It does not matter *what* you say, as long as you say it in a calm, gentle manner. That way you will not come across as a threat.

Place your hand on the horse's nose and put a lead rope around its neck (Ackerman, 2006) (**Figure 1**). Most horses will now accept that they have been caught and allow you to put the head collar on.

Figures 1-3. *Putting a head collar on horse.*

Table 1. Summary of behavioural characteristics for happy, frightened and aggressive horses

Happy, relaxed horse	Frightened horse	Aggressive horse
Ears forward	Showing the 'whites' of the eyes	Tail swishing
Will show interest when approached	Snorting	Baring of teeth
'Nickering' or 'neighing' as a greeting	Running backwards	Ears laid flat back against the head
Medium head carriage	Bolting (running away very fast)	Striking out with the front legs
-	High head carriage	Swinging the hindquarters round to kick
-	-	Low head carriage

**Suggested Personal & Professional Development (PPD)*

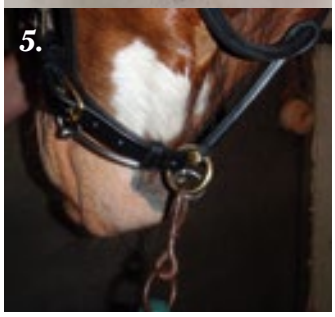
EQUINE HANDLING

Place the nose band of the head collar over the horse's nose (**Figure 2**).

Take the long strap up and over behind the ears and secure the buckle fastener on the left side of the cheek; making sure you can fit a hand's width under the chin (**Figure 3**). This will ensure that the head collar is not too tight (Atkinson et al, 2011).

Putting on a bridle with a Chifney bit

Most horses can be handled in a simple bridle or head collar. However, young animals or horses that have been on 'box rest' for long periods of time may require the use of a Chifney (anti-rearing bit) for extra control (**Figure 4**).



Figures 4&5. *Putting on a bridle with a Chifney bit.*

This bit is designed for in-hand use only and must be used in experienced hands, as it can cause injury and discomfort with insensitive use (Atkinson et al, 2011). The Chifney attaches to a leather head piece and has a loose ring for the lead rope to attach to at the back of the horse's chin. The thin V-shaped bit will dig into the horse's tongue if it tries to rear or pull.

A head collar should be applied on top of the Chifney to prevent the leather headpiece being pulled over the head if the horse runs back sharply (Atkinson et al, 2011). The lead rope should be attached to the ring on the head collar as well as to the ring on the Chifney (**Figure 5**).

This will prevent undue pressure and potential injury to the horse as the loop cannot travel any further away from the jaw than the head collar will allow.

How to put on a bridle with a snaffle bit

A bridle with a simple bit, such as a snaffle, may also be used for handling. Approach the horse from the left shoulder and place your hand around its head to secure the horse in a comfortable position. The bridle cannot be placed with the head in an elevated position. Hold the headpiece up against the head, apply gentle pressure with the bit and place your thumb in behind the incisors at the same time (**Figure 6**).

Figures 6-8. *Putting on a bridle with a snaffle bit.*

Once the bit has been accepted by the horse, place the headpiece over its ears (**Figure 7**).

Once in position, adjust the headpiece to fit, so that there are no more than two creases in the edge of the lip and the bit is not dangling on the incisors (**Figure 8**). Place the head collar over the head piece to secure it in position.

To remove the bridle, take hold of it behind the ears and allow the bit to gently drop between the incisors.
A hand should be held under the nose to catch the bit to prevent it from banging on the horse's teeth (Atkinson et al, 2011).

Leading a horse

Horses are usually accustomed to being led from the left-hand side, but should lead easily from either side.

Once the head collar is on, the handler should stand at the horse's shoulder to lead it. When you want the horse to move forward give the command "walk on", take a step forward and the horse should follow. The horse should not be allowed to get too far in front of the handler as it may try to run off.

The lead rope should be held with the right hand, approximately 20cm from the horse's jaw. The remaining rope should be held loosely

Figure 9. *Leading a horse.*

in the left hand and never wrapped around the hand, as injury could occur if the horse rears or runs back (Atkinson et al, 2011) (**Figure 9**).

Registered Veterinary Nurses (RVNs) working in equine practice will be very heavily involved in lameness examinations and these involve trotting the horse on a hard surface and lunging the horse on a soft and a hard surface. This process will be repeated several times in one day if the horse requires nerve blocks.

When leading a horse for a lameness examination:
- Use a level, firm surface, about 20 metres in length (most equine practices have a hard 'trot up' area)
- The horse should be walked away and back in a straight line and then trotted away and back in a straight line, while the veterinary surgeon (VS) and owner can observe movement
- When turning the horse around at the end of the 'trot up' (this is always done in walk) the handler should turn the horse away from them in a fairly wide circle. This will help to prevent the horse from treading on the handler's toes
- The lameness examination should be carried out in a secure area from which the horse cannot escape if it breaks free

"Always use a quick-release not that allows the horse to be released quickly if it panics"

Tying up a horse

All horses should be trained at an early age to stand quietly while tied up:
- Select a suitable ring, post or rail – which should be attached firmly and not be part of anything that will rattle, bang or fall over if the horse pulls away
- Always attach a piece of bailing twine to the ring, post or rail, to which the horse is tied. That way, if the horse pulls back the bailing twine will snap, preventing injury to the horse and damage to the fixture
- Always use a quick-release knot that allows the horse to be released quickly if it panics or tries to pull away (**Figures 10-14**)
- Never leave the horse unattended (Ackerman, 2006)

Restraint for procedures

When performing procedures such as nerve or joint blocks, additional restraint may be required. This might be as simple as holding the tail to keep the horse weight bearing or lifting and holding a foreleg to enable the VS to examine the hind leg. The application of a twitch or chemical restraint may be required in some cases (Atkinson et al, 2011).

Application of a twitch

Twitches cause the release of natural endorphins, which then have a narcotic effect on the horse (Linnenkohl and Knottenbelt, 2012). This creates a light sedative effect and encourages the horse to tolerate certain procedures without the need for chemical restraint. Twitches can be applied by hand to the neck and the ear.

Commercial nose twitches are available and must be placed carefully to prevent injury and not left in place for more than five minutes (**Figure 15**). On occasion, a horse may react unexpectedly when a twitch is used and this is where the equine handling skills of the RVN become exceptionally important. Accurate observation of behaviour and swift action to remove the twitch can prevent potential stress to the patient and injury to the examining VS.

Using a nose twitch

The handler is required to stand at the side of the horse and on the same side as the person applying the twitch in order to prevent the horse from jumping on to them. One hand is placed on the twitch handle and the second hand is put through the end of the twitch and placed on the horse's upper lip.

The twitch is slid up over the first hand and the handles of the twitch are closed around the horse's upper lip. The string is tightened and clipped into place to prevent the twitch flying off and injuring someone if the horse were to react unexpectedly (Atkinson et al, 2011).

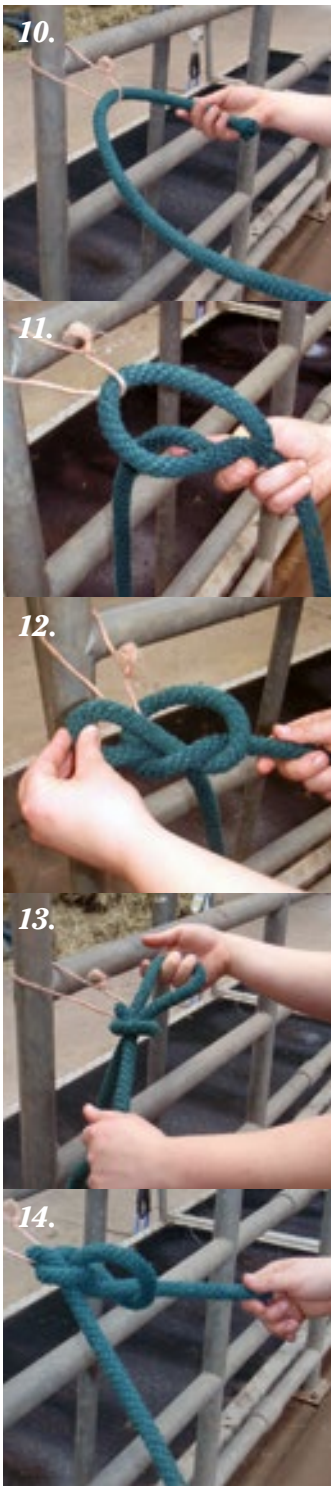
Picking up a foot

The horse should be restrained by a handler or tied to a suitable tie ring and baling twine with a quick-release knot. The handler should stand facing the tail at all times.

"Examination and picking the feet out should be done at least twice daily especially where the horse is standing in a stable"

To lift the front foot, the handler's hand should be placed on the shoulder of the horse and run down the caudal and then palmar aspect of the forelimb until the fetlock is reached. In the hind limb the handler's hand should be run from the neck across to the quarters and run down the caudal and then the plantar aspect of the hindlimb until the fetlock is reached.

Gentle pressure should then be applied to the area and the horse encouraged to lift the limb either by 'clicking' or saying "up". As the horse lifts the limb, the area from the dorso-medial aspect of the foot should be supported and held gently. Keeping in close contact with the horse's shoulder will allow the handler



Figures 10-14. *Tying up a horse. Thread the lead-rope through the baling twine and keep a small loop (10). Thread the lead-rope through the first loop to produce a second loop (11&12). Pull the knot to secure it (13), and thread the remaining end through the second loop made to prevent the horse from pulling on the end and untying itself (14) (Atkinson et al, 2011).*

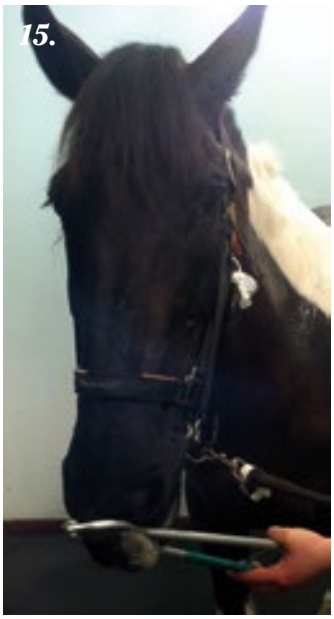


Figure 15. *Applying a commercial nose twitch.*

to detect any movement from the horse and anticipate the horse snatching its foot down.

Examination and picking the feet out should happen at least twice daily, especially in an equine hospital where the horse is standing in a stable where fungal infection could occur as a result of poor foot care (Atkinson et al, 2011).

Handling specific horses

Mares and foals

Care should be taken to observe the mare's behaviour at all times. Even the most well-mannered mares can become aggressive when they have a foal by their side (Linnenkohl & Knottenbelt, 2012). At least two people should be present to handle the mare and foal at all times.

Foals should become accustomed to human handling within the first few days of life so that they learn to trust people. Foals often resent being led by a halter and foals that are not halter trained should never be pulled as they will usually resist and injur themselves. Leading a foal while it is following a mare is a good way to teach it, accompanied by a hand around its hindquarters to gently guide it (Linnenkohl & Knottenbelt, 2012).

When restraining a foal for examination, one hand should be placed around the chest and one hand should grasp the hindquarters or tail head. If the foal needs to be removed from the mare for examination the mare should be sedated (Linnenkohl & Knottenbelt, 2012).

Stallions

Care should always be taken when handling stallions as they can be unpredictable. Proper restraint, using a bridle or Chifney may be useful. Caution should be shown when handling a stallion in the company of mares, particularly if a mare is in season or has a foal at foot (Linnenkohl & Knottenbelt, 2012).

Young horses

The aim with young horses is to be gentle and not to frighten them. Young horses are rarely aggressive, and most often act out of fear.

Nervous horses

Nervous horses will be naturally fearful and, therefore, you should never stand directly in front or behind them (Linnenkohl & Knottenbelt, 2012). These horses should be talked to using a soothing voice for reassurance and movements should be slow and fluent so as not to startle the horse. Punishing a nervous horse will often aggravate its behaviour, which would be counterproductive.

Aggressive horses

Truly aggressive horses are extremely rare. Often a horse's behaviour is interpreted as aggression, but this is more often motivated by fear. An aggressive horse can be very dangerous, so caution must be used at all times. Never handle an aggressive horse alone and always use appropriate restraint – a bridle or a Chifney. Always handle aggressive horses with cautious confidence (Linnenkohl & Knottenbelt, 2012).

Summary

Horses can only be handled safely if the handler has knowledge of their natural behaviour. Being a prey animal, horses are easily frightened and will react by either running away, biting or kicking. Firm, kind handling is what is required of RVNs in practice, paying particular consideration that the horse is likely to be stressed through being in unfamiliar surroundings at the practice.

> "Grooming is very important especially for hospitalised horses"

Extra restraint can be applied in the form of a Chifney bit but these should only be used by people with experience as they can cause injury and discomfort to the horse if used incorrectly. Twitches can also be used but must be applied with caution and only left in place for five minutes.

Grooming is very important, especially for hospitalised horses to provide social contact and guide a detailed assessment of the patient. Horse's feet should also be picked out twice daily to reduce the risk of box rest-related complications, such as thrush. RVNs should not underestimate the importance of their role in providing company and comfort to hospitalised horses and this helps to reduce stress and encourage a faster recovery. ■

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Ill-fitting saddles cause back pain to horse and rider

A study conducted by the Equine Centre of the Animal Health Trust (AHT) has concluded that ill-fitting saddles are not only associated with back muscle asymmetry, a stilted gait and back pain in the horse, but they are also associated with back pain in the rider. The results strongly suggest that 'saddle fit' should be checked regularly and that riders and trainers should be encouraged to learn how to identify ill-fitting saddles.

Supported by World Horse Welfare, the study was conducted by Dr Sue Dyson, head of clinical orthopaedics at the Centre for Equine Studies at the AHT, and Line Greve, PhD student at the AHT.
A clinical assessment of the horse and rider was performed and data were subsequently obtained from the same riders via an online questionnaire, without the riders being aware of the link between the two initiatives. The horses were selected from a variety of work disciplines, were in regular work and were presumed by their riders or owners to be sound.

The AHT assessed 128 horses of varying size, age and type. The degree of lameness of each horse was graded; back shape and symmetry were measured and saddles assessed for symmetry and fit. Each horse was ridden by at least two riders and rider straightness plus weight were recorded. The grade of saddle slip, whether it occurred with more than one rider, and whether saddle slip was influenced by the direction of movement or the diagonal on which the rider was sitting, were also noted.

The saddle consistently slipped to one side in 54 per cent of horses with hind limb lameness, compared with four per cent of horses with forelimb lameness, and zero per cent with back pain and/or sacroiliac joint region pain, and of non-lame horses. Diagnostic analgesia was subsequently used to abolish the hind limb lameness and this eliminated the saddle slip in 97 per cent of cases.

More than 500 sport horses – in normal work and presumed by their owners to be sound – were examined ridden. Saddle slip, rider crookedness, saddle fit and lameness were assessed. Approximately 47 per cent of horses had lameness or gait abnormalities. Lameness was by far the most important factor associated with saddle slip.

The following summary is taken from the Animal Health Trust website:

It is already known that lameness often coexists with back pain and is the most frequently reported health problem in all sport disciplines; however, the relationship between lameness and back pain is poorly understood. The tendency for a saddle to slip to one side has usually been attributed to ill-fitting saddles, asymmetry in back shape or a crooked rider. It has also been observed that hind limb lameness and saddle slip seem to go hand in hand, which could mean that saddle slip might be an indicator of hind limb lameness.

> "Lameness was by far the most important factor associated with saddle slip"

Line Greve recommended: "Ideally saddle fit should be checked more often than once a year in order to reduce the instances of ill-fitting saddles; yet this isn't the whole solution because, worryingly, 30 per cent of horses that had their saddles checked at least once yearly still had an ill-fitting saddle. What is unknown is whether these saddles had ever fitted correctly, or whether a properly qualified saddle fitter was responsible for the fitting. It can only be of benefit for riders, trainers and other associated professionals to become more educated about the complexity of the links between lameness, saddle slip, ill-fitting saddles and rider crookedness."

The AHT has expanded its research into three more areas. It:

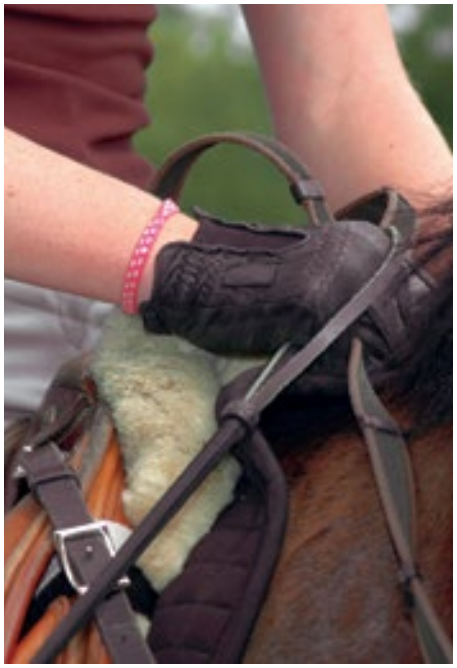
1. has quantified the changes in back shape that occur over a course of a year in a cross-section of horses – of a range of ages and from various work disciplines – that are assumed to be sound; and ultimately wants to be able to make recommendations about how often saddle fit should be checked. The results are currently being analysed
2. has looked at the way back dimensions increase with exercise and are analysing the results of a questionnaire survey of horse owners concerning saddles and their maintenance
3. will be looking at how individual horses modify their gait in the face of lameness to find out why saddle slip occurs in some cases but not in others – and if funding is available.

The results of the current survey will be presented at the second Saddle Research Trust International Conference, to be held in Cambridge on 29 November 2014 at Anglia Ruskin University.

The Saddle Research Trust is a charitable organisation that has been established to lead and support research into the influence of saddles on the welfare, performance and safety of horses and riders by using scientific and objective methods. It supports research in the field of horse, saddle and rider interaction – in particular:

- Welfare, performance and safety issues of saddles
- Back problems and associated behavioural issues
- Causes of saddle-related poor performance and wastage in sports horses
- Safety aspects of saddle design
- Saddle fitting in relation to weight fluctuation and obesity
- Effects of saddle design on rider performance and health
- Saddle design for disabled riders

For more information visit saddleresearchtrust.com



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Owen Atkinson
BVSc DCHP MRCVS

Owen has worked in farm animal practice since 1994, mainly with dairy cows. His interests in rumen health, cattle foot care and lameness reduction led him to do an increasing amount of training and advisory work.

In 2013, Owen left the practice to found Dairy Veterinary Consultancy Ltd, to better pursue his vision for preventive health management and strategy. Owen's goal is to help farmers make changes on their farms that benefit the cows, the quality of life and the bank balance.

*Suggested Personal & Professional Development (PPD)

LAMENESS

Understanding lameness in dairy cows

Dairy cow lameness is at an unacceptably high level in the UK and has been identified as an important area to improve (FAWC, 2009). From the perspective of the dairy vet, it might be considered an ultimate challenge: lameness is one of the 'big three' endemic diseases (along with mastitis and infertility), and although our understanding about precise aetiologies of foot disorders is growing, there are still many unknowns and misconceptions. Work in this area requires skills and understanding in many disciplines: anatomy, epidemiology, housing design, nutrition; but perhaps above all else, human psychology and the ability to communicate well! Part one of this two-part article briefly describes a project observing the implementation of the DairyCo Healthy Feet Programme on 23 farms, and discusses some of the findings which are relevant to our understanding of successful lameness reduction.

In 2011, DairyCo launched the Healthy Feet Programme, an industry-wide initiative to reduce lameness in Great Britain (DairyCo, 2013). This includes a structured one-to-one approach between farmer and mobility mentor (usually a vet) over a prolonged period (**Figure 1**).

Some dairy farms have no – or very few – lame cows; others have up to 60 per cent of the herd lame at any one time (Barker et al, 2010; Atkinson and Fisher, 2013). Why the difference? You might think it is down to the breed of cow, the trimming policy, the type of system, or how often foot bathing is done. Not necessarily, according to results suggested by a large scale mobility project, conducted in 2012/13 on dairy farms in the North West of England (RADA, 2013)

Three key qualities of dairy producers appear to be important for good mobility on their dairy farms:

1. An accurate awareness of their herd lameness prevalence
2. An understanding of foot diseases: lesion recognition and aetiology
3. A positive attitude towards their personal ability to influence lameness.

Summary of project method

The 18-month project, funded by Defra, on cattle mobility in north west England had three objectives to:

1. Measure the impact of the DairyCo Healthy Feet Programme (DHFP) on mobility in dairy cattle
2. Understand the motivations and barriers to implementing management changes on-farm that improve cattle mobility
3. Evaluate the cost savings and business benefits arising from mobility improvement.

The study involved 11,800 cows on 44 dairy farms: half had voluntarily enrolled on the DHFP; and the other half were a semi-random control group – farm clients of two Cheshire vet practices which were not enrolled on the DHFP.

Table 1 shows a summary of farm details in each group. All herds were predominantly European/US Holstein, except the five block-calving herds which

Figure 1. *The DairyCo Healthy Feet Programme is a UK-wide initiative and includes training materials, practical guides and score cards. The one-to-one programme is delivered to producers by a mobility mentor – a vet or 'category one' hoof trimmer.*

Table 1. Details of farms in each group: farms engaging in the DHFP with their vet and control farms

	DHFP FARMS	CONTROL FARMS
Cow numbers (average)	295	240
Cow numbers (range)	72 to 550	90 to 540
Yield (litres per cow per year average)	8,863	7,917
Yield (litres per cow per year range)	5,000 to 11,000	6,500 to 9,400
Number of all-year calving systems	22	17
Number of block calving systems	1	4
Total number farms in study	23	21
Number of questionnaires completed	27	20

"Some dairy farms have no – or very few – lame cows, others have up to 60 per cent of the herd lame at any one time. Why the difference?"

were cross-bred, including Jersey and NZ Holstein.

All farms were independently mobility scored at regular intervals (every three months) over a 12-month period, and producers were interviewed in depth at the end of the year to discern their specific practices in relation to lameness control, as well as their beliefs and attitudes towards lameness.

The DairyCo Mobility Scoring system (0,1,2 and 3) was used during the project. Scores 2 and 3 were classed as 'lame', 0 and 1 as 'not lame' All scorers were trained to a consistent level, and wherever possible the same person scored any individual farm at each occasion through the year. One scorer was used as a 'moderator' to randomly check other scorers by co-scoring on some occasions, to reduce inter-scorer variation as far as was practical. Interviews were carried out by one trained interviewer, on farm, using a pre-trialled structured interview process and a scripted questionnaire with practised further explanations (to avoid the interviewer leading the respondent to a particular answer). Questions were sometimes 'open' and in other instances multiple-choice style, or with ranked answers. Interviewees were paid for their time during the interviews.

In some instances, where more than one key decision maker existed (herds-person and farm owner, for example), more than one person was interviewed per farm. At the end of the study, it was possible to look at the differences between farms:

- Enrolled on the DHFP and those not (controls)
- Which reduced lameness the most over the year and those where lameness increased the most
- With the least lameness and those with the highest proportion of lame cows in their herds.

Mobility scores

Overall, at the start of the project, 32 per cent of cows were lame (score 2 or 3). There were no overall differences between the DHFP farms and the control farms, but within all farms there was a very wide range – from 0 per cent lame to over 50 per cent lame. These results are consistent with, although slightly lower than, in a previous UK large-scale project reviewing cattle mobility (Barker et al, 2010).

After a year, the DHFP farms showed a significant reduction in lameness overall: down to an average of 25 per cent prevalence. Again, there was a big range, with some farms showing better improvement than others.

Within the control group, the overall lameness remained the same, at 32 per cent. Some farms had improved, and

Figure 2. *It can be easy to assume lameness is seasonal, but this is not always the case, and each farm differs in its own particular risk factors.*

Figure 3. *Foot-bathing is an important part of lameness control, but should be tailored to suit the specific farm conditions.*

Table 2. Mobility scores during the project

	Herd Score 2 (%)	Herd Score 3 (%)	Herd Lame (%)
Average of all farms at start	23.8	8.2	32.0
Control farms at start	21.9	10.1	32.0
DHFP farms at start	24.5	7.4	31.9
Control farms at end	21.7	10.3	32.0
DHFP farms at end	20.7	4.7	25.4
Top 25% herds (lowest lameness average over year)	13.4	3.5	16.9
Worst 25% herds (highest lameness average over the year)	27.1	13.7	40.8
Average of producers' estimates for own farm	-	-	22.9
Average of producers' estimates for the average of UK dairy herd	-	-	30.2
Average of producers' own aspiration for whole of UK dairy herd	-	-	10.3

some farms had worsened; but generally there was less movement in mobility scores than in the DHFP group. Overall, there was no significant seasonal variation in lameness, although all herds fluctuated to some degree in mobility scores between each occasion (**Figure 2**).

The DHFP farms carried out twice as many new actions during the year as the control farms to reduce lameness (7.9 vs 3.8 specific new interventions). However, the study did not find any isolated actions or management practices these were common to all farms with lowest lameness, or which lowered lameness the most (**Figure 3**).

Table 2 summarises the mobility scores during the project, and farmers' own estimates of their own lameness as well as lameness in the national herd. It is interesting to note that farmers have a pretty realistic view of lameness in the UK dairy herd (an average estimate of 30.2 per cent), and an aspiration to reduce this significantly (to around 10 per cent, on average). However, farmers do tend to under-estimate lameness on their own farms.

"Lameness is one of the 'big three' endemic diseases (along with mastitis and infertility) and although our understanding is growing, there are still many unknowns and misconceptions"

Awareness, understanding and attitude

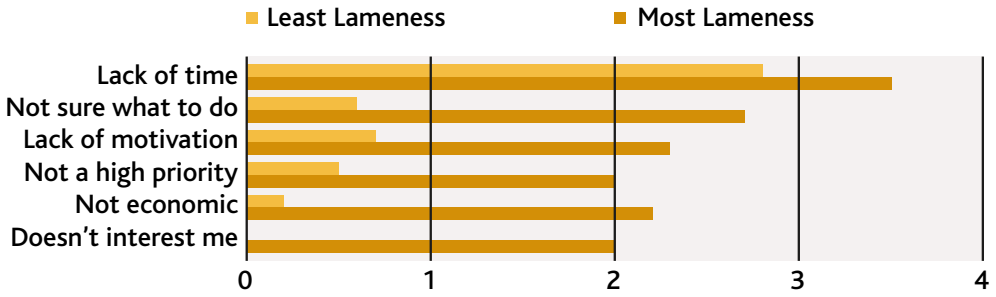
It was striking that producers with the lowest lameness and those who reduced lameness the most were better able to accurately estimate lameness

Table 3. Actual lameness prevalence vs producer estimates

Quartile	Actual*	+/- SEM	Estimated*	+/- SEM	Sig. Diff	Diff Actual to Presumed (%)
Highest Ave Lameness	40.8	1.27	31.7	4.25	NS	-22
Lowest Ave Lameness	16.9	2.27	18.3	4.80	NS	+8
Increased Lameness Most	35.8	2.51	26.0	3.98	P>0.05	-27
Decreased Lameness Most	26.0	2.23	22.6	3.54	NS	-13

**Interviewees were asked what their presumed % lameness was over the last 12 months and the answers were compared with the actual average % lameness over that same time period – these are not the same as end of project scores.*

Figure 4. *Mean personal barrier scores of producers with the least and most lameness for several potential factors likely to inhibit their taking action to reduce lameness in their herds, where 0 is no barrier at all and 4 represents the greatest barrier possible.*



in their own herds (**Table 3**). Meanwhile, farms with higher lameness levels consistently under-estimated their herds' lameness levels by much greater amounts.

By the end of the year, the DHFP farms significantly improved their ability to estimate their herds' lameness levels, indicating that awareness improved. Of course, there are different possible explanations for this, and a simple causative relationship is not necessarily the case.

Farmers were set a short quiz on their ability to recognise and understand the causes of some common foot disorders. Again, the DHFP farmers significantly improved their understanding from the start of the year to the end (these farmers were asked to complete the same quiz before they began the DHFP).

"Perhaps the most interesting difference between the farms with least lameness and those with the most was their attitude to lameness and confidence in their ability to make a difference"

It was difficult to measure whether increased understanding of lameness led to less lameness directly, but those farms which showed the biggest lameness reductions during the year also scored higher in the same quiz. These farmers were also more likely to have had recent formal training in foot care/trimming, either for themselves or their staff.

Perhaps the most interesting difference between the farms with least lameness and those with the most was in their attitude to lameness and confidence in their ability to make a difference. While producers were inclined to attribute lameness in their herds to extrinsic factors – such as weather, nutrition and environment – in fact, analysis of management data and interview responses indicated that intrinsic attitudes and beliefs were the most significant factors that were associated with varying lameness prevalences between farms.

Producers who perceived their personal barriers to be lower had better mobility in their herds. The greatest perceived barriers were lack of time, not being sure which actions to take, and lack of motivation (**Figure 4**).

There was a clear difference between answers given by producers with the least lameness in their herds, compared with those with the greatest lameness prevalence.

A composite mean score for all perceived barriers was 4.9/24 (20%) for producers with least lameness and 14.7/24 (61%) for producers with most lameness. Perhaps this can be best summarised by saying that producers with least lameness had a more 'can-do' attitude towards lameness prevention (**Figure 5**).

Furthermore, producers with least lameness rated having an action plan to reduce lameness more highly. Perhaps not surprisingly, the DHFP farms valued having an action plan with external help which enabled them to identify the easiest and cheapest things they could do that were likely to have the greatest impact on reducing their herds' lameness.

Summary

The project has been vital in understanding more about reducing lameness. It has shown that the DairyCo Healthy Feet Programme can significantly help individual farms reduce their herd lameness levels. However, it is also apparent that no single factor will be the answer for all farms, and that a tailored approach is needed.

The unifying factors that farmers with low lameness seem to have in common are an increased awareness of their own herd's mobility status, and a more positive attitude to reducing lameness. They understand lameness better and are more likely to have an action plan. This news should give great encouragement to all vets actively engaged in the Healthy Feet Programme, or other planned approaches to lameness reduction that involve education, training and facilitation.

Part two of this article will continue to examine producers' attitudes towards lameness, including the likely financial costs associated with lame cows, and how this information can be used to develop effective lameness reduction strategies. ■

Figure 5. *Working to reduce lameness requires a team approach, including all members of the farm team and the hoof trimmer.*

PPD Questions

1. Considering incidence and prevalence of lameness within dairy herds, which of the following statements do you agree with?

A. Incidence is the number of occurrences, while prevalence is the rate
B. Prevalence and incidence are always linked
C. Prevalence is the proportion of the population affected at any one time
D. Incidence is a better measure of lameness than prevalence

2. Which of the following statements about mobility scoring (using the DairyCo score system) do you believe to be correct?

A. Mobility scoring a herd is an effective measure of lameness incidence
B. Mobility scoring a herd gives an effective indication of lameness prevalence
C. Using the DairyCo Mobility score, only score 2 and 3 cows are considered lame
D. As long as the same operator is always used, it is safe to compare mobility score data within the same herd over a period of time
E. Score 1 cows are likely to have lesions evident if the feet are lifted for closer inspection
F. Regular mobility scoring is a practical way of identifying early lame cows to treat

3. In the study in NW England, compared with the average, producers which had less lameness:

A. Foot-bathed more frequently
B. Used an external hoof trimmer more regularly
C. Demonstrated a better knowledge of lesions and disease aetiology
D. Housed their cows for longer
E. Had a longer grazing season
F. Had a greater understanding of costs of lameness
G. More accurately estimated their herd's lameness prevalence

Answers

1. C

Incidence is the number of new occurrences in a certain time frame (typically one year). As lameness events can be very protracted and do not necessarily have an easily defined start and end point, lameness incidence is generally a much more difficult (if not impossible) measure than prevalence in dairy herds. The two can be linked, but the relationship is not simple. For example, a herd might contain a high proportion of chronically lame cows (high prevalence) but no new cases in a year (so zero incidence).

2. B, C and F

Answer D is incorrect because not only is there inter-operator differences with mobility scoring, which is very subjective, but 'operator drift' is also common. It is wise to ensure re-calibration of scorers using independent co-scoring and/or regular refreshing of the score criteria, using the online resources and video quizzes (available via the DairyCo website).

Answer E is incorrect as score 1 cows may show an altered gait, but the affected limb(s) is (are) not immediately identifiable, and there may not be a lesion evident. Score 2 and 3 cows are very likely to have an identifiable lesion responsible for the lameness, if the feet were examined.

Answer F is correct and illustrates perhaps the main value of mobility scoring for producers. Although an effective measure of prevalence, which is useful for monitoring purposes, regular and purposeful mobility scoring is the most widely available and trusted tool for early detection of new cases, which is an essential element of a key plank for lameness reduction: early detection, prompt effective treatment (EDPET, for short).

3. G.

Producers who demonstrated a better knowledge of lesions and disease aetiology (answer C), did show the most improvement over the year (and were more likely to be DHFP farms), but were not necessarily those with the lowest prevalence during the study.

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How safe is our food?

A list of the top 10 most concerning food-borne parasites was released by the Food and Agriculture Organisation (FAO) and World Health Organisation (WHO) on 1 July. The FAO is working to develop new guidelines for parasite control after it was revealed that the pork tapeworm (*Taenia solium*), is the most concerning global food-borne parasite. The organisation aims to create new standards for the global food trade to help countries control these parasites in the food-chain.

The parasites listed below affect the health of millions of people every year, resulting in huge social costs and global impacts, yet the FAO says information is generally lacking on where they come from, how they live in the human body and how they cause illness.

The top 10 rankings
based on the burden placed on human health and are:

1. *Taenia solium* (pork tapeworm) – in pork
2. *Echinococcus granulosus* (hydatid worm or dog tapeworm) – in fresh produce
3. *Echinococcus multilocularis* (a type of tapeworm) – in fresh produce
4. *Toxoplasma gondii* (protozoa) – in meat from small ruminants, pork, beef, game meat (red meat and organs)
5. *Cryptosporidium* spp. (protozoa) – in fresh produce, fruit juice, milk
6. *Entamoeba histolytica* (protozoa) – in fresh produce
7. *Trichinella spiralis* (pork worm) – in pork
8. Opisthorchiidae (family of flatworms) – in freshwater fish
9. *Ascaris* spp. (small intestinal roundworms) – in fresh produce
10. *Trypanosoma cruzi* (protozoa) – in fruit juices

Renata Clarke, head of food safety and quality at FAO, said: "Considering the problems they cause, these parasites do not receive the attention they deserve. We hope that by releasing a 'top 10' ranking we can increase awareness among policy makers, the media and the general public about this major public health issue."

The report lists a number of ways to reduce parasite infection, such as monitoring the use of organic fertilisers in farming – particularly on produce – to ensure it is composted properly and all faecal matter is removed. The report also advises close monitoring of water quality – and for consumers, that all meat should be well cooked, with only clean water used to wash and prepare vegetables.

This report follows on from news – issued by food inspectors earlier in the year – that more infected animals could enter the food chain because of changes to safety checks in slaughterhouses. Under new EU regulations, which are supported by Britain's Food Standards Agency (FSA) hygiene inspectors will no longer be able to cut into carcasses and offal, having now to rely on visual checks alone for signs of disease in pig carcasses.

> "Considering the problems they cause, these parasites do not receive the attention they deserve"

These regulations came into force on 1 June. The reasons given for the change are to reduce cross-contamination and the spread of microbiological and pathogenic hazards, such as *E.coli* and *Campylobacter*.

Data – collected from UK factories by the FSA in response to a Parliamentary question – show that millions of carcasses carrying parasites such as tapeworms, and animals infected with pneumonia, septicaemia, peritonitis and tumours, were removed from the food-chain by official inspectors between 2012 and 2014.

Inspectors recorded more than two million instances of tapeworm in red meat in the past two years. They also rejected nearly three million animals with pneumonia, 450,000 with abscesses and 28,000 with tuberculosis (TB). They warn that such diseased meat may be more likely to enter the food-chain if proposed changes to abattoir inspections go ahead.

Ron Spellman, director general of the European Working Community for Food Inspectors and Consumer Protection (EWFC), which represents meat inspectors across the EU, said: "Last year we know that there were at least 37,000 pigs' heads with abscesses or TB lesions in lymph nodes in the head. They won't be cut now. There is no way to see those little abscesses or small tuberculosis lesions without cutting lymph nodes."

Meat from pigs' heads is recovered by specialised parts of boning plants and it goes into pies, sausages and other processed foods. Mr Spellman considers that the new 'no cutting' regulations risk diseased parts of animals going undetected into processed food. ■

> "There is no way to see those little abscesses or small tuberculosis lesions without cutting lymph nodes"

Clinical approach to common avian emergencies

The initial management of an avian emergency is critically important in ensuring the best possible clinical outcome. This article aims to summarise the author's approach to a number of emergency presentations, but will not provide specific treatments for all of the conditions covered.

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Tom is a 2011 graduate of the University of Edinburgh. After finishing his veterinary degree he completed a one-year rotating internship at Northwest Surgeons in preparation for his residency training. He started his European College of Zoological Medicine (ECZM) residency training in avian medicine and surgery at Vets Now Referrals in May 2012.

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Neil qualified from the RVC in 1983. He gained his RCVS Specialist Status (Zoo and Wildlife [avian]) in 1992. He gained his FRCVS by examination in exotic bird medicine in 1996 and became a Diplomate of the ECAMS in 1997. Neil heads the avian and exotic department at Great Western Exotic Vets .

**Suggested Personal & Professional Development (PPD)*

AVIAN EMERGENCIES

Many birds are masters at hiding early clinical disease and at presentation they are often more critically ill than their owners appreciate. The most common clinical signs constituting an avian emergency are: sitting at the bottom of the cage, haemorrhage, respiratory distress, regurgitation, anorexia and 'fitting'.

Triage

Before a critically sick bird is examined, the owner should be warned that handling and treatment could exacerbate clinical signs or even lead to death. While the initial clinical examination should be thorough, good organisation and preparation will lead to the minimum period of restraint.

In cases where the bird is not sufficiently stable to undergo a full clinical examination, a brief assessment is carried out (5-10 seconds) while the bird is being transferred to a hospitalisation cage/incubator/oxygen tent. Fifteen minutes pre-oxygenation (prior to handling or anaesthesia) is often prudent in critical patients.

For many avian emergencies, a short period of general anaesthesia will be required to facilitate diagnostic testing (safe phlebotomy/radiography, for example). The rest of the clinical exam can be performed at this stage.

When immediate interventions are not required, many useful assessments can be made while observing the bird in its cage for at least 10 minutes to allow it to start showing its clinical signs. Posture, ambulation, perching, respiratory status, environmental interaction, feather condition, eye shape and falling asleep, fluffing of feathers can all be evaluated. Faeces in the travel cage should be examined.

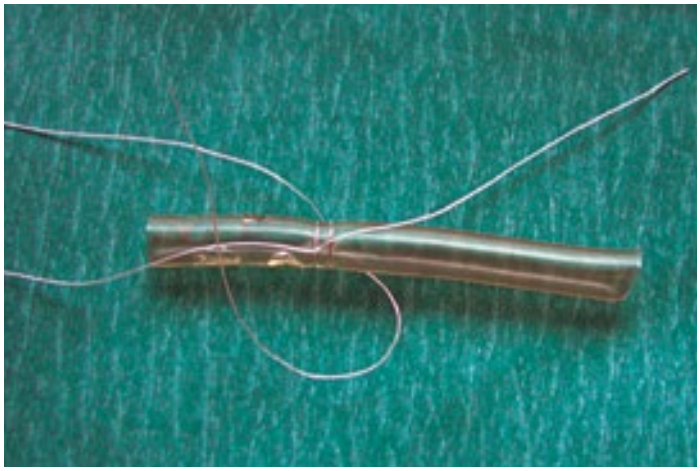

Figure 1. *A prepared, sterilised air sac tube.*

A clinical history can be taken during these observations too; and if necessary, a colleague can take a detailed history while the bird is being stabilised. Written history questionnaires are particularly useful.

Initial symptomatic treatment including heated environment (29-30°C), oxygen supplementation, fluid therapy and nutritional support (rehydration prior to addressing hypoglycaemia is recommended) will benefit many emergency cases.

Initial clinical examination

The initial clinical exam may be adapted depending on species and presenting clinical signs. All patients should have:

- An accurate weight recorded
- Crop palpated for food/foreign material
- Choana (roof of oropharynx) checked – blunted papillae (hypovitaminosis A), inflammation, papilloma, foreign material
- Examination of integument – feathers parted. Skin turgor to assess hydration
- Assessment of body condition made (pectoral muscle mass – prominence of sternal carina)
- Beak and head examined
- Examination of refill time (ulna vein) to evaluate perfusion
- Auscultation to reveal abnormalities in heart rhythm, rate and murmurs and respiratory abnormalities over the trachea, lungs and air sacs
- Coeliom palpated – in normal birds (except carnivorous species whose ventriculus is minimal) often only the ventriculus is palpable
- Vent and cloaca examined

Figure 2. *Air sac intubation location.*

Figures 3 and 4. *Air sac tube insertion and connection.*

– prolapse, inflammation, (papilloma in New World species such as Amazons and macaws) masses
- Brief neurological assessment

Following an initial clinical examination, choose appropriate diagnostic tests and symptomatic therapy (if not already instigated).

Blood work is worthwhile – venipuncture from the right jugular vein is the author's preferred site, although the medial metatarsal and superficial ulna veins are alternatives. If an intravenous cannula is to be placed (bacilic/superficial ulna vein), use that for blood collection.

Blood volumes greater than 1ml/100g body weight should never be collected from avian species, and in most critical patients, 0.5ml/100g is the maximum safe volume. Complete blood counts, biochemical analysis and blood smear assessments are performed in the majority of patients, and blood collected into an EDTA container and stained with Rees & Eckers can be examined on a Neubauer-ruled haematocytometer for immediate results.

Stress leucograms have been reported in a number of avian species – particularly macaws. Ancillary blood work (heavy metal analysis, chlamydophila PCR/serology, aspergillosis serology, PBFD testing, for instance) can be performed based on history, clinical signs and initial blood results.

Cytological examination of diagnostic samples is commonly performed in avian emergencies. Nasal flushes, faecal/cloacal swabs, crop swabs and tracheal samples are all useful and being able to perform basic cytological examinations 'in house' allows earlier instigation of appropriate treatment to improve the prognosis.

Radiography is a vital tool in avian medicine. Accurate positioning is paramount for accurate interpretation. Taking conscious radiographs is rarely successful and often counter-productive. Ventro-dorsal and lateral survey radiographs are commonly performed and contrast radiographs are useful when assessing the coelom.

If anaesthesia is to be carried out, it is prudent to perform all the required diagnostic tests at one time (phlebotomy, radiographs, tracheoscopy) so repeated anaesthesia is not required. Intravenous/IO catheters can also be placed at this time.

Specific avian emergencies

Respiratory distress

Respiratory distress is usually a life-threatening emergency and immediate stabilisation will be required. A warmed hospitalisation cage or incubator with oxygen concentrations initially around 80 per cent (5l/min flow rates) are required. The use of butorphanol/midazolam (anxiolytic properties) and a bronchodilator (such as terbutaline) can be advantageous.

Upper and lower respiratory tract disease can be differentiated with a thorough history, observation in the oxygen-enriched environment and clinical examination, including auscultation. Dyspnoea is not always a result of primary respiratory disease – coelomic distension (fluid, masses, organomegally) can put significant pressure on the air sac system resulting in dyspnoea.

Upper airway and infraorbital sinus

Underlying hypovitaminosis A – most commonly caused by feeding an inadequate seed-based diet – is responsible for much URT pathology. Bacterial and fungal infections are common as a result of squamous metaplasia. Infection can extend into the peri-orbital sinus, which often results in chronic recurrent infection owing to the poor sinus drainage.

Cytology of exudates/nasal flush should be performed in all cases – as well as culture and sensitivity – to help determine a diagnosis and select treatment using antibiotics/antifungals administered via systemic and topical routes.

Tracheal disease (glottis to syrinx)

The syrinx is the 'avian voice box'. Any bird presenting with a voice change/loss of voice should be investigated for possible syringeal disease (granuloma/foreign body). Other common signs include dyspnoea and tachypnoea, respiratory stridor, open-mouth breathing.

Emergency air sac intubation should be performed in birds with severe respiratory distress or suspect tracheal/syringeal obstruction. A short period of general anaesthesia will be required.

Have ready a sterilised air sac tube – the diameter should be 25 per cent larger than the patient's trachea. The section of tube which will enter the air sac should be no longer than one third of the width of the patient's coeliom at the level of the last rib. Sutures should be pre-placed (**Figure 1**).

Unless pathology dictates otherwise, use the left caudal thoracic air sac (larger than the right).

The anaesthetised bird is placed in right lateral recumbency, the wing is abducted dorsally and

legs retracted caudally. The last rib is located – access is either between the seventh and eighth rib (at a level one third from the top of the rib) or caudal to the eighth (last) rib. The skin should be sterilised and, following a skin incision, use blunt dissection to access the caudal thoracic air sac via the intercostal muscles (**Figure 2**).

Place your tube into the air sac and occlude it while it is sutured into place. One suture should encircle the last rib to prevent the tube migrating from the air sac. If anaesthesia is to be maintained, then attach the anaesthetic circuit and reduce flow rate to 300ml/kg/minute (**Figures 3 and 4**).

This will stabilise the patient sufficiently such that diagnostics/treatment can be performed. Its respiratory function will often improve dramatically under anaesthetic because fear and stress have been relieved.

Tracheoscopy using a 0° rigid endoscope is the single most useful diagnostic procedure. Transillumination of the trachea can be used in small birds to identify possible foreign bodies/obstructions. Radiographs, blood work and endotracheal washes are also performed.

In large birds, endoscopic removal of granulomas and foreign bodies can be performed. Surgical approaches to the trachea/syrinx have been described and resection and anastomosis of a damaged trachea can be performed in the case of post-anaesthetic tracheal strictures (most common in macaws), or fungal granulomas.

Small airway disease

Small airway disease may result from bacterial/fungal pneumonia, toxin exposure (PTFE toxicity) and allergic respiratory disease.

Affected birds should be stabilised – initially with oxygen (+/- bronchodilators) – before diagnostic testing is performed, together with CBC, biochemistry, radiographs, endoscopy, endoscopic-guided lung biopsy and aspergillosis PCR.

In cases of respiratory disease caused by toxic exposure, symptomatic therapy with oxygen, terbutaline (+/- sedatives, such as butorphanol) can be used. Medication may be provided via nebulisation – using terbutaline or acetylcystein, for instance.

In cases where bacterial or fungal infection is identified or suspected, then specific therapy should be provided.

Lung/air sac disease

Auscultation sounds are often normal in cases of parenchymal disease. Fungal, bacterial infection (including psittacosis), cardiac disease with secondary pulmonary oedema, aspiration pneumonia and neoplasia are all common causes of lung/air sac disease.

Haematology, biochemistry, radiographs and chlamydophila PCR/serology should be performed in the majority of cases – coelomic endoscopy is particularly useful at assessing the air sacs because any lesions identified can be biopsied.

Non-respiratory tract causes of dyspnoea

Dystocia, organomegally, ascites and masses can all cause respiratory distress.

In the case of ascites, symptoms can be relieved by performing coelomicentesis – ideally ultrasound-guided (access should be via the exact midline, via a point just caudal to the yolk sac attachment, so that the air sacs are not penetrated). Cytology and cultures should be performed on the aspirated fluid.

Protein-losing hepatopathy or enteropathy can both lead to formation of coelomic fluid, as can cardiac disease and reproductive disease (egg yolk coeliomitis – fat globules will be seen on cytology, as long as it hasn't been fixed with alcohol).

In cases of dystocia, a period of oxygen stabilisation is followed by treatment to correct the dystocia. Dystocia-related dyspnoea is most common in chronic egg-laying birds. These birds often have significant environmental stimuli that are the underlying cause of the problem.

> "Ultrasound is particularly useful in detecting soft-shelled or shell-less eggs"

Haematology is particularly useful for differentiating infection and non-infectious causes. Fungal and bacterial disease will often be associated with marked leukocytosis, and radiographs, echocardiogram, coelomic endoscopy (+ biopsy) are commonly performed.

Voriconazole is the most successful agent for treating aspergillosis in most species. Antibiotics and bronchodilators can be provided systemically and via nebulisation. Doxycycline (Vibravenous – imported from Europe with special treatment certificate [STC]) is the most common treatment for psittacosis in pet birds.

Reproductive emergencies

Chronic egg-laying often has significant underlying husbandry causes. It can result in a large number of reproductive emergencies, including dystocia, peritonitis and hypocalcaemia.

Dystocia is often diagnosed purely on history and clinical examination. Birds invariably present with dyspnoea, 'tail pump' breathing, straining, wide stance and hind limb paresis/paralysis. Radiographs and ultrasound can be used to determine the position and number of eggs.

Ultrasound is particularly useful in detecting soft-shelled or shell-less eggs. Haematology and biochemistry are useful and hypercholesterolaemia, hyper- or hypocalcaemia, and hyperglobulinaemia are often seen.

Symptomatic therapy alone will often result in oviposition. It comprises parenteral calcium, oxygen therapy, analgesia, warm environment and IV/IO fluid therapy.

Egg peritonitis is a common sequel to egg binding, as the subsequent follicle goes into reverse, ending in the coeliom. Antibiotics should be provided where infection is suspected, and prostaglandins or oxytocin (controversial) may be used in cases of non-obstructive dystocia.

Manual manipulation can be applied where symptomatic therapy alone is not successful. Lubricant should be instilled into the cloaca and a blunt, lubricated probe inserted into the cloaca to dilate the vaginal opening into the oviduct. Adhesions between the egg and oviduct can be carefully broken down with the probe.

Where manual manipulation is not successful, per-cloacal (ideally) or transcoelomic (increased risk infection) ovocentesis may be performed (**Figure 5**). This is followed by implosion of the egg and its subsequent removal. Surgical laparotomy and salpingotomy can be tried where trans-cloacal removal of the egg is not possible.

Hormonal treatments (deslorelin acetate implants) or surgical therapy (salpingohysterectomy) can be applied to prevent recurrence of the reproductive disease.

Trauma

Symptomatic treatment for most traumatic injuries comprises controlling haemorrhage, providing oxygen therapy, warmth, fluid therapy (oxyglobin or transfusions, if required), analgesia and broad-spectrum antibiotics if there are contaminated wounds.

Wounds and lacerations – such as bite wounds from other household pets or damage from cage bars and wire – are common. Small wounds are best left open to drain and heal by secondary intention. Larger fresh wounds can be fully or partially closed after being thoroughly lavaged.

Chronic contaminated or infected wounds should not be closed – the option of delayed closure can be employed when infection has been controlled using open techniques. Psittacines undergoing wound management will often require the application of a protective collar because self-mutilation is common.

Beak and nail injuries can haemorrhage significantly. Nails can be cauterised using silver nitrate pencils or electro-cautery. Beak haemorrhage must be treated under anaesthesia, either with electro-cautery or silver nitrate pencils.

Self-mutilation is common in pet psittacines, with grey parrots and cockatoos being particularly susceptible. Flying injuries or self-trauma can both result in damage to blood feathers and pressure will often stem the flow of blood. Broken feather shafts can be ligated or removed; but haemostatic agents, such as silver nitrate, should *not* be used on feather follicles because permanent damage can result.

Figure 5. *When the egg is visible at the cloaca, then a needle can be inserted and per-cloacal ovocentesis performed.*

Open fractures can be true emergencies; closed fractures require initial external coaption to prevent further injury while a treatment plan is formulated. In open fractures tissues should be thoroughly lavaged, bone fragments replaced under the skin, where possible, and a supportive bandage placed prior to surgery.

Seizure and other neurological emergencies

Seizure behaviour has a large number of potential differential diagnoses, so for treatment to be successful, a diagnosis needs to be made at the earliest opportunity.

Midazolam or diazepam can be used in birds suffering from 'status epilepticus'. In seizures not controllable with benzodiazepines, general anaesthesia followed by phenobarbital can be performed.

Hypocalcaemia, hypo- or hyperglycaemia, toxin exposure (including heavy metal toxicity), trauma, chlamydiosis, proventricular dilation disease and hypertension can all lead to seizures. Following initial medical stabilisation, a diagnostic work-up should include CBC, biochemistry (including ionized calcium and electrolytes), radiographs and heavy metal screening (zinc and lead as standard). Doppler blood pressure monitoring should be performed.

Birds with heavy metal toxicity may or may not have metallic foreign bodies within the GI tract and, therefore, cannot be ruled out solely on radiography. Galvanised cage bars and fittings, padlocks, toys are common sources within the home.

> "Self-mutilation is common in pet psittacines, with grey parrots and cockatoos being particularly susceptible"

Heavy metal toxicity is treated with chelation therapy – usually CaEDTA.

Head trauma can often be diagnosed based on history and clinical signs – although trauma is often not visualised by the owner. Where trauma has been identified, an underlying cause for the accident should be identified (hypocalcaemia, heavy metal toxicity, night frights and flight feather damage, for example). Doppler blood pressure should be recorded and treatment based around keeping the patient stable. Any seizure should be controlled initially with benzodiazepam, then with phenobarbital.

Systemic hypotension – where intracranial hypertension is present – is associated with a poorer outcome. The use of loop diuretics, such as furosemide, as a standard treatment for head injury cases is, therefore, contraindicated. Systolic blood pressure should be maintained at between 90 to 120mmHg.

Controlled boluses (10ml/kg) of isotonic crystalloids can be given if systemic hypotension is identified. Mannitol may still be considered where the bird's neurological signs are deteriorating despite other treatments – this is thought to have the benefit of maintaining cranial perfusion.

The use of corticosteroids is controversial and poorly researched in avian patients.

Psittacosis

Psittacosis most commonly presents with respiratory (mild to severe) or gastrointestinal signs, but severe multisystemic disease can occur. All can result in emergency presentation.

All sick pet psittacines of unknown health status should be tested for *Chlamydia psittaci*. No test is 100 per cent sensitive; PCR testing can result in a high number of false negatives owing to intermittent shedding (less common in a clinically sick bird) but can diagnose acute infection (five days from oral swabs). Serology will not detect acute (<2 weeks) infection where the bird has not seroconverted. False positive results may also occur when a bird that has been exposed to the bacteria – but is not infected – is tested.

Treatment for psittacosis is based on supportive therapy and intramuscular injections of long-acting doxycycline (Vibravenous) at a dose rate of 50-100mg/kg once a week for six weeks.

Renal disease

Dehydration, electrolyte abnormalities, gout (articular/visceral), non-regenerative anaemia can all result from renal disease. Renal disease often results in anorexia leading to weight loss/starvation. A CBC and biochemistry should be performed – a persistent elevation in uric acid is the most useful biochemical finding in renal disease.

Elevated uric acid is commonly seen in dehydrated patients suffering from another medical condition and will resolve following fluid resuscitation. Radiographs, ultrasound examination, coelomic endoscopy are useful imaging techniques when evaluating

the kidneys. Blood pressure should be monitored. Renal biopsy is still not commonly performed in avian patients and in many cases of renal disease the underlying cause is not identified. Treatment will invariably be based around intravenous or intraosseous fluid therapy to correct dehydration, reduce the uric acid and correct electrolyte abnormalities. Nutritional support should be provided because anorexia is common.

Allopurinol can be given to treat elevated uric acid and reduce the instance of gout. Hypertension should be treated with ACE-inhibitors, such as enalepril or benazepril. Cases of glomerular disease may benefit from omega-3 fatty acids and, if underlying bacterial or fungal disease is suspected, appropriate broad-spectrum therapy should be provided.

Gastrointestinal disease

Gastrointestinal disease can lead to dehydration, electrolyte imbalances and starvation. Diarrhoea needs to be differentiated from polyuria; and pathogenic vomiting should be distinguished from behavioural regurgitation. In debilitated birds, vomiting/regurgitation often results in aspiration pneumonia.

Crop infections (ingluvitis), gastritis/enteritis, proventricular dilatation disease, chlamydophila, parasitic disease, heavy metal toxicity, sepsis, pancreatitis and hepatopathy can all manifest with GI clinical signs. Underlying husbandry problems, especially arising from seed diets – hypovitaminosis A, toxin contaminated, fungal contaminated – are responsible for many gastrointestinal infections. Psittacine proventricular dilation disease should also be considered as a differential. Diagnostic tests should include CBC, biochemistry, chlamydophila PCR/serology, heavy metal screen, crop cytology, faecal Gram stain, radiographs (contrast where required), fluoroscopy and bornovirus PCR/serology.

Supportive therapy is vital and should at least comprise fluid therapy, nutritional support and correction of electrolyte imbalances. ■

PPD questions

1. A 120g cockatiel (*Nymphicus hollandicus*) presents with a history of diarrhoea, biliverdinuria, weight loss and lethargy. After initial symptomatic therapy you decide to take blood for haematology and biochemistry. What is the maximum volume of blood you can safely take from this patient?

A. 1.2ml
B. 0.6ml
C. 0.12ml

2. A grey parrot (*Psittacus erithacus*) presents in respiratory distress. Having placed the animal in an oxygen-enriched environment, a brief history reveals the bird has been having difficulty vocalising for the past week and now has no voice. What is your next step?

A. Perform a full and thorough clinical exam
B. Anaesthetise the parrot and perform blood work and radiographs
C. Place an air sac breathing cannula

3. A Hahn macaw presents haemorrhaging from the tip of its upper beak following a bite from a neighbouring parrot. How will you control the bleeding?

A. Anaesthetise the parrot and provide haemostasis using bipolar electrocautery
B. With the bird conscious and restrained apply a caustic pencil to the haemorrhaging beak

4. Loop diuretics such as furosemide should be used as part of symptomatic therapy for neurological signs associated with head trauma and intracranial hypertension in birds.

A. True
B. False

5. When assessing renal function in avian species, which biochemical parameter is most useful?

A. Uric acid
B. Urea
C. Creatinine

Answers
1. B In a healthy cockatiel it would be safe to sample 1.2ml; but in a sick and debilitated patient only half of this can be sampled **2.** C **3.** A The avian beak is highly sensitive and treatment should be provided under general anaesthetic **4.** False. The use of furosemide is contraindicated in these cases **5.** A

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The exotic **pet trade**

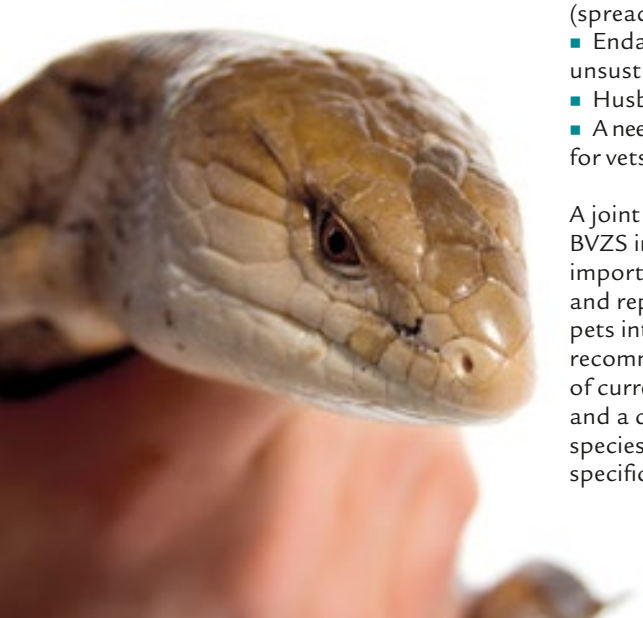
MRCVSonline recently reported on one of the largest seizures of exotic pets in US history, details of which were published in the latest issue of *the Journal of Applied Animal Welfare Science*. The authors formally investigated a major international wildlife wholesaler and later confiscated more than 26,400 animals, including 171 different species and types. Around 80 per cent of the animals were grossly sick, injured or dead, with the remaining 20 per cent suspected to be in suboptimal condition.

The wholesaler was reported to discard in the region of 3,500 dead or dying animals – mostly reptiles – each week, with a 72 per cent mortality rate during the six-week 'stock turnover' period. In the 10 days following confiscation, mortality rates – including euthanasia for humane reasons – were 18 per cent for invertebrates, 44.5 per cent for amphibians, 41.6 per cent for reptiles and 5.5 per cent for mammals.

These were animals held legally by the wholesaler but dying as a direct result of totally inadequate care and housing. Causes of mortality included cannibalism, crushing, dehydration, emaciation, hypothermic stress, infection, parasite infestation, starvation, overcrowding and stress/injuries.

The report stated that contributing factors for injury and disease included poor hygiene, crowding, inadequate or inappropriate provision of food and water, heat and humidity, lack of environmental enrichment and inappropriate housing.

Thousands more smuggled exotic and endangered species destined for the pet trade die every year before even reaching their destination. Reptiles and amphibians in particular are often transported in overcrowded and unsuitable containers, where they may remain for days, particularly if there are delays in connecting flights from airports.



Approximately 300,000 reptiles and amphibians pass through Heathrow Airport's animal reception centre each year to supply the pet trade in the UK and Europe. In 2012, the Pet Food Manufacturers' Association estimated an exotic pet population in the UK of approximately 42 million (including fish).

> "The exotic pet trade causes suffering to millions of animals, disrupts ecosystems and may even be driving species to extinction"

Even when the animal reaches the pet owner, its fate is precarious. Large numbers of exotic pets die each year owing to lack of knowledge about care and housing by the owner or by being discarded once their 'novelty' has worn off, or they have grown too big or aggressive to be kept in the family home.

The BVA Ethics and Welfare Group and BVA's zoological division – the British Veterinary Zoological Society (BVZS) – are in agreement that the major issues associated with the trading and keeping of exotic pets are:

- Welfare of the animals in captivity and during transportation
- Impact on native species if they escape (spread of diseases, predation)
- Endangering species through the unsustainable harvest of wild animals
- Husbandry/welfare issues
- A need for more education and information for vets and public on exotic pets

A joint statement from the BVA and BVZS in 2013 called for the EU to ban the importation of wild caught amphibians and reptiles intended to be sold as pets into the EU. The statement also recommended the robust enforcement of current import and welfare legislation and a caveat to allow certain wild caught species to be taken into captivity for a specific purpose, such as conservation.

The Federation of Veterinarians of Europe (FVE) believes that some exotic species are completely unsuitable for keeping by the general public. At a meeting in October 2013, it agreed to support the principle of drafting 'suitability lists' that specify the species that can or cannot be kept by private individuals and called for countries in the EU to work towards the establishment of such lists.

The RSPCA has dedicated Pledge 5 of the RSPCA Pledges to exotic species – 'We pledge to reduce the number of exotic animals kept as pets and increase their humane care'. They also ask anyone considering keeping an exotic pet to consider the following points:

- How long the animal will live and how large it will grow
- What it eats and how much
- What environment the animal needs – the enviroment must allow for natural behaviour
- Size of enclosure
- Should the animal be kept alone or with others?
- Whether the animal will be active at night or during the day?
- Is there an 'exotics vet' nearby who can treat this animal if it becomes sick?
- Do you need a licence or other legal paperwork to keep it?

Globally the exotic pet trade is growing and this demand for exotic pets fuels both the legal and illegal wildlife trade. According to the Humane Society of the United States (HSUS), the exotic pet trade is a multi-billion dollar industry, second only to drugs and weapons on the black market turning over $15 billion dollars in the United States alone.

The exotic pet trade causes suffering to millions of animals, disrupts ecosystems and may even be driving species to extinction. The capture of animals from the wild is regularly cited as a major cause of species decline and is a significant factor driving biodiversity loss. Exotic pets that escape or are deliberately released by their owners also pose a threat to native species, habitats, and the public. ■

Emily Eudall
Marketing Manager, Onswitch

Having originally trained in equine management and equitation, Emily has over 20 years' experience working in a variety of equine-based roles – the most prestigious of these being yard manager at the Civil Service Riding Club at The Royal Mews, Buckingham Palace.

As her career developed, Emily spent eight years in equine practice, working in both nursing and customer-facing roles and she now combines motherhood with her work as marketing manager for Onswitch. Emily has recently gained a distinction for the Introductory Certificate in Marketing and is about to embark on the Professional Certificate in Marketing.

**Suggested Personal & Professional Development (PPD)*

MARKETING

Your marketing plan – is it working? Feedback, assessment and reflection

You've written and implemented your marketing plan, what now? How do you know what's working and what's not? How do you measure the success of your marketing strategy? Before writing this article, I asked veterinary practices what they found most challenging about marketing. The response was overwhelming and almost exclusively related to focusing resources – getting the team involved and measuring success. If this sounds familiar, then read on!

If you have created a marketing plan, involving the whole practice team, you will know where you stand in your local market. You will know your strengths and weaknesses along with those of your competitors. However, in order to ensure that you are using your time, money and people efficiently, you'll also need to know which parts of your plan are working and which activities may be falling flat on their face!

It's time to start measuring

Regular measurement will highlight whether you are improving and out-performing your competitors. There are five areas on which to focus, each with key performance indicators (KPIs) that will help you monitor your performance (**Table 1**).

Regular measurement of these KPIs is critical in spotting any negative trends early so that you can act immediately. And if something's not working, don't be afraid to change it.

Team

Your team is the backbone of your business; its members must each be focused on the same goals. It is essential that they have played a part in building your marketing plan – when your team shares your vision, they speak with your voice.

You (and they) will be pleased to hear that you don't need to get your tape measure out and start taking down their particulars! Instead, there are two proven ways to measure your team's performance.

Staff engagement levels

Let's face it, if your team ain't happy, then most likely your customers ain't either! And they'll tell their friends. You can help keep your team engaged by asking a few simple questions every quarter – identifying any dips so that you can act quickly when required. A happy team will enthusiastically share your

Table 1. Focus areas and KPIs for monitoring marketing performance

Focus area	Key performance indicators
Team	▪ Measure staff engagement levels ▪ Mystery shopping
Customer	▪ Caller conversion rates ▪ New client registrations ▪ Record source of new clients ▪ Collect feedback and Net Promoter Scores
Word of mouth	▪ Key opinion leaders ▪ Street surveys ▪ Referral programmes ▪ Testimonials
Digital	▪ Google analytics ▪ Social media ▪ Newsletters
Finance	▪ Profit ▪ Turnover per full time equivalent vet ▪ Cost per new client

vision and commitment to provide excellent customer care.

The tried and tested Gallup 12 method features 12 carefully designed questions that accurately and anonymously measure employee engagement levels. National Onswitch TeamTrack data for April 2014 show that while 97 per cent of veterinary employees know what is expected of them at work, only 57 per cent have formal discussions about their development and achievements.

Mystery shopping

Mystery shopping is a way of quantifying how real customers would rate your business, according to a range of key criteria:

- Business basics
- Engagement
- Information

A gradual decline in team performance will not be spotted unless it is being measured – just as a bad customer experience at the first point of contact, the telephone, will drive your clients away without your knowing. Both will have a negative impact on your word of mouth rating.

Measuring customer experience levels on a regular basis will enable you to spot trends and create a benchmark against which to measure improvements. The Onswitch Index national benchmark is 46 per cent – an effective base level from which to set your goals.

With a mystery shopping programme, you can also benchmark against data by town, county or a national basis. TownTrack data for non-Index sites shows that practices in the central belt of the UK are more likely to offer an appointment – Basildon has the highest score to date with a 40 per cent appointment offer rate followed by Oxford at 29.7 per cent. Carlisle is the worst performing town with a paltry 12.5 per cent.

Index sites routinely score 80 per cent and above.

Customer

'Customer centricity' is critical to business success. Great marketing plans begin with walking your customer's journey through your practice – from booking an appointment, to consultation and beyond. If you don't understand this process, as well as how you make your customers feel at each touch point, how can you see what needs changing or improving?

Caller conversion rates give a good indication as to whether your customer care team is performing well on the phone. How many of your inbound calls are actually being converted into appointments? How many of your existing clients are visiting regularly?

Take a look at your BT call reports to identify how many inbound calls there were over a set period, compared with the number of visits. If the rate of appointments booked is below 40 per cent for small animal and 80 per cent for equine, training to help the customer care team convert callers into clients more efficiently will soon pay for itself.

It is important to monitor the number of new client registrations each month – keeping track of this will give a clear indication of the success of your marketing activities. Target 20 new clients per full time vet every month. And ask all new clients where they heard about you, to highlight those marketing activities that attract more new clients.

> "When your team shares your vision, they speak with your voice"

Finally, collect feedback. Onswitch research shows that owners are increasingly valuing excellent customer care as a priority – friendly staff are critical to your success. Encouragingly, over 90 per cent of owners rate the customer care and clinical care at their practice either as good or very good.

You may be wary of feedback; yet, in fact, this is probably the most useful tool you can use to improve the service you provide. Even negative feedback can be an opportunity to show how well you deal with the situation, demonstrating that you have implemented changes to prevent recurrences.

You can collect feedback via social media, web reviews and surveys, but the most reliable method is the Net Promoter Score (NPS) – answering the question "How likely are you to recommend us?" Collecting NPS ongoing data helps you keep an eye on how your customers are feeling. And it's used by just about every big brand you can think of.

Onswitch research finds that the latest average NPS score for UK vets is 83.9 per cent; whereas any other business would be happy with an NPS of 50-60 per cent. This suggests that many practices are delivering a customer experience that warrants consistent recommendation.

Word of mouth

Onswitch research shows that 90 per cent of new clients will choose a practice after recommendation; and apart from location, it is the most important factor influencing their choice of practice. There are many ways to measure recommendation levels.

Key Opinion Leaders need to be a big part of your marketing plan. Create a network of local influential pet and horse care businesses, such as farriers, groomers and catteries. Putting effort into these relationships can be lucrative for both parties, and not just in the financial sense. Keep a record of where your new customers are coming from and you'll soon be able to identify which relationships are successful!

Street Surveys, professionally conducted, are a great way to find out what local pet and horse owners think about you, and armed with this insight you can then make changes, if necessary. Onswitch research shows that a significant number of practices appear to have an awareness issue, with half of owners on average in each town being unaware of a specific named practice.

Referral programmes (or Friend-Get-Friend schemes) have been around for a long while and are used successfully by many practices – a very effective way to reward existing clients and

gain new ones at the same time! Keep a record of how many referrals are down to "a friend told me" and tally this against your new client registration figures.

Testimonials are great too – people love to talk about their experiences, good and bad. Creating a regularly updated testimonial page on your website gives a clear indication that your customer experience is second to none! Facebook reviews now feature star ratings, so it's a good idea to encourage your followers to leave reviews. Four and five stars speak for themselves!

Digital (and a little bit of print)

Are you getting noticed online? Are people engaging with, commenting on and sharing the things you post? The best thing about digital marketing is that the majority is free and extremely easy to measure!

Register your website with Google Analytics, a free resource measuring the success of your website. It gives information on visitor numbers and source, Facebook, search engine and so on. You can then link your marketing activities to these data to see what is working, or not. Whether it's Facebook, Twitter, Google+ or any of the other multitude of social media platforms, you can use their analytics to monitor engagement levels through the number of 'likes', 'comments' and 'shares' you receive. Do more of the things that get the most positive response, and if something falls flat, change it.

It is crucial to collect and update clients' email addresses, because a monthly or quarterly enewsletter is a great way to keep in touch and share the latest information and offers. Modern mail tools also enable you to measure how many people are viewing and interacting with your emails, often in real time. An 'open' rate of between 20 to 40 per cent is considered very good, and Onswitch works with practices that regularly achieve 50 to 60 per cent open rates. How else could you reach over half of your client base for such little effort and cost?

It is certainly worth mentioning that there is still a place for print-based advertising, such as a local mail drop or an advert in the local paper. It can be harder to measure, but placing a call to action with a specific reference for owners to quote will highlight which print campaigns are most effective.

Finance

Analysing a few key financial business metrics is a sure-fire determinant of business success, identifying how individuals are performing within the practice and which activities are delivering the best return on investment (ROI).

> "If you don't measure it, it won't get better"

Profit is an obvious one. Turnover may be looking good; yet after you've deducted your running costs – wages, rent, consumables, marketing, for instance – what's left? Profit margins give a definitive answer as to whether things are going well.

Turnover per full time equivalent (FTE) vet accurately measures the efficiency of your vets. Comparing each individual's data will highlight any issues – are consults taking too long? Are procedures not being charged correctly? The average annual turnover per FTE vet is around £210,000 with the target being £230,000. If any of your team members are falling short of this figure, it is vital to assess what's happening so that improvements can be made.

Cost per new client is also a factor that is important to understand. It's great if your new client registrations are on the up, but not so great if acquiring each one is costing more than they are spending. To calculate your ROI of acquisition, take your total spend on sales and marketing over a given time period, then divide it by the number of customers you acquired during the same period. This understanding will determine where and how you should concentrate your resources.

What gets measured, gets better

We've covered a lot of ground here, but there is one common principle to everything we've discussed. If you don't measure it, it won't get better. Start at the heart of your business, with your team and your customers – after all, they are what keeps your business alive.

Remember that good marketing is not about advertising, but building brand awareness – educating, informing and engaging. Constant 'plugs' for your business will turn people off!

Choose a couple of key parameters and measure them regularly. In this way you'll find the best focus for your time, money and effort – producing a highly effective marketing programme that will drive your practice forwards. ■

PPD questions

1. How many new client registrations should you target?
2. What percentage of new clients will choose a practice on recommendation?
3. Which tool is used to measure staff engagement levels?
4. What is the target annual turnover per FTE vet?
5. What is the most reliable tool for quantifying customer feedback?

Answers
1. 20 new clients per FTE vet, every month **2.** 90% **3.** Gallup 12 **4.** £230,000
5. Net Promoter Score

Jo Webster
VN

Jo started work at Stowe Veterinary Group, a large mixed practice, straight after school and has been working as a nurse for more than 20 years. She qualified as a VN in 1996 and for the past 10 years has been head of nursing.

As well as managing a large team of nurses, Jo's enthusiasm for general nursing continues and she has been heavily involved in vet nurse training for several years.

Jo has a large personal menagerie including horses, chickens, sheep, cats and dogs. She lives with her husband, a partner at the practice, and two daughters. Her hobbies include horse riding, walking, cycling and nature watching.

**Suggested Personal & Professional Development (PPD)*

THE NURSING TEAM

Managing a nursing team

As the head nurse in any veterinary practice, you will encounter many different personality types during your career. Different personalities require different management styles. Veterinary nurses are likely to be caring and kind people who tend be passionate about the care of their patients. On the whole, they love their job which makes managing them much easier.

Managing and motivating

As the manager of a team of over 20 nurses – including full and part-time workers – I feel that one of the most important parts of my job is to motivate them to work hard and give maximum effort in all aspects of their work. I believe that this is best achieved by working amongst the team on the shop floor, on a regular basis, taking an active role in daily veterinary life (**Figure 1**).

This may include working in the operating theatres, the kennels, dispensary and nurse clinics. It allows me to observe closely the progress of my trainee nurses and, hopefully, to encourage the other nurses to work hard. For me, working amongst the staff is a real pleasure; although it is also important to achieve the correct balance between clinical work and management time.

"We hold nurse meetings to share ideas that may move the practice on"

As head nurse, I have many administrative tasks – taking telephone calls, sorting CVs and time sheets, making orders, sorting invoices, writing the rota and so on. I could spend many hours at my desk every day; however, I believe that it is more beneficial to work with the other nurses when possible. This can be facilitated by delegating some jobs to other senior nurses.

In many cases, appropriately selected nurses may be more suited to the tasks than myself. In our practice, roles such as ordering and stock control, laboratory equipment maintenance, clinical coaching, student mentoring and work experience student interviews are all divided between the more senior nursing staff.

During the training process, nurses may demonstrate particular areas of interest – exotics, nurse clinics, puppy classes and behaviour for instance – so clearly it is in the practice's interest to nurture this enthusiasm; the knowledge and experience gained will ultimately benefit the practice. These nurses will feel valued and it may be a route to promotion and pay rises.

We hold nurse meetings to share ideas that may move the practice on – each nurse is asked to bring an idea along or suggest a topic for discussion. We aim to keep the meeting positive so that it does not just become a 'moaning' session.

Nurse meetings are a great way of informing nurses of new practice protocols or products to sell. We usually hold them after work and invariably provide tea and refreshments. I find these meetings are great for team building.

It is important for the team to all be involved in social events outside the practice too. The highlight for us is the practice Christmas party. This is paid for by the practice and staff are welcome to bring their partners.

Mentoring and clinical coaching

Each student in the practice is given a clinical coach who ensures that our trainee nurses are happy and making good progress with their college course. The clinical coach needs to be motivated and experienced, and to have sufficient time to assist and observe their student on a

***Figure 1**. Some members of the team.*

Figure 2. *A nurse restraining patient with her mentor.*

Figure 3. *A nurse monitoring anaesthetic with her mentor.*

"Each student in the practice is given a clinical coach who ensures that our trainee nurses are happy and making good progress with their college course"

regular basis (**Figures 2 and 3**). It is vital that the student and clinical coach develop a good relationship, as it will make completion of the CSL or NPL a much less daunting task.

New nurses and kennel assistants are also assigned a mentor – a nurse who works with them regularly and can provide some support during the initial few months of their new job. Every new nurse performs a 'learning style' assessment. This only takes a few minutes yet gives us an idea of how they absorb information – visual, practical or theoretical – and it enables us to provide them with the best possible training.

Continuous professional development

Registered/listed veterinary nurses are required to perform a minimum of 15 hours of continuous professional development (CPD) each year, and it is important that all nurses are provided with the opportunity to achieve this. Some will need more encouragement than others!

We provide all our nurses with a CPD allowance and give them the time to attend the BSAVA or BVNA Congresses every year. In addition, we have in-house CPD with speakers from outside the practice, and a nurse clinical club. The clinical club is run by one of our senior nurses, who invites two of the nurses each to prepare a 30-minute talk on a chosen topic. This occurs every one to two months and food and drink is provided.

The nurse rota

Writing the rota for a large nursing team is a tedious task but the job has become quicker and easier (with fewer mistakes!) since we started using Rota Manager (**Figure 4**).

I try to balance staff numbers equally for each week day but many other factors must be considered on a day-to-day basis. These include:

- Number of days already worked
- Part-time staff
- Length of day worked
- Number of vets operating
- College days
- Holidays
- Maternity leave
- Sickness
- CPD
- Branch surgery cover
- Other pre-planned events

Figure 4. *Nurse demonstrating a computer rota program to student.*

I ask for holiday requests to be made six weeks in advance, as far as possible, to avoid disappointment. It is on a first-come, first-served basis. We allow a maximum of two nurses off at the same time so that a relatively consistent number of nurses are available to work. To maintain fairness, I try to get the nurses to take one week off in each quarter.

Under and over-staffing can be costly for a practice and bad for staff morale; so for some practices, it may be better to limit holidays to known 'quieter' times, such as Christmas. The veterinary workload will, however, always be inherently unpredictable.

I usually try to write six weeks worth of rota at a time too; and before writing it, I ask staff to let me have specific rota requests such as days off, personal appointments, CPD, holiday, college days and exams. I am fortunate enough to have many nurses who are very flexible, working different days and night duties each week. This does make the rota writing complicated but enables the majority of requests to be met.

Some practices have more rigid rotas with set days off and night duties and this may work well, perhaps for a smaller practice with fewer variables.

It is very important to share the work and night duties fairly between the team, because any discrepancies will soon be spotted! Late rota changes are generally

Figure 5. *Trainee restraining a cat for tube feeding.*

sorted out by nurses swapping amongst themselves. Some nurses have other commitments, such as children, and are only able to manage part-time hours, so they are usually not required to perform night duties.

Provision of out-of-hours service

This may not be an issue for practices using an external out-of-hours (OOH) provider, although there may be hospitalised patients that require some care. Our practice does provide 24-hour care, and I feel that our nurses gain valuable experience from this work. It is an opportunity to work independently, often with challenging cases.

It is a huge responsibility to be looking after all the in-patients and answering the telephone calls. Many nurses relish the task, but it does require extensive experience and training. It is a huge help if the duty vet is supportive.

We introduce night duties to the nurses gradually during their second year of training. This is done by shadowing an experienced nurse on night duties on a regular basis. Usually they feel ready to work alone by the end of the second year. This is easier with a relatively large nursing team.

Nurse recruitment

We receive several CVs a week from local people keen to start a career in veterinary nursing. I believe it is important to reply to these, even if it is just to inform them that nothing is available. All CVs are kept on file. We also have career evenings, to which several prospective nurses are invited as a group and can have 'mini interviews' with different members of staff. When recruiting for a qualified nurse, we are more likely to advertise, often in the local newspaper or VNonline.co.uk website.

Following an interview, successful applicants are invited for a 'trial day', followed by a 'trial week' so that we can judge how they 'get on' with the rest of the nursing team. Interestingly, most of my longest serving

> "It is very important to give nurses feedback on their work in the practice"

nurses trained within the practice and lived locally, so it is certainly worth bearing this in mind when selecting new nurses (**Figure 5**).

Appraisals/progress meetings

It is very important to give nurses feedback on their work in the practice. They need to feel valued and appreciated. Ideally partners/directors, practice manager and nurse managers should praise and thank their staff on a regular basis; but this is often missed, especially at busy times.

Every nurse has an annual appraisal meeting involving the managing partner and myself. This is a two-way discussion and each nurse is encouraged to bring along a list of topics they would like to discuss, together with the appraisal form that they are given a few weeks prior to the meeting. This is a good time to discuss what the nurse has achieved during the past year.

Any suggestions on how to improve the practice are welcomed too and any problems can be brought up. However, issues should really be sorted as and when they arise, rather than waiting for an annual meeting.

I have two deputy head nurses, so there is always one of us in the practice, and minor problems can be dealt with promptly. I prefer to be involved when more serious conflicts or problems arise.

As a manager you will be faced with daily staff problems – such as persistently late arrival, taking a lot of sick days, not completing tasks, causing friction with other staff members. If these problems are dealt with promptly, they are less likely to affect the whole practice.

I would normally approach minor problems with a friendly chat to point out my concerns. A more serious issue would be sorted out by myself and our practice manager. This could involve a verbal warning which is recorded on the nurse's file. Thankfully very serious misdemeanours are very rare; but when they do occur they are invariably dealt with by issuing a written warning in conjunction with face-to-face representations at a formal meeting.

All members of staff are given a practice manual when they start work. They are required to sign to confirm that they have read and understood it. This makes life easier when having to reprimand a staff member who has clearly been shown the practice policies.

When the problem is a conflict between two members of the team, then I prefer to speak to them individually and try to elicit all the facts before taking further action. This may then result in a meeting involving all parties.

Conclusion

This article is based on how I carry out the role of managing the nursing team in a large practice. Clearly every head nurse's situation is different and practice nursing structures will vary. I find my job very rewarding, sometimes tough, but perfect if you like working with animals and people. ■

Amira Norris

Amira started her career in financial services in 1999 and qualified as a Chartered Financial Planner in April 2009. She joined Professional Practice Services (PPS) as business development manager in 2010 and became a partner in 2013.

Choosing the retirement option that's right for you

The freedom to choose how and when you access your pension is paramount. Your retirement should be something to look forward to, not a time to worry about how to make ends meet. Whatever you want to do, understanding how to build up enough retirement savings and how pensions work should help you achieve your goals.

The introduction of Auto-Enrolment and Workplace Pensions is a government drive to help people save for their retirement in schemes that are affordable for employers and attractive to workers. They want to encourage people to increase the amount they are saving in pension schemes so that they accumulate the retirement income they would like. Enrolling workers into improved workplace pension schemes automatically will help to do this.

Your accumulated pension pot will have been hard-earned over years of work. It is only right you eventually have the freedom to choose how and when you access your money during your retirement.

Currently, people don't have total flexibility when accessing their defined contribution pension during their retirement – they are charged 55% tax if they withdraw the whole pot. But from April 2015, people aged 55 and over will only pay their marginal rate of income tax on anything they withdraw from their defined contribution pension – either 0%, 20%, 40% or 45%.

How the current system works

Under the current system, there is some flexibility for those with small and very large pots, but around three quarters of those retiring each year purchase an annuity.

Pension pot options

You can take up to 25% of your pension pot tax free. Prior to the Budget 2014 announcement you had these options with the remaining amount:

- If aged 60 and over, with overall pension savings of less than £18K, you could take them all in one lump sum – this is 'trivial commutation'
- A 'capped drawdown' pension allowed you to take income from your pension, but there was a maximum amount you could withdraw each year (120% of an equivalent annuity)
- With 'flexible drawdown', there was no limit on the amount you could draw from your pot each year, but you must have had a guaranteed income of more than £20K per year in retirement
- Buy an annuity – an insurance product where a fixed sum of money is paid to someone each year, typically for the rest of their life
- If you withdrew all your money, you were charged 55% in tax. Regardless of your total pension wealth, if aged 60 or over, you could take a pot worth less than £2K as a lump sum, as this classifies as a 'small pot'.

Budget 2014 changes

There have been significant changes – announced during Budget 2014 and commencing 6 April 2015. Whatever the size of a person's defined contribution pension pot, the proposal is that you will be able to take it however you wish, subject to your marginal rate of income tax in that year and being over the age of 55.

As previously, 25% of your pension pot will remain tax-free.

There will be much more flexibility. However, for those people who continue to want the security of an annuity, they will be able to purchase one, and those who want greater control over their finances can draw down their pension as they see fit. People who want to keep their pension invested and draw down from it over time will be able to do so.

To help people make the decision that best suits their needs, everyone with a defined contribution pension will be offered free guidance via a government-sponsored initiative on the range of options available to them at retirement.

Savings freedom

In the meantime, as a first step towards this reform, a number of changes have been announced to the rules. These commenced from 27 March 2014 and now allow people greater freedom and choice over accessing their defined contribution pension savings at retirement.

These interim changes include:

- The amount of overall

> "Your retirement should be something to look forward to, not a time to worry about how to make ends meet"

**Suggested Personal & Professional Development (PPD)*

PENSIONS

pension wealth you can take as a lump sum has been increased from £18K to £30K. In addition, the amount of guaranteed income needed in retirement to access flexible drawdown has been reduced from £20K per year to £12K per year

- The maximum amount you can take out each year from a capped drawdown arrangement has been increased from 120% to 150% of an equivalent annuity
- The size of a small pension pot that you can take as a lump sum, regardless of your total pension wealth, increases from £2K to £10K
- The number of personal pension pots you can take as a lump sum under the small pot rules increases from two to three

Who benefits?

The interim changes will mean around 400,000 more people (according to the Government) will have the option to access their savings more flexibly in the financial year 2014/15.

From April 2015, the estimated 320,000 people who retire each year with defined contribution pensions will have complete choice over how they access their pension.

5 tips to improve your golden years

Retirement may seem a long way off for you at the moment, but that doesn't mean you should forget about it.

1. Have you considered how much State Pension will you receive?

The State Pension is a valuable foundation on which to build your retirement income, together with any workplace or personal pension provision you have. If you work, you're required to contribute, and if you don't work, you might be making voluntary contributions or being credited as though you were contributing.

You can log onto gov.uk/calculate-state-pension to get a State Pension forecast.

> "It is only right you eventually have the freedom to choose how and when you access your money during your retirement"

2. Track down your missing pension(s)

You might move jobs a number of times during your working life and pay into a number of pensions. It can be hard for you to keep track of your pensions. If you do lose track, you can visit gov.uk/find-lost-pension to track your lost pension(s).

3. Think about the 'what if' scenario – who inherits your pension pot?

Make sure your pension paperwork is up to date, or there could be confusion over who the beneficiary should be. This is particularly important if you're not married and you want to safeguard your partner's position. Most pension providers have an Expression of Wishes form on which you can state a preference for who should receive your pension pot once you're no longer here. There are different choices depending on the type of pension and also whether you've started to take an income yet.

4. How much have you saved for your retirement?

When thinking about your income in retirement, you need to consider the sort of retirement you want and how much money you'll need, so:

- You should pay as much as you can reasonably afford to your pension funds
- Always check your annual pension statement, and if you don't receive one, ask for one
- When buying an annuity, always shop around for the best deal

5. Professional financial advice you can trust

The radical announcement to give retirees more choice as to how they take the income from their pension fund will mean that other options may now be given more consideration. These changes make it even more important, if you are approaching retirement, to seek professional financial advice in order to make the most of your pension pot. ■

Information is based on our current understanding at the time of writing of taxation legislation and regulations. Any levels and bases of – and reliefs from – taxation are subject to change. Tax treatment is based on individual circumstances and may be subject to change in the future. This information does not constitute advice and should not be used as the basis of any financial decision, nor should it be treated as a recommendation for any specific product.

No individual or company should act upon such information without receiving appropriate professional advice after a thorough review of their particular situation. Professional Practice Services cannot accept responsibility for any loss as a result of acts or omissions.

Industry Profile

Your name: Janet Hughes
Position: National sales manager for pet health plans
Company: Denplan
No. of employees: 300+
No. of practices using Denplan: 6,500+

Your role I work with a sales and administrative team that is dedicated to providing the best possible service to our member practices and their clients. It is inspirational to see at firsthand clients who have been following their health plans and can see for themselves that they are doing the very best for their pets. Our mantra is: 'Every pet deserves a healthy life, a responsible owner and a health plan'.

Biography After leaving school, I qualified as a dental nurse, working in the NHS and private sectors. Following a period on a farm in Israel growing all types of fruit and vegetables, I returned home and attended university as a mature student to study Social Sciences, subsequently landing a job at Denplan as a regional consultant. I have worked in different departments during the past 20 years, qualified as a coach with the OU, gained my CIM from the Institute of Management and attended numerous courses on personal development and business growth.

What made Denplan move into health plans for pets?
Denplan had been the market leader in human dental health plans in the UK since 1986 and had always had a keen interest in new markets. After extensive research and focus groups, the firm could see that there was a gap in the veterinary market for fully supported health plans and wanted to share its expertise. In 2007, Pet Health Plans was launched at the London Vet Show.

What lessons had you learnt that helped you when moving into the veterinary sector?
The dental market was very different because all NHS dentists have a contract with the Government to provide dental care for the population as a whole. Denplan adopted a preventive approach to dentistry via capitation, whereby each patient paid for his or her own dental risk with small affordable monthly amounts to maintain their dental health. If you prevent problems arising in the first instance, you help maintain a healthier mouth for longer.

The same principles apply in the veterinary world. If you prevent illness before it happens, the animals have more of a chance to remain healthier for longer. This gives the owner the peace of mind that they are doing all they can to keep their pets healthy, just as the Denplan human patients were doing, keeping their mouths healthy.

Clients love the fact they can follow an easy plan to help them be more responsible pet owners.

What are your predictions for Denplan during the next 2 years?
Denplan's aim is to increase the number of member practices offering a health plan and to ensure we are supporting them to help increase their pet numbers and, in turn, have more compliant clients.

You have recently taken over Practice Plan for Vets. How will that affect your business?
The acquisition greatly strengthens the support we offer to healthcare professionals in the veterinary marketplace. Our absolute focus will be to continue to support all our vets, their clients and pets, and this acquisition will give us both huge opportunities, over time, to explore some exciting new offerings and enhancements to meet growing demand.

What are the biggest challenges facing your industry sector?
Our biggest challenge is the rise in the number of 'corporate' practices within the veterinary sector. Denplan is working hard to help individual and group practices retain their own personal identity and to show clients that they can have a personal bespoke service tailored to every individual need.

What has been the highlight for Denplan in the last 12 months?
The highlight for Denplan has to be the acquisition of Practice Plan for Vets. Both companies have the same passion to offer support and guidance to all respective members and to look at increasing our presence within the veterinary market for many years to come.

We also have some fantastic relationships with buying groups, PMS, wholesalers and pharmaceutical companies who trust us to deliver on our promises and exceed their expectations on support, professionalism and success.

How does your company support the veterinary profession?
Denplan regularly researches its members and clients to ensure our services – and the services of our members – are what the clients want. By combining the results of these surveys, we can begin to produce an accurate picture of exactly what a client expects from their practice and share it with the profession.

We also commission veterinary experts to help with financial and market research. For instance, Gudrun Ravetz MRCVS CertMgmt GDL has been a veterinary consultant for Denplan since 2007. A previous SPVS president and now a Council member, she is well-placed to advise us on new topics being discussed and novel ways of thinking to ensure we are at the forefront of change rather than trying to catch up.

(Gudrun was involved in composing the answers to the remaining questions in this article).

What do you consider the biggest challenges facing UK vets?
There are a number of challenges that are regularly highlighted within the veterinary press – things such as the increasing number of vet schools, 'feminisation' of the profession, changes in practice ownership models, regulatory changes affecting businesses. All of these challenges provide associated opportunities and will continue to shape the profession's future; and it is good that they are being debated. However, many of these issues are 'organic' and are a natural cycle of business – the challenge is how we as a profession decide to change in a positive way to encompass them.

A real and interesting challenge is how we adapt to the ever-increasing progression of knowledge. In the past decade there have been huge medical and surgical advances. This knowledge is also readily available to clients. This has raised expectations of both practising vets and clients as to the diagnostics and treatments available for pets. While the ability to do more for pets is fantastic, there is a challenge for practices as to how to provide this and to manage client expectation on what is available and at what cost.

How do you think vets should tackle these challenges?
With many of the 'internal' professional changes, it is important that we work with them in a positive way. They are going to happen anyway – but how they happen and their impact on the profession are things that we can affect.

Part of the process is for vets to understand what is going on by engaging with all stakeholders and with the professional organisations – BVA, SPVS, BSAVA, for instance – such that the profession can respond positively and with one voice. A collective voice is particularly important when it comes to global problems, such as antimicrobial resistance.

The veterinary profession is a very resilient one and has always faced challenges. Engaging with – and managing – change is perhaps the biggest challenge for vets, and burying our heads in the sand will mean a lot of missed opportunities.

Do you believe the current model of vets splitting fees between services and products is sustainable?
Historically this has been successful. However, with the changes that occurred following the Competition Commission report on pharmaceuticals – increased availability of pharmaceuticals and pet products outside of veterinary practices, together with some insurance companies encouraging and facilitating the purchasing of products away from practices – this model is potentially not sustainable.

Our professional knowledge and service is something of which we should be proud. The medical and surgical service is something that is unique and can only be provided in the veterinary practice. The most sustainable model is one that can flourish based on professional services. This subject has been debated for years and our challenge, perhaps, is to find a way of communicating to clients the true value of our professional service rather than just a physical product.

Products have a place in veterinary practice but the purchase needs to be differentiated from buying the same or similar product elsewhere. This is where education plays a big part. Selling a product with the right veterinary education attached is hugely valuable and health plans in practices do just that. The vet practice should always be the number one place to get pet health and preventive care products and the vet team are the only ones that give the best pet health education.

Adding value to products sold is the key to maintaining a share of this market.

What do you think is the public's perception of the products and services offered by vets?
In terms of products, this often varies between practices and between clients. Many practices have embraced the concept of adding value to product purchases by having products combined into health plans. In these cases, the products are combined with education and a feeling of 'belonging' within the practice. Research from Denplan shows that in these cases, client's perceptions are very positive.

On the whole veterinary services are still well thought of by the public. However, access to the internet, social media and an inquisitive press do mean that both negative and positive stories are more available. Public comment can now be immediate. The challenge for practices is to educate the public about how fantastic vets are and the great service that they provide.

> "Whether large or small, corporate or independent, a practice that runs as a business, has animal welfare at its heart and sees and promotes the value of its services, will be a success long into the future"

How do you see the future structure of veterinary practice in the UK?
Recent debate about the future of the profession has seen a levelling of the ratio of corporate: independent practices to 50:50. This could well be the stabilised point of these two types of practices. Whatever the ratio is, successful practices of the future will be those that invest in both the clinical and non-clinical areas.

The clinical areas are obvious; but successful practices will continue to embrace the 'service' aspect of the job and see the continuing importance of the 'client experience'. Investment in the business aspect of practices will also be vital both to maintain a happy practice team and happy clients. Whether large or small, corporate or independent, a practice that runs as a business, has animal welfare at its heart and sees and promotes the value of its services, will be a success long into the future.

What are the main factors that make pet health care plans attractive to vets?
As has been discussed, vets face competition from within and from outside the profession. To be successful, practices need to be the place that clients turn to for all of their pet's needs. Pet health plans offer a practice the ability to package everything that a client needs to keep their pet healthy in one easy bundle.

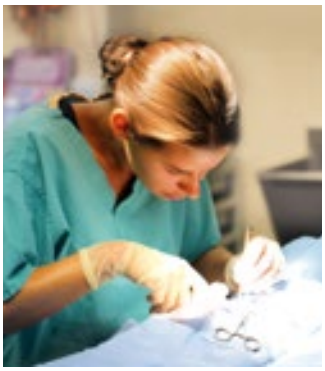
It adds value to products that a client may buy elsewhere and develops a bond between the client and the whole practice team. Importantly, it also offers the practice a regular monthly income and increases 'footfall'. Research has shown that clients on plans will spend more in the practice too.

What are the main factors that make pet health care plans attractive to clients?
The majority of clients want to do the best for their pet. They also want to feel that they have attained good value, that they are valued by the practice and that they feel happy and comfortable there. Pet health plans offer all of these things.

Clients have the peace of mind that they are doing the best for their pet. They are gaining the education and attention that they need and deserve from the practice, they feel that they belong and they can budget by having it all rolled into one monthly payment.

How do you see the future of pet health plans?
The growth of plans within practices has been phenomenal and the speed of this growth is increasing. At one point, booster reminders were novel – now they are a 'no-brainer', simply part of practice. In a few years, pet health plans will be exactly the same!

Central College of Animal Studies



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