

Veterinary PracticeToday

THE JOURNAL FOR PERSONAL & PROFESSIONAL DEVELOPMENT

Animal welfare-focused practice

Steering to avoid the rocks



Rabbit anaesthesia

Safe anaesthetic protocol in general practice

Equine liver disease

Causes and treatment of hepatic disease in horses

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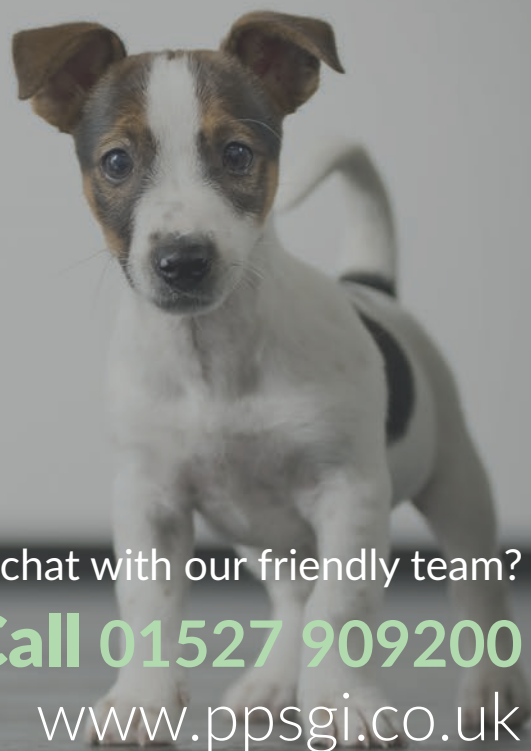


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UP FRONT...

Plain sailing

The subtitle to this issue's Comment article – 'Steering to avoid the rocks' – is an analogy close to the hearts of both editors; although personally, steering to avoid weed in the River Cam rather than rocks off the Cornish coast – as in David's case – is more appropriate.

Rocks or weeds, either, can cause untold damage to a sailing boat not to mention danger to its crew. And so it is in veterinary practice. We steer a narrow channel between providing what is best for animal, owner and staff – so a slight move out of the channel can have us accused of only doing things for the money or not caring about the animal.

Our Comment article talks about the animal welfare-focused practice, but as individuals and pet owners we also have on occasions to make those animal welfare-focused decisions in isolation. Focus is the operative word because when looking compassionately and logically at a very sick animal it isn't difficult in most cases to make the right decision for the animal. It's just that in the short term it sometimes doesn't seem to be the wanted decision for the owner.

On reflection, you always know that the decision was the right one, but you are then in a different more logical, less emotional place. Helping clients through these emotional and often traumatic situations is one of the important roles of the veterinary practice – just as important as being able to provide the latest innovative surgical and medical advances.

Our whole ethos in veterinary practice is to care for the health and welfare of all animals and, in particular, those specifically under our care. The article on goat health planning really illustrates this point, citing the provisions for good practice in the Animal Welfare Act (2006) as the basis for good goat health care. The need for a suitable environment, housing and diet, the ability to exhibit normal behaviour patterns and to be protected from pain, injury, suffering and disease must be the right of every creature under human control.

Returning to the nautical steering analogy, our article on website design gives readers advice on how to make their way through the www. IT jungle of practice websites. With 38 million Britons (76 per cent of the population) logging onto the internet every day, it is vital that practices engage with their clients and have the chance to explain the ethos of their business, welfare-based or otherwise, to potential and actual clients.

Veterinary Practice Today articles cover the whole veterinary field and from this issue onwards readers will have the opportunity to read extra, related copy posted on www.vetcommunity.com. So look out for the 'continue online' boxes at the end of articles in this issue.

Maggie Shilcock
Editor

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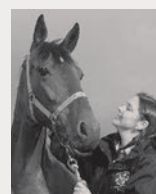
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Animal welfare-focused practice



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We have joined a profession in which a concern for animal welfare is expected of us by society (Rollin, 2006) and promised by us to society (Bones and Yeates, 2012). Indeed, not only is concern for animal welfare an obligation, it is also a pleasure – a key motivator for joining and staying in our profession (Yeates, 2013). Improving animal welfare is also a key concern for veterinary professionals – it was the top lobbying priority in the most recent BVA member research survey (BVA, 2012).

Animal welfare-focused practice is an alternative to vet-focused practice (where the primary aim is to benefit oneself or one's practice) and to client-focused practice (where the primary aim is to benefit one's clients). Both of these alternative aims are not bad in themselves – helping 'number one' and helping one's customers are both acceptable or admirable.

The question is what happens – when 'push comes to shove' – when we are faced with conflicts between different interests. Do we deliberately harm an animal in order to benefit ourselves or our clients?

I will not here argue for *why* we should be welfare-focused – that is down to our individual and collective consciences. Perhaps some people might think it acceptable for a vet to work primarily in order to help humans or themselves, regardless of the animals' interests. But I think it is not what is now expected of us.

Instead, we can consider some cases, to see what welfare-focused practice implies. I have a suspicion that many are welfare-focused, but worry that being explicitly so would mean we cannot ever consider our clients or ourselves. In reality, neither one of these is the case.

Animal welfare can be the wind that fills our sails – but we still need to steer to avoid the rocks.

Win-win-wins

In many cases, there is a 'win-win-win' option, where everyone's interests align. Most owners want to help their animals, owners and vets want animals not to suffer, and helping animals can bring us an honourable wage. In these cases, welfare-focused practice helps everyone, and the apparent dilemma dissolves into a mist of loveliness. Put another way, we often do not need to think about these different perspectives and can merrily press on with helping everyone.

Even if we ultimately home in on the welfare-focused approach – in the final analysis, we can still celebrate benefits to ourselves and owners. These can be considered 'side-effects'; in that we should not aim for them directly, but we can enjoy them when they occur (Yeates, 2013).

Realism

In making welfare-focused decisions, we need to be realistic. Welfare-focused practice does not afford animals any rigid absolute right to life. It does not mean we imagine we are in some idealistic and impossible Utopia. Rather, we decide on what is best for animal welfare in the circumstances, given the reality of the situation as regards the animal's owners (or absence thereof) and resources.

We still need to have discussions with owners – welfare-focused practice does not mean ignoring them – in order to gain their insights, expectations, resources, constraints and plans. All of

"Animal welfare can be the wind that fills our sails – but we still need to steer to avoid the rocks"

ETHICS

these need to be factored into our decision-making. We should not pander to owners completely – we should not tack too hard or we risk finding ourselves beating to windward. However, they are one part of reality that we need to take into account.

For example, an owner may present us with a dog for euthanasia that has bitten a child. Welfare-focused practice would not suggest that we avoid euthanising that dog or that we pretend that the dog can be rehabilitated safely. The question for us here is what would that dog's life be like if he/she is not euthanised?

It seems likely that the dog will either be relinquished – in which case the shelter, as a responsible charity, will probably have to euthanise it rather than re-home a dangerous dog, which in turn means the dog is put through the stress of kennelling before being euthanised; or the owner will keep the dog in a tightly controlled environment, lacking decent exercise or affection. In both cases, the dog is better off being euthanised – or put another way, welfare-focused practice would protect humans (and oneself).

Long-termism

Similarly, welfare-focused practice should consider the long term – in particular we should not benefit one animal if doing so excessively harms others.

For example, we need to ensure that our practice is able to continue functioning and employing staff by making a reasonable net profit on services and products, and that owners continue to present animals for treatment in the expectation of a professional service that does not breach confidentiality. Sometimes this will mean that welfare-focused practice is not doing whatever is in the interests of the particular animal in front of us.

A specific example of realism and long-termism is the need for welfare-focused practice to consider legal constraints. As veterinary surgeons and nurses we need to act within the law and within our professional obligations.

For example, we should not steal owners' animals or money, we should take reasonable steps to gain consent for elective procedures and so on. These legal constraints may be big rocks to avoid – or, if we do not know the law well, we may be excessively fearful that there are rocks under the water, and give them an excessively wide berth.

Professional bodies

At the same time as making welfare-focused decisions as individual clinicians and practices, we can also ensure that our decisions as professional bodies are welfare-focused. We should ensure that our professional rules – for example, those devised by the RCVS – are based on what will improve animal welfare overall, again, depending on reality and legal constraints.

We should ensure that our 'membership' organisations – the BVA, for instance – are focused not primarily on protecting the personal

"We still need to have discussions with owners – welfare-focused practice does not mean ignoring them – in order to gain their insights, expectations, resources, constraints and plans"

interests of their membership (or their 'clients'), but on helping animals. Again, this actually means that such organisations *should* ensure that vets earn a fair wage in order to ensure good people are in the profession and practices are sustainable.

This may create some difficult procedural questions – or at least perceived issues – not least because democratic processes can risk accusations of voting being based on personal interests and the use of specialist divisions can risk accusations of complicity with the industries or practices that cause welfare compromises. The criticism of the BVA over their support for the badger culls in England is one such example.

If vets are all welfare-focused, then these examples will represent perceived conflicts, rather than real issues; but the accusations will remain and it may be difficult to create a process that avoids them transparently. (Perhaps the BVA's Ethics and Welfare Group could take factual input from the specialist divisions, but not look to them for the final 'ethical' decision?).

Ultimately, the proof of the pudding will be in its fruits (don't worry about these mixed metaphors and remember we're already on a boat!). If the profession's positions and policies genuinely reflect animal welfare, then these accusations will fall away.

Conclusions

So welfare-focused practice does not mean we ignore clients' or our own interests. We should consider animal welfare in a way that takes reality into account – recognising the (legitimate) constraints on us in our efforts to help animals. This means that there are legitimate constraints on our welfare-focused decision-making – the reality of owners, the reality of practice, the law and our professional rules are all rocks to steer between.

Set against the background of such constraints and side-effects, it is likely that welfare-focused practice will create relatively few conflicts. And where such dilemmas do loom large – and they do – it gives us a direction and a course by which to steer. Welfare-focused practice simply means that, when there are conflicts, we prioritise our duty to animals. ■

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"In making welfare-focused decisions, we need to be realistic. Welfare-focused practice does not afford animals any rigid absolute right to life"



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**Suggested Personal & Professional Development (PPD)*

PUPPIES

Feeding techniques for sick, immature and premature neonatal puppies

Puppies may need to be hand fed following the death or illness of the mother, puppy immaturity or problems including hypothermia and hypoglycaemia. Sadly, many puppies ultimately die as a consequence of incorrect feeding methods and inappropriate nutrition, often instigated too late.

There are essentially two means of feeding neonatal puppies (from birth to 21 days of age) when hand rearing – ‘stomach’ tube feeding and teat feeding.

If a puppy lacks a suck reflex, then feeding by a tube placed into the oesophagus at each feed is the only option for providing nutrition via the gut. To test for a suck reflex, introduce a clean finger into the puppy's mouth; it should suck on your finger fairly hard. If it does not, then trying to feed via a teat carries a high risk of inducing aspiration pneumonia and will also exhaust an already critical puppy.

Tube feeding is useful, but should only be used when needed, as there is a risk of placing the tube into the lungs rather than into the oesophagus. Unless there is an anatomical abnormality, tube feeding should only be necessary for a few days at most.

If a puppy has a suck reflex, then teat and syringe feeding is the method of choice. It is safer and most people find it easier than the traditional teat and bottle feeding. Feeding using a dropper bottle is never advised as it often results in aspiration pneumonia.

“If a puppy has a suck reflex, then teat and syringe feeding is the method of choice”

Tube feeding

The following is the essential equipment needed for tube feeding puppies:

- appropriately-sized feeding tube. Each puppy should have its own tube – the use of urinary catheters is not advised, as these are too hard and can cause damage to the throat and oesophagus. By comparison, feeding tubes are soft and you can ‘feel’ where you are going as you descend the oesophagus. Typically, a newborn puppy will need a 3FG or 4FG tube and a 6FG for larger breeds
- appropriately-sized syringes. Generally, a 2.5ml, 5ml or a 10ml for giant breeds
- surgical tape for marking the length of tube.

Measuring the tube

The tube must be measured and marked before placing it into the puppy – and re-measured every few days.

Lay the tube tip so that it lies three-quarters of the way

along the length of the rib cage (about the level of the 9th rib). Then, with the puppy in a natural lateral position, lay the rest of the tube along the chest, up the neck and measure to the mouth (**Figure 1**).

Keeping your fingers at this point, remove the tube from the puppy's side and place a piece of surgical tape at this point. During feeding, the end of the tube should be sitting in the oesophagus just before the opening into the stomach.

Feeding procedure

Prepare the feed to the correct temperature and draw up the required amount into the syringe. Expel any air present in the syringe; then connect the tube to the syringe and depress the plunger until all the air has been removed from the tube and the feed appears in a small drop at its end. Use this small drop of feed to lubricate the tube as it passes into the mouth and down into the oesophagus.

Figure 1. Measuring the tube.



Place the puppy on a warm, non-slip surface and keep it on this surface during feeding. Using the thumb and forefinger of one hand, gently press on the corners of the mouth to make the puppy open its mouth; then, use your finger to gently 'wedge' the jaw open whilst you place the tube.

Keeping the puppy's neck in a natural position, using your other hand, gently insert the tip of the tube into the mouth, aiming towards the roof of the mouth about three-quarters of the way back. If the puppy's neck is extended or flexed, it is much harder to place the tube correctly into the oesophagus.

The tube should glide easily from the mouth and into the oesophagus. Stop when you reach the tape marker.

Gliding the tube along the tongue will introduce the tube into the trachea. The tube is in the trachea if it feels 'sticky' when advancing and if you cannot advance the tube up to your tape marker. Be aware that puppies under 10 days of age and weak puppies requiring tube feeding usually do not have the cough reflex you would normally expect if the tube enters the trachea.

To check the tube placement, pinch the puppy's ear; if strong enough, the puppy should be able to give a loud squeal. If it

"The puppy will take a little time to accept the teat"

gags or chokes, withdraw the tube and start again. A weak or very young puppy will not react. If in any doubt, do not introduce the feed.

Once the tube is placed correctly in the oesophagus, hold it in place using the finger and thumb that were holding the mouth open. If you don't do this, the tube will work its way out during feeding and may direct feed into the lungs. Slowly depress the syringe plunger at a rate of one millilitre over 10 seconds. Leave the tube in place for two seconds before removing in one smooth, swift movement.

If you have taken a long time to place the tube, you will need to reheat the feed in the syringe and tube again as it will have become cold.

Teat and syringe feeding

Teat and syringe feeding is particularly useful for small and weak puppies as, by depressing the syringe plunger slowly, you can aid feeding.

Using a closed system in this way also helps avoid the puppy taking in air, which often happens when using a bottle.



Figure 3. Adaptors to fit teats to syringes (from left): ST2 teat fitted to a 5ml syringe using an adaptor, the end from a ST1 teat, the hub of an intravenous catheter, the hub from an old feeding tube.

The author uses Catac feeding teats (**Figure 2**).

There are three different sizes of teat, depending on the size of the puppy. The ST1 (long and thin) is best for very small puppies and fits directly onto a syringe. The puppy only takes the tip of the teat into its mouth.

The ST2 teat with a ridge suits most small to medium-breed puppies at birth; the puppy takes the teat up to the ridge into the mouth.

The largest ST3 teat suits large and giant-breed puppies at birth in addition to smaller breeds moving on from the ST2 as they grow. Both the ST2 and the larger ST3 need an adaptor to fit onto a syringe (**Figure 3**).

Adaptors can be fashioned from an old ST1 teat (or sacrifice a new one). Cut off the attachment end and place this piece onto the syringe before placing the feeding teat over the top. It is worth keeping old teats for this purpose. Alternatively cut off the end of an intravenous catheter hub or the hub of an old feeding tube. Place this onto the syringe first before placing the teat over the top.

You will need to make a hole in the teat. Purchase more

teats than you think you need as it takes practice to make the hole the correct size. The teat hole enlarges with use and, therefore, teats need replacing every few days.

Make a tiny hole in the teat using a small pair of fine, sharp scissors. The hole needs to be much smaller than you would create for bottle feeding. Test the hole size using a syringe of water. You need a small squirt of water to come out of the teat in a constant flow as you slowly depress the syringe plunger.

When you are ready to feed, draw up the required warmed volume of feed in a syringe. Attach the adaptor (if needed) and teat. Dip the end of the teat into the warmed feed.

Place the puppy on a warm, non-slip surface and keep it on this surface during feeding. Using the thumb and forefinger of one hand, gently press on the corners of the mouth to make the puppy open its mouth; use your finger to gently 'wedge' the jaw open whilst you introduce the teat into the mouth (**Figure 4**).

Keep your thumb and forefinger either side of the mouth to help the puppy stay on the teat. The puppy should be held on the non-slip

Figure 2. Feeding teats.





Figure 4. Syringe feeding a neonatal puppy.

surface during the feed with the mouth, teat and syringe all kept in a level plane. As the puppy sucks from the teat, help it by slowly

and smoothly depressing the syringe plunger. The puppy will take a little time to accept the teat, but will improve after a few feeds. ■

Summary of key feeding points

- tube feed only when needed using a 3FG or 4FG feeding tube for puppies of most dog breeds
- measure and mark the tube before use and every few days
- teat and syringe-feed the puppy as soon as its suck reflex is strong enough
- check the hole size in the teat every day because it enlarges with repeated use
- never use a dropper feeder or syringe without a teat.

PPD Questions

1. What is the safest way to feed a puppy without a suck reflex?
2. How can you check for a suck reflex?
3. Which method of feeding is never advised and why?
4. When measuring the tube against the puppy, which rib should the tube reach?
5. What checks should be made before starting to introduce milk down a placed feeding tube to ensure correct position?
6. What is a useful alternative to bottle feeding?

Answers

1. By oesophageal tube
2. Insert a clean finger into the mouth. The puppy should suck fairly hard!
3. Dropper feeding as there is a high risk of aspiration pneumonia
4. The 9th rib
5. The tube should have slid down into the oesophagus easily up to the marker and the puppy should be able to vocalise if an ear tip or paw is pinched
6. Using a teat and syringe

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*Suggested Personal & Professional Development (PPD)

PARASITOLOGY

Essentials of trematodes in cats and dogs

Although considerably less well known in companion animals than roundworms and tapeworms, there are many trematodes or flukes (flatworms, class *Trematoda*) that parasitise companion animals. This article considers the trematodes most likely to infect UK cats and dogs, especially those travelling abroad, as well as their diagnosis, clinical significance and treatment.

Trematodes have a complex life cycle – with adult worms or ‘flukes’ living in the intestines, bile ducts, lungs or vascular systems of vertebrates depending on the species of fluke. Most flukes are flattened dorso-ventrally, have suckers for attachment to the host and are hermaphrodites (**Figure 1**).

Eggs are passed from the host and infect mollusc intermediate hosts. Sometimes second or third intermediate hosts are then involved, but at some stage infective cercariae or metacercariae develop that are infective to their vertebrate host.

Few endemic species in the UK parasitise dogs and infection is rare; but the presence of fluke eggs in faecal samples and aberrant infection by livestock trematodes, such as *Fasciola hepatica*, are likely to lead to confusion and misdiagnosis in first-opinion practice. Cats are even less likely to be infected with trematodes originating in the UK.

Cats and dogs travelling to the USA and Asia, however, are at far higher risk of infection. Practitioners should, therefore, be aware of

the potential for infection in pets visiting these countries.

Trematodes currently endemic in UK

The only species of fluke known currently to parasitise dogs in the UK with patent infection is *Alaria alata*. Dogs may be incidentally infected with *Fasciola hepatica*, although this is a rare phenomenon.

Alaria alata

This intestinal fluke is primarily a parasite of foxes; but dogs may be infected through the consumption of frogs acting as second intermediate hosts or rodents that can act as paratenic hosts. It has been shown to be endemic in Wales (Williams, 1976) and Ireland (Wolfe et al, 2001) with prevalence in foxes of 13 per cent and 27 per cent respectively (**Figure 2**).

Whether it is endemic in the rest of the UK, however, is unknown. Prevalence can be underestimated by as much as 71.4 per cent through diagnosis by means of faecal flotation (Wolfe et al, 2001) and infection in dogs is, therefore, easily missed.

Adult flukes are 2-6mm long and are well tolerated by canid hosts. Clinical cases are rare with high burdens apparently well tolerated – but they can be a cause of enteritis or pulmonary haemorrhage as they migrate through the lungs.

If trematode eggs resulting from *A. alata* infection are identified in the faeces, then confusion may arise as to their significance. Eggs are operculated and large (98-134µm × 62-68µm). They superficially resemble *Fasciola hepatica* eggs and may be mistaken for these on faecal examination, although they are slightly smaller.

If trematode eggs are found in the faeces of dogs then treatment is indicated to prevent environmental contamination and possible pathology through re-exposure and accumulation of higher burdens. *A. alata* is susceptible to treatment with praziquantel.

Zoonotic infection can occur; but there are, to date, no recorded cases in the UK. Dogs and foxes pose no direct health risk – with recorded zoonotic infections

Figure 1. Adult *Fasciola hepatica* showing anterior end sucker (Photo: Dr Eric Morgan).

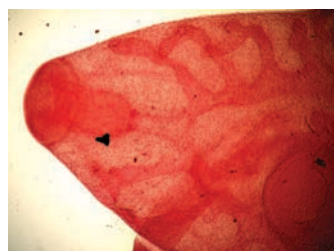


Figure 2. *Alaria alata*, a parasite of foxes, is endemic in Wales.





Figure 3. *Fasciola hepatica* eggs (Photo: Dr Eric Morgan).

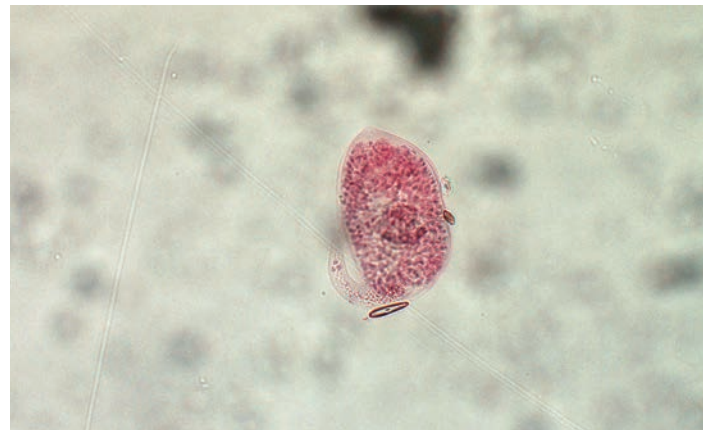


Figure 4. *Fasciola hepatica* cercaria (Photo: Dr Eric Morgan).

resulting from the ingestion of under-cooked game and frog legs.

Fasciola hepatica

Ovine and bovine fascioliasis is increasing year on year in the UK owing to consecutive wet, mild summers and winters. Dogs – and rarely cats – may be infected by drinking water or eating plant material contaminated with metacercariae. Clinical cases may be patent and severe, leading to bile duct obstruction and liver failure. Fortunately, to date, there have been no recorded cases in the UK (**Figures 3 & 4**).

As prevalence of the parasite increases in livestock, however, resulting in increased environmental contamination, veterinary professionals should be aware of the possibility of infection and include fascioliasis as a differential diagnosis in cases of acute liver failure or jaundice. The presence of large (130µm-150µm × 65µm-90µm) operculated eggs on faecal examination, in combination with hepatic signs, should raise a high index of suspicion.

Treatment with praziquantel has limited efficacy against *F. hepatica* and the efficacy and safety of triclabendazole use in cats and dogs has not been established. Surgery to clear bile ducts may be required in severe cases.

Trematodes not endemic in UK

The potential for cats and dogs to become infected with trematodes while travelling abroad, especially outside of Europe, is far higher than in the UK and veterinary professionals should be aware of potential infection in pets returning to the UK. There is a wide range of flukes that may produce patent or clinically significant infection.

Heterobilharzia americana

This American trematode of raccoons and dogs is a schistosome-type fluke with distinct male and female worms. Adult *H. americana* worms travel through the portal veins to the mesenteric veins where they mate and deposit eggs.

H. americana adults have a close association with one another, with one or more female worms residing in a groove alongside the larger male worm after mating. Eggs are deposited through the mesenteric veins into the small intestines where they are passed in the faeces. Snails act as an intermediate host from which free-swimming cercariae emerge and penetrate the skin of raccoons or dogs that may be swimming or wading in contaminated water.

The migration of *H. americana* eggs across the intestinal wall can cause severe granulomatous

inflammation, resulting in vomiting, diarrhoea, anorexia and weight loss. Secondary glomerulonephritis can also develop leading to renal failure and potentially fatal complications (Ruth, 2010).

Pathogenesis may be advanced by the time clinical signs develop and diagnosis has been established. As a result, clinical infections carry a very guarded prognosis. Treatment with praziquantel (10mg/kg PO tid for 2 days) or fenbendazole (24mg/kg PO sid for 7 days) can be effective in combination with supportive treatment for diarrhoea and renal complications.

Diagnosis is made through the identification of eggs in faeces. Eggs are unoperculated and thin-shelled, measuring 87µm × 70µm. They contain pear-shaped ciliated miracidia that will hatch, swim away and infect snails. The eggs do not float well in standard flotation media and will hatch in fresh water, so sedimentation techniques in saline are required if infection is suspected.

There is no peer-reviewed evidence to suggest that

chemoprophylaxis is effective in protecting dogs, so it is important that vets and nurses recommend that dogs travelling to these states should not make contact with water by swimming or wading in canals or ponds.

Paragonimus kellicotti

Paragonimus kellicotti adults develop into cysts in the lungs of both dogs and cats and are prevalent throughout North America and East Asia. Adults are typically fluke-like in appearance and operculate eggs are passed in the faeces. A snail intermediate host is required, but cats and dogs are infected by eating crayfish and crabs that act as second intermediate hosts.

Infected pets may remain in a subclinical state or can present with a variety of respiratory signs, including coughing, dyspnoea, pneumothorax, bronchiectasis, and haemoptysis. Clinical infection is often fatal if left untreated, so cats and dogs returning from countries where *P. kellicotti* is endemic should be checked for trematode infection through faecal examination or bronchial washes.

“Although *Paragonimus kellicotti* has significant zoonotic potential, cats and dogs pose no direct risk”

Treatment consists of praziquantel (20mg - 30mg/kg) and supportive treatment for the respiratory signs. Infection of cats and dogs travelling abroad can be prevented by avoiding exposure to crayfish and crabs when pets are playing in streams or pools.

Nanophyetus salmincola

Nanophyetus salmincola is a small (0.5mm x 0.3mm) intestinal fluke of cats and dogs and highly prevalent in the Pacific Northwest of the United States. Typically, operculated fluke eggs are passed in the faeces and snails are required as intermediate hosts. Infection occurs through the consumption of raw or under-cooked salmon or trout which act as second intermediate hosts.

Although heavy infestations can cause enteritis, the most significant pathology associated with infection is development of the 'salmon poisoning complex' caused by rickettsial organisms that the fluke carries. This can be rapidly fatal in dogs, so preventing exposure to the parasite is vital.

If 'infection exposure' is suspected, pets should be treated immediately with praziquantel (20mg - 30mg/kg) or fenbendazole (50mg/kg/day for 10 to 14 days).

Clonorchis sinensis* and *Opisthorchis felineus

Clonorchis sinensis and *Opisthorchis felineus* are important liver flukes in Asia, capable of causing significant disease in cats and humans. Infection results from eating under-cooked fish and prevalence in stray cat populations in Asian countries can be high.

Infection can be highly pathogenic, so if there is any possibility of exposure the patient should be treated with praziquantel at 40mg/kg.

Metagonimus spp.

This intestinal fluke is primarily a parasite of Asian wildlife, with rats acting as the primary definitive host. Infection occurs through the consumption of fish and cats may be incidentally infected via this route.

Diagnosis

Trematode eggs do not float well and are rarely seen in standard faecal floats. As a result, if fluke infection is suspected, then a sedimentation technique should be used. Many different techniques are available and can be carried out 'in house' or by external labs.

A typical test technique is:

- mix 5g faeces in 200ml of water
- pour the mixture through a tea strainer and discard the solid material left behind
- after 10 minutes discard 70 per cent of the fluid and refill with fresh water
- repeat step three until the fluid is clear
- pour off 90 per cent of the water and examine by low power microscopy in a petri dish or on slides.

Commercial fluke kits for use 'in house' are also available.

Any large operculated egg suggests fluke infection and treatment with praziquantel is effective against most companion animal flukes. Clinical signs are also useful in establishing a diagnosis.

Conclusions

Although trematode infections in UK cats and dogs are uncommon, the situation is likely to change as pet travel increases and climate change allows the spread of these parasites and the intermediate hosts upon which they rely. Veterinary professionals must consider flukes in their differential diagnoses – especially in pets that have travelled abroad – if significant

disease is to be treated and avoided. The correct preventive advice must also be given to people taking their pets to countries where these parasites are prevalent. ■

PPD Questions

1. Which of the following trematodes cause 'salmon poisoning' in dogs?
 - A. *Metagonimus spp.*
 - B. *Clonorchis sinensis*
 - C. *Nanophyetus salmincola*
 - D. *Paragonimus kellicotti*
2. Which of the following trematodes lives in the lungs?
 - A. *Metagonimus spp.*
 - B. *Clonorchis sinensis*
 - C. *Nanophyetus salmincola*
 - D. *Paragonimus kellicotti*
3. In addition to dogs, which species can act as a mammalian host for *Heterobilharzia americana*?
 - A. Beavers
 - B. Raccoons
 - C. Skunks
 - D. Pigs
4. Which anthelmintic is most often effective against companion animal trematodes?
 - A. Praziquantel
 - B. Albendazole
 - C. Ivermectin
 - D. Moxidectin

1.C 2.D 3.B 4.A
Answers

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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)

RABBITS

Rabbit anaesthesia – Part 1: an overview

Rabbit anaesthesia is considered to carry a high risk compared with anaesthesia of the dog or cat (Brodbeck et al, 2008). In reality, most adverse events are avoidable and excellent success rates can be achieved in general practice. This article summarises how to set up a safe anaesthetic protocol in general practice, with minimal extra equipment.

It is vital to consider all stages of the anaesthetic exercise – starting from six weeks before the procedure to several weeks afterwards. Just concentrating on ‘getting things right on the day’ means that important risk areas are not considered.

Preparation stage

Many complications in rabbit anaesthesia are related to husbandry factors or pre-existing disease. It follows that attention to detail well before the anaesthetic will improve safety (**Figure 1**).

Figure 1. Take a careful history, even for seemingly healthy animals.

Background – hygiene or breeder/rescue. Transmissible disease possible; may be subclinical for years. Previous dental disease; increase of upper respiratory infection.

Indoor rabbits – may have vitamin D deficiency – can be implicated in dental disease, malnutrition and respiratory infections.

Outdoor rabbits – poor hygiene increases risk of pneumonia and *Encephalitozoon cuniculi* infection.

Diet – should be based on hay and grass with small supplement of extruded pellet and fresh leafy vegetables. Try to resolve dietary problems if anaesthesia is not urgent.

When you feed a rabbit, remember that you are actually feeding the intestinal bacteria that digest the plant matter, producing caecotrophs which then feed the rabbit. Grass acts as a prebiotic making sure that a slow-fermenting bacterial flora develops. This provides a safety net in the post-anaesthetic period to help prevent bloat and other intestinal complications. If high sugar items are fed – even in small quantities – small, fast-fermenting bacteria populations can develop, awaiting the chance to overgrow and cause problems in the post-surgical period.

The bacterial flora takes about six weeks to stabilise after dietary changes and, therefore, these changes should be undertaken well in advance of anaesthesia. If it is not possible to do so, then the rabbit should be fed an unmodified diet until it has fully recovered from anaesthesia.

Clinical examination should be performed as for any other species, but with special attention being paid to the areas highlighted in **Figure 2**. Whenever possible, manage or resolve husbandry or disease issues well before anaesthesia.

Upper respiratory infections are very serious because rabbits are obligate nasal-breathing animals. Airway obstruction can occur rapidly under anaesthesia. If infections cannot be resolved before anaesthesia, it is important to use a fast-acting intravenous induction agent, followed by the rapid placement of either an endotracheal tube or v-gel supraglottic airway device to bypass the nasal airway and provide oxygen. Of the two, the v-gel is far faster and easier to place in an emergency.

Admission/premedication stage

Rabbits are a prey species. Evolution has made them into ‘fluffy snack bars’ for any passing predator. Anything

Figure 2. Pre-anaesthetic examination check list.

Ear infections are one manifestation of generalised infections that include nasal and sinus sites.

Body condition – both thin and obese rabbits can have underlying disease processes.

Heart disease is uncommon in rabbits. Check for dull lung areas which may indicate infection. Lung field is small – auscultation is not a sensitive test for thoracic disease.



Dental changes may point to underlying nutritional disease or infections.

Check tail base and feet. Urine staining is a marker of various diseases including renal disease. Impacted caecotrophs are frequently caused by poor diet which can affect anaesthetic risk.

that is outside their normal environment will create genuine fear, which will impact on every stage of anaesthesia.

So anything that can be done to reduce stress and fear will assist these patients, for example:

- admit them to the hospital together with a well-bonded partner rabbit. This one change in the author's hospital made more difference to the rate of postoperative complication than anything else. If a bonded partner is not available, then items from the home environment may make a difference – but this is far less effective
- keep them out of the sight, sound and smell of predator animals. This can be done by using a large wire basket or puppy crate if there is not an appropriate kennel area
- minimise the use of painful injections – subcutaneous injections will be less painful than the intramuscular route. The author finds that use of EMLA cream (Astra Zeneca) prior to catheter placement is helpful
- the induction environment should be quiet and calm, without bright lights. Towel wrapping while handling is likely to reduce stress by giving the rabbit a hiding place
- prokinetics and fluids should be administered as required following a clinical assessment. The author does not administer prokinetics routinely before elective surgery, reserving their use for those rabbits showing reluctance to eat in the recovery period. Good analgesia appears to be more effective.

Normal haematology and biochemistry ranges are readily available, but many chronic diseases are not easily identifiable on bloods and blood sampling may be less rewarding than in dogs and cats.



Figure 3. Anaesthesia combination for rabbits.

Analgesia

Analgesia options can be split into five groups, which should be used in combination (**Figure 3**). Few drugs are licensed for use in rabbits, however, so obtaining informed consent is important.

Opiates

Opiates have potential sedative side effects (which may slow intestinal movements). They are powerful analgesics, effective for controlling surgical and post-surgical pain, and both full agonists and partial agonists can be used.

NSAIDs

Non-steroidal anti-inflammatory drugs (NSAIDs) are highly effective and should be a part of all routine pre-surgery analgesic combinations. Oral solutions are normally very palatable, but remember that there are potential renal and gastric side effects.

Local anaesthesia

This can be used as a 'splash' block, a block between ligatures, a ring block or a nerve block to be included in routine analgesia combinations.

Non-pharmaceutical methods

Gentle tissue handling is highly effective in minimising pain from tissue trauma – the use of stay sutures and moistened sterile cotton buds is recommended for tissue handling. It has been shown with humans that replacing peritoneal fluid loss with warmed sterile saline prior to closure reduces postoperative abdominal pain and the risk of adhesions (Roman et al, 2005). The same is likely to be true in rabbits.

Distraction analgesia

In humans, it is well known that diverting attention away from a painful stimulus reduces the perception of pain (Hoffman et al, 2001). This is likely to be true in other species. The presence of a bonded partner encourages grooming and grazing behaviour, which is probably the simplest way to achieve this for rabbits.

Induction stage

Induction of anaesthesia should be calm and quiet. Various protocols exist, and subcutaneous or intramuscular combinations are easy to administer. Intravenous drugs should be given via an ear vein catheter to avoid accidental extra-vascular administration. In the author's view, face mask inductions are unnecessarily stressful and injectable agents are safer and more predictable.

During anaesthesia, rabbits should be positioned with the thorax slightly raised. Surgical 'bean bag' supports are useful for this. Raising the thorax allows the intestines to slide away caudally from the diaphragm. Rabbits primarily use the diaphragmatic muscles

for respiratory movement and reducing the load on the diaphragm will make respiration easier (Harcourt-Brown, 2008).

Use ocular lubricants throughout the procedure to maintain a moist corneal surface and prevent ulceration.

Airway management

Three options are available to manage the airway – face mask, v-gel supraglottic airway devices and endotracheal tubes (ETT). Every rabbit should be at a surgical plane of anaesthesia and have an appropriate dose of lidocaine applied to the larynx before attempting intubation or v-gel placement.

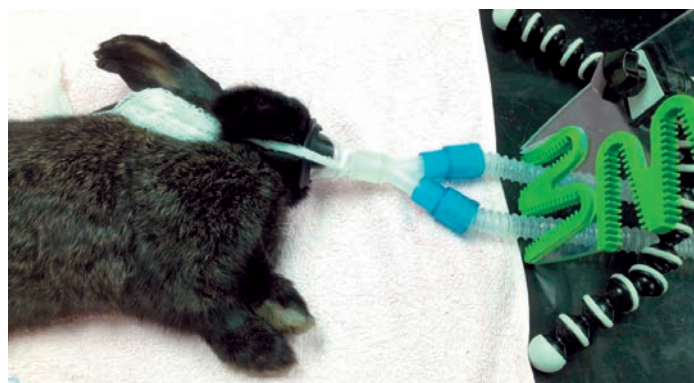
Face mask

Face masks are easy and rapid to use, but prone to leakage and the airway is easily blocked. Always use a clear type with a rubber diaphragm only just large enough to cover the mouth and nostrils. Ensure that the seal edge does not rub on the eyes. Tying in place improves the gas seal (**Figure 4**).

v-gel supraglottic airway devices

These are anatomically shaped devices that sit in the pharynx

Figure 4. Correctly applied small rabbit face mask, tied in position and supported by D-grip device (Docsinnovent/Millpledge, UK).



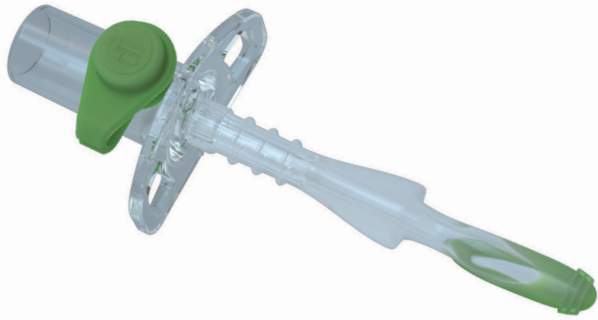


Figure 5. Rabbit v-gel device (Docsinnovent/Millpledge, UK).

and open a wide airway directly above the glottis, without entering the trachea (**Figures 5 & 6**). They offer a series of beneficial features:

- very rapid placement (approximately eight seconds with practice)
- the airway is maintained at an appropriate anatomical width – this reduces airway resistance compared with an endotracheal tube (**Figure 7**)
- v-gels are autoclavable (121°C autoclave cycle) to prevent cross infection between patients
- they are very useful for neutering and other abdominal procedures, orthopaedic, emergency and some dental procedures; and particularly helpful to establish and stabilise anaesthesia in the early stages before switching to

an endotracheal tube

- dental surgery and dental extractions are possible with a v-gel in place, but visibility is more restricted for caudal teeth than it is with an endotracheal tube.

Because the v-gel is inserted in a ‘blind’ manner, it is important to check its placement, preferably with a capnograph (CO₂ waves indicate placement of the airway channel over the glottis) or by monitoring thoracic movement as the circuit bag is squeezed.

Endotracheal tubes

Endotracheal tubes offer a good, secure solution for airway management in rabbits. However, they need practice to place and restrict the airway diameter significantly, making unassisted breathing harder

Figure 7. Chart to show airway resistance of endotracheal tubes (ETT) versus rabbit v-gels (R1/R2/R3). A lower value means less resistance and easier breathing.

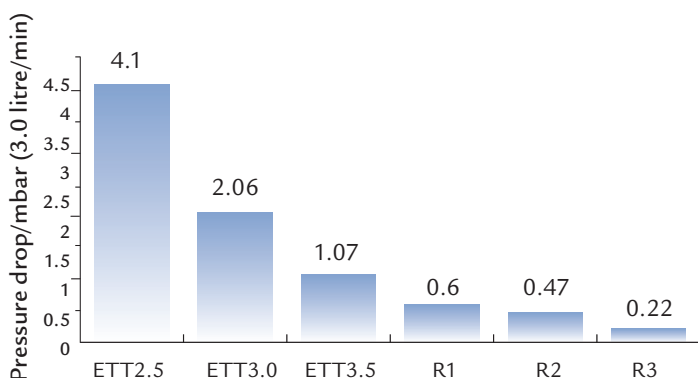


Figure 6. v-gel in use during dental investigation. The v-gel is supported by a nurse here to improve dental access (Docsinnovent/Millpledge, UK).

(**Figure 7**). There are several factors to be considered.

The passage of an endotracheal tube shaves off cilia from the ciliated epithelium of the trachea, in many species, even when using a new tube (Alexopoulos et al, 1984) (**Figure 8**).

The manufacturer's instruction to ‘single use’ polyvinylchloride ETTs should be followed; because cleaning them in chemical sterilising agents initiates dehydrochlorination reactions which have the effect of making the plastic harder and more brittle (Crotaz, unpublished research).

Endotracheal tube trauma has been reported in rabbits (Phaneuf et al, 2006) and it can be reasonably supposed that harder tubes create more trauma.

Red rubber tubes and silicone tubes have thicker walls and narrower airways when compared with PVC tubes, but they can be autoclaved – at least until the material is seen to be hardened or cracked, at which point they should be discarded.

ETTs are useful for difficult dental procedures, especially caudal cheek tooth extractions.

It is the author's experience that it is considerably easier to intubate when using a new

tube. Small ETTs are very prone to kinking and blocking with airway secretions and accidental oesophageal intubation is very common. For this reason, initial and ongoing placement checks are vital. Again, capnography is the best way of doing this.

Use guided techniques to place ETTs – otoscopic placements are relatively simple and require no additional equipment.

Monitoring

If you are going to buy one monitor for rabbit anaesthesia, it should be a capnograph.

Rabbits have a tendency to hypoventilate during anaesthesia and carbon dioxide rises are impossible to verify with traditional manual methods. Levels higher than 60mmHg are considered to be toxic and are likely to contribute to many rabbit anaesthetic deaths.

Breath-holding because of the odour of the volatile agent, pre-existing respiratory disease, the narrow airway, small thoracic cavity, diaphragmatic breathing, diaphragmatic compression and respiratory suppression from anaesthetic drugs all add up to create a dangerous combination.

Therefore, in addition to the standard anaesthetic chart (pulse rate, heart rate,



Figure 8. Artist's impression based on electron micrographs of cilia damage during endotracheal intubation (Docsinnovent/Millpledge, UK).

respiratory rate, assessment of anaesthetic depth, rectal temperature), particular attention should be paid to the nature of respiration, looking continuously for rate, depth and quality of breathing.

If a capnograph is not available, it is sensible to assist breathing regardless, with an extra breath being given by gently squeezing the circuit bag, every 10 breaths. Remember that the chest will still move even if the airway is blocked ... for a short while at least! Monitor your circuit bag and/or capnograph – bag movement and capnograph waves confirm a patent airway.

Tidal volume is small in rabbits and only a very small amount of pressure is required on the bag to inflate the thorax. It is best to watch the thoracic wall when manually ventilating to ensure that just sufficient air is moved to raise the thoracic wall by 0.5cm or 1cm in larger rabbits.

Although a pulse oximeter should certainly be used, if available, it will give little warning of impending

cardio-respiratory failure. Respiratory or cardiac arrest in rabbits is the end stage of a number of worsening processes and emergency treatment is unlikely to be effective. Capnography allows intervention in the early stages of this process when success rates are much higher.

Generally CO₂ should be in the range of 35-45mmHg, with strong regular traces on the monitor. However, the trend is the most important thing, so if the capnograph is consistently reading 55mmHg with no upwards trend, this may not require intervention, just further monitoring.

Hypoventilation produces an increase in CO₂ (assist ventilation and perhaps decrease anaesthetic depth); whereas hyperventilation produces a decrease in CO₂ (consider increasing anaesthetic depth, assist ventilation to properly fill

alveoli, consider administering a fast-acting analgesic agent).

Recovery and postoperative care

Although rabbits should be kept warm, they are prone to hyperthermia – so keep monitoring body temperature. Avoid the use of electric heat mats because the patients will chew the electrical cables; and keep the rabbit in sternal recumbency for optimal lung function.

With good analgesia and careful wound closure, Elizabethan collars are rarely necessary and are best avoided as they prevent normal grooming and caecotroph ingestion.

Supply high fibre food and water as soon as possible after recovery – good high fibre syringe foods are available from Oxbow and Supreme Petfoods. Fresh water should be made available; although

care should be taken with water bowls if the rabbit is still unsteady. Fresh grass, dandelion and plantain (fresh and dried) and fresh herbs are commonly accepted, and the rabbit's normal food should always be available, even if it is not of the highest quality.

Analgesia must be maintained throughout the recovery period because pain is likely to be the single biggest cause of postoperative ileus. If a partner rabbit is not available and the individual is used to human contact, gentle stroking and grooming can be useful to reduce pain and ease recovery.

Home environments should be warm, quiet and not exposed to adverse weather. The first postoperative check should be no more than 24 hours after the surgical procedure, with careful attention being paid to dropping production. Droppings tend to be small and hard for the first few days, gradually increasing in size back to normal during the recovery process. Prokinetic agents such as ranitidine – as well as improved analgesia and syringe feeding – are useful for inappetent rabbits.

Summary

Good rabbit anaesthetists consider all aspects of health – from husbandry to postoperative care – in order to achieve low anaesthetic mortality rates. The next article will put this knowledge into place using a variety of case examples, adding suggestions on drug combinations and dose rates. ■

"If you are going to buy one monitor for rabbit anaesthesia, it should be a capnograph"

PPD Questions

1. Which one of the following monitors is most valuable during rabbit anaesthesia?
 - A. ECG
 - B. Apnograph
 - C. Pulse oximeter
 - D. Blood pressure monitor

2. How many times should PVC (blue) endotracheal tubes be re-used?
 - A. Until they crack
 - B. Until they have turned yellow
 - C. Until they are leaking
 - D. PVC tubes should not be re-used

3. A rabbit is eating a diet consisting mainly of low quality muesli and oat-based biscuits for human consumption. Not surprisingly, it needs emergency anaesthesia to shorten dental spurs. Which of the following options is most appropriate?
 - A. Eat the biscuits yourself and provide good quality hay ad lib for the rabbit
 - B. Provide hay, one eggcup full of good quality extruded pellets and green leafy vegetables prior to anaesthesia
 - C. Replace the muesli with a good quality extruded pellet food prior to anaesthesia
 - D. Leave everything as it is, let him enjoy the biscuits and then slowly adjust the diet once he has recovered from the procedure

4. Which of the following might be part of an analgesia combination for a rabbit spay?
 - A. Meloxicam
 - B. Buprenorphine
 - C. Lidocaine
 - D. Warmed sterile saline solution, gently irrigated into the abdomen during surgery
 - E. All of the above

5. Which one or more of the following findings during a rabbit anaesthetic would cause immediate concern?
 - A. $\text{ETCO}_2 = 50\text{mmHg}$, respiratory rate = 35bpm
 - B. $\text{ETCO}_2 = 65\text{mmHg}$, respiratory rate = 10bpm
 - C. $\text{ETCO}_2 = 45\text{mmHg}$, respiratory rate = 3bpm
 - D. $\text{ETCO}_2 = 35\text{mmHg}$, respiratory rate = 30bpm

Answers
1.B 2.D 3.D 4.E 5.B&C

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As a practical examiner for the RCVS, Central Qualifications and City and Guilds she also has the pleasure of assessing the next generation of veterinary nurses.

Making sense of nursing care models

Nursing care plans and their continued use in veterinary practice is a significant subject. The use of these plans encourages RVNs and the extended veterinary professional team to think of the animal as an individual instead of just as a species or disease state. This article discusses the use of models of care and the three main examples relevant to veterinary practice. It is also useful to fully understand the use of nursing care plans not just as a student veterinary nurse but also as a clinical coach.

Firstly we have to clarify that a 'model' is a representation or picture of what nursing actually is – the nursing that should/will be delivered to the animal. In a previous article, I discussed in detail the use of the nursing process [Veterinary Practice Today, 3(3): 28-30].

To be able to implement nursing models effectively, a full understanding of the nursing process is essential. This is because the models of nursing care are 'delivered' via the nursing process. The veterinary nurse must use both objective and subjective observations to assess nursing

requirements and patient disease state (Maughan, 2013).

Why use models of care?

Models of nursing are vital for ensuring that consistency of care is given by practice professionals (**Figure 1**).

Using a set protocol or nursing care plan can give clear direction and enable clear decision making on the care and treatment a patient is to receive. They also ensure that all care professionals work to clear goals which, in turn, will reduce conflict between staff in the veterinary practice. Models of nursing care also incorporate the care that can

be given by other members of the practice team to include veterinary surgeons, physiotherapists, dietitians and behavioural specialists. Teamwork is an essential component in the success of care plans in practice – requiring time, understanding and commitment from all the team members involved (Lock, 2011).

Models of care

All models are based on four clear concepts: the individual patient, their health status, the nursing skills required, and the prevailing environment.

Individual patient

The care plan should be

Figure 1. Models of nursing are vital for ensuring consistency of care.



*Suggested Personal & Professional Development (PPD)

NURSING CARE

complete for each individual animal, specifically identifying their required individual needs. For example, a blind patient will need additional support and nursing care specific to the nursing of patients with sensory loss. This has been identified as an area of weakness in nursing care plans (Forshaw, 2003).

Health status

The health status of the patient will be considered and the needs or goals identified to match the specific health factors of the animal. For example, an animal is admitted in renal failure but it is also a geriatric patient, so the nursing needs will need to incorporate the disease state and the individual age requirements.

The veterinary staff involved must set a goal for each of the identified problems from the nursing assessment. It should be identified between short-term and long-term goals (Jeffery, 2012).

Nursing skills

What nursing skills will need to be implemented? Do you need to seek further guidance for specific skills or advice from other team professionals? For example, a discussion on pain control will need to include the prescribing veterinary surgeon.

Figure 2. *The 12 Activities of Living.*

- maintaining a safe environment
- communication
- breathing
- eating and drinking
- elimination
- personal cleansing and dressing – grooming
- controlling body temperature
- mobilising
- working and playing
- expressing sexuality
- sleeping
- dying.

Prevailing environment

Specific disease states have environmental requirements, along with the species and the individual requirements of the animal. For example, a geriatric animal will require environmental warming owing to decreased cardiovascular functioning and restricted movement (as long as this is not contraindicated on account of other factors affecting the patient's clinical status).

Orem's Model of Self Care (1959)

This is a human-based model of care that can be adapted to suit the requirements of the veterinary practice. It focuses on the assessment of the patient's ability to 'self care', which might have been affected by illness or disease state. Self care is the practice of activities that will maintain life and health and will promote well-being (Cavanagh, 1991).

Eight self-care requisites are identified by the nurse and a care plan is identified on the basis of this assessment. The eight requisites are the maintenance of:

- a sufficient intake of air
- a sufficient intake of water
- a sufficient intake of food
- satisfactory elimination functions
- a balance between activity and rest
- a balance between solitude and social integration
- prevention of hazards to life
- promotion of functioning and development within social groups and the desire to be normal ('normalcy').

Roper, Logan & Tierney Model (1980s)

This model is based on the patient's Activities of Living (Figure 2). It offers scope for the veterinary nurse to assess whether the animal is dependant or independent with respect to the care it needs. It is based on the concept of what is required

to be 'healthy' (Orpet and Welsh, 2011).

Dependence and independence are related to life span and the Activities of Living (Figure 2). Their assessment is intended to identify whether the animal is able to carry out an activity on its own or with the required help of a veterinary professional/owner.

This approach acknowledges that there are times of life when a patient cannot perform certain activities for living independently (Orpet and Welsh, 2011).

Orpet & Jeffery Ability Model (2007)

Adapted from the Roper, Tierney and Logan Model, this model is based on the 10 abilities that the animal can or may complete. The nursing assessment is structured around the abilities of the animal using the patient assessment component that is amalgamated into this model. This allows for clear fluidity between the nursing assessment and the development of nursing goals.

The animal's life stage is assessed within the model; because, for example, a geriatric animal has different requirements to a juvenile animal (Orpet and Welsh, 2011).

Factors that may influence the delivery of nursing models

There are factors that may influence all of the models of care that can be used within a veterinary practice.

Biological

A good understanding of anatomy and physiology will help the nurse to be aware of factors that will influence any of the Activities of Living. They should be able to understand the impact of biological systems and function on the activities that the animals carry out (Orpet and Welsh, 2011). For example, a geriatric cat in

cardiovascular collapse will need environmental rewarming.

Psychological

The impact of psychological stressors on the nursing care required for animals can be significant. At the time of the nursing assessment, the owner should be questioned as to whether the animal suffers from separation anxiety, because this may cause the animal to withdraw from communication and result in anorexia or behavioural problems. This in turn will have a detrimental effect on health (Orpet and Welsh, 2011).

Politico-economic

The health of the global economy and its effects on personal financial well-being can have serious consequences on attitudes towards pet ownership and the care that is provided for animals. The current recession has impacted on the amount of disposable income that clients have available to spend on veterinary care.

Some veterinary practices have had to make staff redundant or take wage decreases; and non-essential equipment within the practice is not necessarily being replaced. This has an effect on staff morale, which, in turn, can impact on the level of care given.

Social and religious

Different religions and social groups can have conflicting opinions of animal care and welfare, which can impact on the ethical and moral beliefs of staff (Orpet and Welsh, 2011). Religious views must be considered when completing a nursing care plan. These should be gained at the time of the nursing assessment to ensure that clients' requirements are understood and achievable.

Application of models to nursing practice

Joiner (2000) completed research on nursing models

in veterinary practice and published her findings following the use of the models. She concluded that the guidelines within the model influenced what was expected of nurses, leading to better job satisfaction. The patient also received consistency of care.

Forshaw (2003) performed a study involving 15 veterinary practices. The findings highlighted that there is a more thorough patient assessment, and greater consistency of care when a model is used. The model prompts nurses to think about their patient in a more holistic way.

Future use of nursing models of care

Historically, nurses believed that the more information that they have documented, the better their legal defence will be in any disciplinary procedures. This is not true. Streamlined documentation can record more data in less time and space (**Figure 3**).

With the registration of veterinary nurses, it is important that the standard of care given is recognised. This can be done by using recognised models of nursing care. Also Registered Veterinary Nurses must maintain the VN Code of Conduct by making

the health and welfare of animals their main priority (RCVS, 2015).

Nursing care plans can be effective in maintaining clear, consistent standards of patient care. They also enable and guide student and registered nurses to specific protocols that can be reflected to meet practice requirements. So, as an RVN, I would like to see nursing care plans used more regularly and effectively in veterinary practices.

Nursing care plans, essential? Or a waste of time?

Having worked in various nursing environments over the years I have experienced many types of nursing care/hospital sheets. Nursing care plans are essential for ensuring delivery of full holistic approaches to the animals that come into our veterinary practices. To ensure that delivery of expected nursing care we must have a robust assessment of the patient and owner before admittance. If the information that is collected at the time of admission is incorrect then the whole nursing process may not meet the needs of the individual patients. There are many different nursing models available for use in veterinary practice and these can be tweaked to meet the requirements of your specific nursing practice. All animals should be considered as individuals requiring individual care. No one box fits them all. As a lecturer in veterinary nursing I consistently encourage the implementation and correct use of nursing care plans. When completing a care plan I always like to think – would this be adequate for my dog and would I feel they have had a fully individualised holistic time in veterinary practice? Nursing care is one of the most important roles of a veterinary nurse, so why not ensure the care is documented to set protocols and standards. ■

Figure 3. Streamlined documentation can record more data in less time and space.



PPD Questions

1. A model is delivered by the:
 - A. Nursing process
 - B. Medical assessment
 - C. Veterinary surgeon
 - D. Communication process

2. Which model of care is based on the eight self care requisites?
 - A. Roper, Logan and Tierney
 - B. Ability model
 - C. Orem
 - D. Gibbs

3. Which model of care is based on the key 'Activities of Living'?
 - A. Roper, Logan and Tierney
 - B. Ability model
 - C. Orem
 - D. Gibbs

4. Maintain normalcy is a component of which model of nursing care?
 - A. Ability model
 - B. Roper, Logan and Tierney
 - C. Orem
 - D. Gibbs

1.A.2.C.3.A.4.C
Answers

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BSc(Hons)

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, and 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.

Paracetamol toxicity in cats

Paracetamol – alone or in combination with other substances – accounts each year for approximately four per cent of total enquiries to the Veterinary Poisons Information Service (VPIS). Although there is a higher number of cases reported in dogs, the feline cases are usually more serious, with about 21 per cent resulting in fatality despite treatment.

In cats, paracetamol poisoning most often results from administration by their owners in a misguided attempt to relieve pain, fever and other perceived non-specific ailments.

Paracetamol is a non-narcotic analgesic with anti-pyretic properties – similar to those of aspirin, but without anti-inflammatory properties. There is no therapeutic indication for its use in cats, in contrast to dogs where it is a well-established and increasingly used analgesic.

Widely available in the UK as an over-the-counter medication for human use, paracetamol is sold under many different brand names and is available in many formulations including tablets, liquid suspensions and powder preparations, often in combination with other drugs including codeine, caffeine, aspirin, ibuprofen, antihistamines and decongestants.

Cats are different

Compared with other species, cats have a limited ability to metabolise paracetamol to non-toxic metabolites, which is why relatively small amounts of the drug may result in fatal toxicity.

In all species, paracetamol is metabolised in the liver by glucuronidation, sulphation and oxidation. The glucuronide and sulphate conjugates are non-toxic and are excreted in bile and urine. In the metabolism of paracetamol in most species, the oxidation pathway is a very minor one while glucuronidation is the

major pathway. Cats, however, have a restricted ability to conjugate with glucuronic acid as they have low levels of glucuronyl transferase, the enzyme that catalyses the final step of the glucuronidation pathway. Hence – unlike other species except rats – sulphation is the primary metabolic pathway and the products of the minor oxidation route become more significant (Maddison et al, 2008).

This oxidation pathway, mediated by cytochrome P450, involves N-hydroxylation followed by spontaneous formation of N-acetyl-p-benzoquinoneimine (NAPQI), a highly reactive metabolite. Normally this is conjugated with reduced glutathione, then further metabolised to cysteine and mercaptopuric acid derivatives that are non-toxic and which are excreted in urine (**Figure 1**).

At low dosing this can be an effective and efficient detoxification pathway despite the fact that cats have low glutathione concentrations.

At higher paracetamol doses, when the glucuronidation and sulphation routes are saturated and paracetamol concentrations in blood and liver rise, the oxidation pathway increases in activity. This results in increased production of N-acetyl-p-benzoquinoneimine, causing glutathione depletion in the liver and subsequently in red blood cells as the detoxification pathway is used.

As glutathione becomes depleted, the reactive N-acetyl-p-

benzoquinoneimine binds covalently with amino acid residues of cellular macromolecules and proteins with subsequent cellular necrosis. At higher doses paracetamol also inhibits glutathione synthesis further restricting the capacity of this pathway to produce non-toxic metabolites (**Figure 1**).

Oxidising metabolites

Alternative metabolic pathways also allow accumulation of oxidising metabolites that may induce methaemoglobin formation, Heinz body formation and denaturation of erythrocyte membranes. Heinz bodies are denatured chains of haemoglobin with oxidised sulphhydryl groups. They precipitate and migrate towards cell membranes where – perhaps through the alteration of membrane phospholipids – they render cells fragile. Haemolysis and restricted passage of erythrocytes through the microcirculation and spleen may result.

Feline haemoglobin is particularly susceptible to oxidative damage as it possesses eight sulphhydryl groups per molecule. Methaemoglobinaemia reduces oxygen carrying capacity. It is unclear whether methaemoglobinaemia is directly related to Heinz body formation.

It has been suggested that the metabolite para-aminophenol, and not NAPQI, is responsible for the methaemoglobinaemia seen in cats and dogs with paracetamol poisoning (McConkey et al, 2009).



*Suggested Personal & Professional Development (PPD)

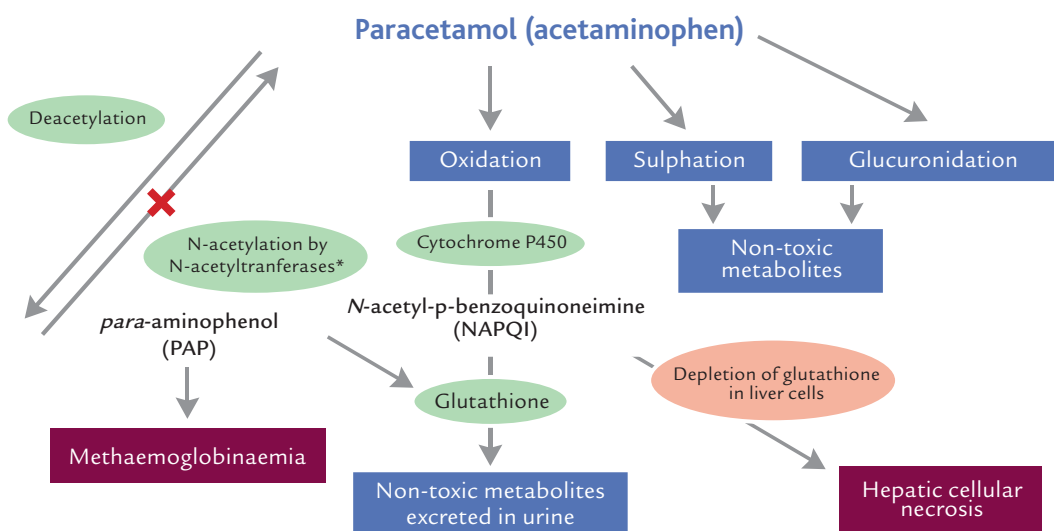


Figure 1. Paracetamol in cats – metabolism and mechanism of toxicity.

* N-acetylation of drugs involves two enzymes, N-acetyltransferase 1 and N-acetyltransferase 2 (NAT 1 and NAT2). Cats have only NAT 1 and dogs have no NAT enzymes.

This is a minor metabolite of paracetamol that is removed as N-acetyl conjugates. Cats have only one of the enzymes responsible for this reaction and dogs have none. This means that both species are less efficient at removing this toxic metabolite which is known to undergo reactions with oxyhaemoglobin.

Clinical picture

Cats are very sensitive to paracetamol and in particular they may develop methaemoglobinaemia, haemolytic anaemia, Heinz body formation and hepatic necrosis.

The initial clinical effects develop between one and four hours following administration, with progressive cyanosis being the most striking sign (43 per cent of symptomatic cases [VPIS case data]), associated with tachycardia, tachypnoea and dyspnoea. Mucous membranes appear brown in colour, and weakness and lethargy may be observed.

Between four and 24 hours, facial and paw oedema may be observed (19% of symptomatic cases [VPIS case data]; 29 per cent in a review of 17 cases [Aronson and Drobatz, 1996]). Dark brown blood

may be noted (Osweiler, 1996) indicating severity of methaemoglobinaemia. Depression, vomiting, anorexia and vocalisation may also be evident.

From day two onwards, raised ALT, AST and bilirubin have been reported (Kolf-Clauw and Keck, 1994) but hepatic necrosis is not the principal cause of fatality in cats as they usually die as a result of severe methaemoglobinaemia. Haemoglobinuria, intravascular haemolysis, jaundice and other evidence of liver damage may be seen in animals that survive the initial stages of paracetamol poisoning. Coma, convulsions and pulmonary oedema are occasionally reported and are poor prognostic signs.

With prompt treatment, the prognosis is good, but is dependent on the severity of methaemoglobinaemia (Aronson and Drobatz, 1996; Osweiler, 1996). It may be that the time between ingestion and treatment is more important than the dose ingested (Aronson, 1996).

In cats with cyanosis present, there is a 41 per cent fatality rate (VPIS case data).

Case management

The aim of treatment is to ensure adequate oxygenation and prevent further metabolism of paracetamol to toxic metabolites with the use of antidotes and to prevent damage to the liver and erythrocytes.

Given that the VPIS recommends treatment for any ingestion >20mg/kg – and the most usual presentation of paracetamol is 500mg – any ingestion in a cat should be treated. Any cats with signs consistent with paracetamol toxicity should be treated, irrespective of the time since ingestion. *If there is any doubt about the timing or dose taken the cat should be treated.*

For late presenting animals

If there have been no clinical signs within 12 hours, then there appears to be no risk of toxicity as most cats develop clinical effects in the first four to eight hours following ingestion.

In cases where owners seek veterinary advice at 12 hours or more following ingestion, they should be questioned thoroughly about any clinical signs the cat may have had and if necessary the animal should be

assessed and a laboratory evaluation made.

Initial gut decontamination should include emesis and repeat dose activated charcoal; the use of antidotes, particularly acetylcysteine, is crucial in securing a successful outcome in paracetamol toxicity.

Acetylcysteine (previously N-acetylcysteine, NAC)

Acetylcysteine (N-acetylcysteine) can significantly reduce the toxicity of paracetamol by a variety of mechanisms:

- firstly, it is a precursor of glutathione. On administration it is hydrolysed to form L-cysteine which provides substrate for glutathione synthesis in red blood cells and the liver. Glutathione cannot be given directly as it is not readily taken up by cells
- secondly, acetylcysteine acts directly on the reactive metabolite resulting from the cytochrome P450 mediated oxidation of paracetamol, N-acetyl-p-benzoquinoneimine, to form an acetylcysteine conjugate which can be excreted although this reaction is slow
- thirdly, it is oxidised in the liver to form sulphate, thereby increasing the capacity of the sulphation pathway. Administration of acetylcysteine has been shown to reduce the half-life of paracetamol by half in cats (Rumbeiha et al, 1995).

S-adenosyl-methionine

S-adenosyl-methionine (SAME) is a naturally occurring molecule throughout the body and is available as a nutritional supplement. SAME is a methyl donor, aiding the activation and elimination of drugs by the transmethylation, transsulfuration and aminopropylation biochemical pathways (Plumb, 2011).

SAMe is precursor of glutathione, reducing methaemoglobin to haemoglobin. In mice, SAMe has significantly reduced paracetamol toxicity and was more potent than acetylcysteine in reducing hepatotoxicity (Terneus et al, 2008).

Administration one hour after paracetamol ingestion provides protection by reducing oxidation and Heinz body formation; but such treatment after four hours in cats may be of limited benefit (Webb et al, 2003).

Ascorbic acid

Ascorbic acid can be given to reduce methaemoglobin to haemoglobin as it is a good non-enzymatic reductant although the reaction occurs slowly (Hjelle and Grauer, 1986). There is some evidence to suggest it may also scavenge N-acetyl-p-benzoquinoneimine before it binds to proteins, possibly reducing it back to paracetamol. This certainly happens in vitro, although there is debate as to whether it occurs in vivo (Ilkiw and Ratcliffe, 1987). It may be given in combination with the other antidotes (Steenbergen, 2003).

Methionine

Methionine is a precursor for glutathione and sulphate and has some use in paracetamol poisoning. It may be given where acetylcysteine is unavailable or used in conjunction with acetylcysteine therapy, but is not widely available.

Methylene blue (methylthioninium chloride)

In cases of severe methaemoglobinaemia, methylene blue has been used in cats. This drug increases reduction of methaemoglobin. It is reduced to leucomethylene blue by an NADPH-dependent methaemoglobin reductase. The leucomethylene blue then

reduces the oxidised haem iron to its normal state.

Methylene blue should be used with caution as it has caused Heinz body anaemia in cats (Dowers, 2011). When given in an experimental study with acetylcysteine in paracetamol-poisoned cats, methylene blue did not improve paracetamol clearance (Rumbeiha et al, 1995).

Cimetidine

Cimetidine is a potent inhibitor of cytochrome P450 metabolism in the liver and, theoretically, administration could result in inhibition of the oxidation pathway (Ilkiw and Ratcliffe, 1987). Its efficacy has not been established for paracetamol poisoning cases in cats. Cimetidine in combination with acetylcysteine and ascorbic acid is more effective than any of these treatments alone (Richardson, 2000).

Clinical support

In addition to medication, hydration and body temperature should be monitored. Urea, electrolytes and blood gases should be monitored on admission – 12-hourly initially and then for at least one week.

Also monitor for evidence of methaemoglobinaemia, liver damage, anaemia, haemolysis and renal impairment. This should be done on admission and 12-hourly initially and then for at least one week after acetylcysteine therapy. ■

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Microchipping for cats – has it had its chips?

According to the recent Pet Population (microchipping) Survey 2015 carried out by Cats Protection and the Pet Food Manufacturers Association, 3.3 million of the UK's 7.4 million pet cats have not been microchipped. This means that fewer than half the UK's cats are microchipped compared to the two thirds of the 8 million dogs that have been microchipped.

The survey found that a much higher percentage of cat owners in the South East (69 per cent) have microchipped their pets; while in Scotland it is 32 per cent.

So why is none of this very surprising? Most pet owners are aware of the advantages of microchipped pets and are comfortable with the procedure of microchipping itself. The issue really is the different attitudes towards dog and cat ownership. There is a perception that cats are more independent than dogs, it's natural for them to roam free, they are unlikely to be stolen and, sadly, it is often the case that when they are 'lost' it is often the result of a road accident which they have not survived.

Add to all this the lack of any legal responsibility attached to cat ownership and the figures above begin to make more sense. It could also well be that the percentage of microchipped cats would be even smaller, if it were not for those owners who have microchipped their cat in conjunction with the purchase of a cat flap that only allows the admission of their own cat.

Lost, abandoned and aggressive dogs have a much higher profile than cats. Lost and stray dogs cost the taxpayer and welfare charities £33 million per year. A microchip makes it much easier to reunite a dog with its owner and microchipping will reduce the burden on animal charities and local authorities, as well as helping protect the welfare of dogs by promoting responsible dog ownership.

The Department of Environment Food and Rural Affairs (Defra) policy paper '2010-2015 Government policy: animal welfare', published in May this year, makes it compulsory in England, Scotland and Wales from April 2016 to have your dog microchipped and your contact details kept up to date. Anyone breeding dogs will be responsible for microchipping their puppies before they sell or give them to new keepers.

All imported dogs will need to have a microchip. Breeders will be required to register their own details and these will be recorded against the microchip for the life of the dog. The only exemption from the requirement is where a vet has certified in writing that a dog is unfit to be microchipped.

Once the new rules come into effect, if a dog without a microchip comes to the attention of the authorities, its keeper (should they be found), may be served with a notice requiring the dog to be microchipped, and may face criminal prosecution and a £500 fine if they do not comply with the notice.

There are currently numerous offers of free microchipping for dogs so that the incentive to microchip could really be no greater. Interesting then that to date, in the region of 2.5 million dogs have still not been microchipped!

June was National Microchipping Month, supported and promoted by animal charities and veterinary practices countrywide. In addition to urging owners to have their cats microchipped, the largest cat charity, Cats Protection, has called for the compulsory microchipping of all pet cats. They have reported that two in three cats taken into their care are not microchipped, costing the organisation over £190,000 to microchip them.

Cats Protection looks after over 7,000 unwanted cats at any one time – with over 215,000 passing through their hands each year. The charity is part of the Microchipping Alliance which comprises animal welfare charities, assistance dog charities, veterinary organisations, dog membership organisations, and other organisations that are affected by dog issues and jointly campaigned for the introduction of compulsory microchipping for dogs.

So is this the beginning of a potentially successful campaign to introduce compulsory cat microchipping and how much more difficult might this be compared to persuading dog owners to microchip their 'best friends'? We owe our pets the reassurance of responsible ownership and, despite the fact that cats are such independent creatures, having that tiny microchip could just make the difference between a happy reunion and a stressful stay in kennels with an uncertain outcome. ■

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www.cats.org.uk/cat-care-microchipping

Defra Policy Paper, 2010-2015, government policy: animal welfare appendix: 5



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Imogen graduated from the University of Sydney in 1997 and then spent three years in private equine practice in Australia. She completed a residency in large animal internal medicine at the University of Pennsylvania between 2001 and 2003, and remained there as a lecturer until 2007.

She is currently a senior lecturer in equine medicine at the Royal Veterinary College. Her major clinical interests are in gastrointestinal diseases of horses and foals, and current research involves investigating the inflammatory response to colic in horses.



*Suggested Personal & Professional Development (PPD)

LIVER DISEASE

Hepatic disorders in horses – diagnosis and management

Disorders of the liver appear to occur with some frequency in horses, and identification of hepatic dysfunction is relatively easy. The challenge with most cases is to determine the cause of the disease and thus implement specific treatment, if possible. In many – if not most – cases, a definitive cause is not identified, and treatment is empirical and designed at supporting liver function whilst regeneration occurs. This article will review the causes of – and treatment options for – hepatic disease in horses.

Liver anatomy and function

The liver is located within the cranial aspect of the abdominal cavity, predominately to the right of midline. It is the largest organ in the body and plays a vital role in many metabolic, secretory, excretory and storage functions. Distribution of nutrients is one of the key roles of the liver, and explains why weight loss is a common clinical sign, especially in horses with chronic or advanced hepatic dysfunction.

Bile, produced by the hepatocytes, is continuously released into the duodenum. Bile acids within the bile act as detergents which facilitate excretion of phospholipids and cholesterol, as well as allowing for absorption of fat-soluble vitamins and other lipids from the gastrointestinal tract (GIT). Because the majority of the released bile acids are reabsorbed by the ileum and then removed from the circulation by the liver, measurement of bile acids is an excellent test for liver dysfunction.

Detoxification, or biotransformation, is another key hepatic function, and failure to deal effectively with substances such as ammonia, for example, can result in clinical signs including hepatic encephalopathy. The Kupffer's cells, or tissue-fixed macrophages within the liver,

Table 1. Clinical signs reported in horses with liver disease

Common signs	Less common signs
Depression	Photosensitisation
Anorexia	Diarrhoea
Colic	Bilateral laryngeal paralysis
Hepatic encephalopathy	Haemorrhagic diathesis
Weight loss	Ascites
Icterus	Dependent oedema

play a key role in phagocytosis of endotoxin and bacteria within the portal blood so that they are not then released into the systemic circulation.

Clinical signs

As a result of the liver's many functions, a diverse range of clinical signs (**Table 1**) can be seen with liver disease, none of which is pathognomonic (**Figures 1 & 2**). Owing to the

liver's considerable reserve capacity, these classical clinical signs are typically not seen until approximately 60 per cent of hepatocyte mass is lost. As such, in the author's experience, the majority of horses in practice that are diagnosed with liver dysfunction are presented for poor performance, or just not being 'right' and indeed many more are likely to be truly subclinical.

Figure 1. Icteric horse – other causes of icterus, including anorexia and haemolytic anaemia, would need to be ruled out before a diagnosis of hepatic disease was made.



Figure 2. Poor body condition and photosensitisation in a horse with cirrhosis. (Photo: Dr Bettina Dunkel).



Table 2. Biochemical abnormalities that may be present in horses with liver disease

Test (direction of abnormality)	Liver specific	Other sources/reasons for abnormal result	Other
Bilirubin (^)	No	Haemolysis	Measure conjugated and unconjugated. Increased with anorexia
Bile acids (^)	Yes	Mild increases with anorexia/GI disease	Highest in obstructive disease
Albumin (v)	No	Protein loss via GIT, kidneys etc.	Rare – long half life
Globulins (^)	No	Inflammation	Decreased Kupffer's cell mass results in increased dissemination of enteric-derived antigens polyclonal gammopathy
Clotting times (^)	No	Many (e.g. disseminated intravascular coagulation)	Rarely see clinical signs
Glucose (v)	No	Rare in adults; foal decreased intake	Rare
Triglycerides (^)	No	Systemic disease resulting in anorexia	Marked increases can result in hepatic lipidosis
Sorbitol dehydrogenase (SDH) (^)	Yes	-	Acute liver disease – short half life
Aspartate aminotransferase (AST) (^)	No	Skeletal muscle (also cardiac muscle, erythrocytes, intestinal cells, kidney)	Long half life. Evaluate CK (creatinine kinase) to rule out muscle disease
Alkaline phosphatase (ALP) (^)	No	Bone, intestine, placenta, kidney, leukocytes	Increased activity in normal foals, during pregnancy, by haemolysis, with GIT disease
Gamma-glutamyl transferase (GGT) (^)	Yes	Kidney (excreted into urine, not blood)	Cholestasis

Diagnosis

Measurement of hepatic enzyme activity and bile acid concentration can be used to identify hepatic disease. The activities of gamma-glutamyl transferase (GGT – cholestasis) and sorbitol dehydrogenase (SDH – hepatocellular damage) are the most specific markers for hepatic disease, as other enzymes can also become increased for extra-hepatic reasons.

Table 2 lists the most commonly measured indices for hepatic disease.

Ultrasound examination of the liver is the logical next step, although in many cases this will be normal. It is most useful in diagnosing hepatic masses or abscesses, changes in echogenicity that may suggest a cellular infiltrate, for identifying choleliths and biliary stasis, and for locating an appropriate biopsy site. Because of the location of the liver – being mostly 'hidden' behind the lungs – only approximately 20 per cent of the organ can be

Table 3. Equipment required for hepatic biopsy

- ultrasound machine (recommended)
- correction fluid/marker
- sedation
- clippers
- surgical scrub and spirit
- local anaesthetic, needles and syringes
- scalpel blade
- biopsy instrument (Tru-cut)
- plain pot (culture)
- pot with formalin
- suture
- analgesia.

imaged, and as a result, focal diseases may be missed.

A hepatic biopsy can be performed to aid in the

diagnosis and prognosis formulation in horses with suspected hepatic dysfunction (**Tables 3 & 4; Figures 3-6**). Although a low

Figure 3. Identification of biopsy site with ultrasound, and marking using correction fluid at the periphery of the clipped area.

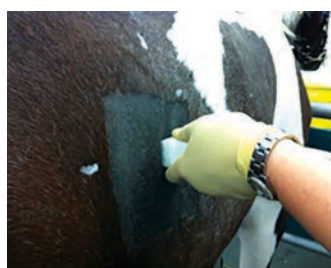


Figure 4. Location of liver within the 16th ICS and depth of hepatic parenchyma at the site.

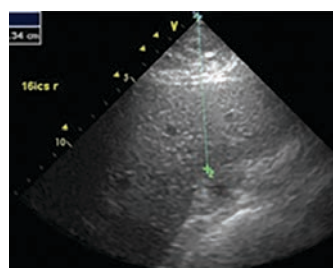


Figure 5. Placement of the biopsy instrument prior to the procedure.



Figure 6. Hepatic core being 'teased' into formalin pot to ensure instrument does not touch formalin.



Table 4. Step-by-step approach to a liver biopsy

- sedation (with an alpha-2-agonist and butorphenol) is recommended
- locate with ultrasound, including the anticipated depth of the liver at the site and mark using liquid correction fluid outside the clipped area (because the intercostal vasculature and nerves run on the caudal aspect of each rib, the site should ideally be located nearer the cranial edge of a rib)
- prepare the area aseptically
- infiltrate the skin with local anaesthetic (5-7ml of mepivacaine) – extending to the parietal peritoneum
- make a small stab incision through the skin with a No15 scalpel blade
- insert the biopsy instrument at the determined site and advance the needle to the depth measured via ultrasound and fire (during expiration)
- repeat until desired number of cores have been obtained (2-3)
- if the biopsy is unsuccessful, advancing the needle in a more cranial and dorsal direction may help, as may advancing a small distance deeper than that measured
- insert a skin suture or staple, if required
- administer flunixin meglumine (1.1mg/kg) and ‘box rest’ the horse for 24 hours.

complication rate has been reported, prior to carrying out the procedure, the risks, including haemorrhage, should be discussed with the owner. Utilisation of ultrasound to identify a place to biopsy is recommended, especially in older horses where atrophy of the right liver lobe has been reported.

In a recent study, liver was not routinely visualised on ultrasound in intercostal spaces recommended for biopsy (11-14 intercostal space) based on the blind technique, and in the majority of cases, lung was identified in the proposed biopsy location, emphasizing the need for ultrasound not only to increase the likelihood of success but also to minimise the complication rate of the procedure (Sammons et al, 2014).

How to interpret biopsy results

In some cases, the pathologist will be able to make a specific diagnosis based on the histopathological findings. Examples include pyrrolizidine toxicity

(megalocytosis), neoplasia, hepatic lipidosis, bacterial cholangiohepatitis or chronic active hepatitis. However, in many cases, whilst pathology may be identified, because of the generic nature of the response within the liver to a variety of different insults, a distinct aetiology cannot be identified.

In these cases, the biopsy results become most useful in formulating a prognosis, as some changes – fibrosis, megalocytosis, necrosis and biliary hyperplasia – are considered irreversible, and their identification has a negative impact on long-term prognosis. Utilisation of a biopsy scoring system based on the presence and severity of irreversible changes can provide useful prognostic information (Durham et al, 2003).

Causes of liver disease

Infectious cholangitis or cholangiohepatitis is thought to result from ascending infection from the GIT with clinical signs consisting commonly of fever, colic and icterus. In some cases, choleliths occur

“Because of the presence of viral hepatitis in many other species, a viral cause of hepatic disease has long been suspected in horses”

in conjunction with these disorders, resulting in biliary obstruction. The reason for stone formation is unknown, but may be associated with parasite migration, ascending biliary infection or inflammation, biliary stasis or the presence of foreign bodies.

Hepatic abscesses are rarely reported, but can cause similar signs to cholangiohepatitis. Ultrasound can easily identify the abscesses if they are located within the region of liver accessible to ultrasound examination, otherwise they may be challenging to diagnose.

Because of the presence of viral hepatitis in many other species, a viral cause of hepatic disease has long been suspected in horses. In the past several years, a number of novel equine hepatitis viruses have been identified, including Theiler’s disease-associated virus, which was identified in the USA in 2011 following investigation of an outbreak of acute hepatitis in a group of horses (Chandriani et al, 2013). Two other viruses, non-primate hepacivirus and equine pegivirus, have also been identified; although the link between hepatic disease and infection with these viruses has not been established.

Liver fluke (*Fasciola* spp.) has rarely been reported as a cause of hepatic disease in horses. It is endemic in some areas of the world, but its frequency as a cause of disease in horses in the UK is unknown. Diagnosis is challenging, because fluke eggs are intermittently shed in the faeces, and serological

tests developed for other species do not appear to have sufficient sensitivity to be useful in horses.

Often a presumptive diagnosis is made and treatment with triclabendazole (not licensed for use in horses in the UK) instituted. Co-grazing with cattle or sheep in wet temperate climates that favour the survival of the intermediate hosts (snails) would increase the index of suspicion of fluke-associated liver disease.

Parascaris equorum and strongyle species can cause hepatic damage secondary to larval migration, but clinical disease appears to be rare. Similarly, hepatic cysts associated with *Echinococcus* spp can be identified in horses, although they are typically considered to be incidental findings unless they become very large.

Toxic

Pyrrolizidine alkaloid toxicity is the most commonly described toxic agent affecting the liver in horses, requiring long-term ingestion of the plant to cause disease. Many other potential hepatotoxins have also been reported or suspected.

When a relatively large proportion of horses on the same premises are affected with clinical or subclinical hepatic dysfunction, a toxic aetiology (pasture, hay, water) is often implicated, although proving the cause is often unrewarding. In these cases, a change of feed/water source may be appropriate to rule out or in possible causes.

Chronic active hepatitis

Chronic active hepatitis is an idiopathic, chronic and typically progressive disorder in horses. The diagnosis is made by identification of biliary hyperplasia and periportal or biliary inflammation, along with signs of hepatocellular damage. Reported causes include chronic cholangitis and autoimmune disease, although the cause is unknown in the majority of cases.

Treatment

Clearly, treatment for hepatic diseases will vary according to the cause – if a specific cause can be identified. In many situations, however, despite a thorough diagnostic investigation, a definitive cause is not identified, and therapy is then aimed at supporting hepatic function and treatment of causes considered most likely based on the available information.

Specific

If a bacterial cause is identified (for instance, positive culture on biopsy, or presence of fever or increased acute phase proteins in a horse with evidence of liver disease) or suspected (based on the predominance of neutrophils on a biopsy specimen, for example) then antimicrobials are indicated. Ideally this approach would be based on culture and sensitivity results, but in most cases these are not available, and broad-spectrum antimicrobials, such as potentiated sulphonamides or tetracyclines, are used in the first instance.

Response to treatment is best assessed by improvement in clinical signs, as blood work changes, especially GGT activity, can take weeks – if not months – to resolve. If a treatment response is not noted, then a change in

antimicrobials (to penicillin and gentamicin, for instance) may be indicated, or the bacterial aetiology reassessed.

Hepatic lipidosis can occur in association with hyperlipaemia. Ongoing fatty acid mobilisation can be minimised by encouraging the horse to eat or, if necessary, by providing nutrition in the form of nasogastric intubation or parenteral glucose (1-2mg/kg/minute). Insulin can be used additionally to manage hyperglycaemia if it occurs, and to minimise the activity of hormone-sensitive lipase which prevents further fatty acid mobilisation.

Supportive

The mainstay of treatment in most cases of hepatic disease relies on supporting liver function, slowing progression of disease and facilitating the regenerative ability of the liver. If hepatic encephalopathy (HE) is present, treatment with hypertonic saline (2-4ml/kg IV) or mannitol (0.5-2mg/kg) may be beneficial. If sedation is required, lower than normal doses are recommended to take account of the diseased liver's decreased capacity to metabolise drugs.

In people, dietary modification has been considered a key element in the management of patients with hepatic disorders, in particular those with hepatic encephalopathy. Traditionally, a protein-restricted diet was recommended, which was based on observations dating back to the 1950s when patients with HE appeared to improve on a low protein diet. Since then, however, there has been no evidence to suggest it is beneficial; in fact, it is likely to be harmful, especially in chronic cirrhosis when malnutrition is common.

These original guidelines have been adopted by equine clinicians, but they are also likely to be outdated, especially considering the relatively low protein concentration of a typical equine diet. In people with liver disease, malnutrition is associated with a poorer prognosis and any loss in muscle mass can worsen neurological status owing to the important role muscle tissue has in the metabolism/removal of circulating ammonia.

As such, diets for horses with hepatic disease should emphasise palatability in animals with poor appetite, including feeding small meals, frequently. In other cases, no specific dietary recommendations appear to be required, and protein restriction is no longer recommended.

Two substances which are being used with increasing frequency in horses with hepatic disease are S-adenosyl methionine (SAME) and milk thistle. SAME is an important, metabolically active, molecule that participates in multiple cellular reactions such as the precursor for the synthesis of glutathione and principal methyl donor required for the methylation of nucleic acids, phospholipids, and proteins.

The synthesis of SAME is decreased in chronic liver disease, and this low level has been shown to exacerbate liver damage in preclinical studies (not performed in horses).

Similar studies have suggested that SAME may be beneficial in the treatment of a variety of hepatic disorders, although strong clinical evidence in any species is lacking.

The active ingredient in milk thistle is silibinin, while silymarin is a standardised extract of milk thistle fruits and seeds. Silymarin acts primarily as an antioxidant free radical scavenger and inhibitor of lipid peroxidation. Other reported actions include anti-inflammatory and antifibrotic properties.

In people with liver disease, milk thistle has been shown to be beneficial. A recent study in horses identified bioavailability of less than one per cent, however, in other species (and presumably in horses) the route of excretion is primarily hepatobiliary, and thus the bile concentration is vastly higher (100 times higher in humans) than the serum concentration. Hence a hepato-protective effect can still be seen despite this low bioavailability (Hackett ES et al, 2013a). Indeed, plasma antioxidant activity increased in horses fed milk thistle, suggesting it may indeed be beneficial in horses with oxidative damage in the liver (Hackett ES et al, 2013b).

Prednisolone (1mg/kg PO, tapering over several weeks) is used as an anti-inflammatory and with the hope of preventing progression of >>>



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"Management of hepatic disorders in horses can be challenging"

fibrosis. The indications for using steroids are not clear cut, but there does appear to be a subset of horses with evidence of both chronic and active inflammation on biopsy that respond to prednisolone. Other anti-fibrotic agents, such as pentoxifylline, have also been used in horses.

Ragwort poisoning is not as common as most of us think

Ask the average veterinary surgeon to name a common cause of damage to the liver in horses and it is a fairly safe bet that he or she will say 'ragwort poisoning'. A recent review of the evidence, however, raises questions about the validity of this 'knee-jerk' assumption.

An article by Professor Andy Durham in the *Equine Quarterly Disease Surveillance Report* [10(4) Oct-Dec 2014] – a joint publication from the Animal Health Trust, the British

Equine Veterinary Association (BEVA) and Defra – asks why ragwort poisoning seems to feature so strongly in the minds of equine vets and horse owners in the context of liver disease and then looks in detail at several investigations in 2014 into the actual impact of ragwort on the equine industry. Conclusions were drawn from four separate surveys; yet, despite the differing perspectives, Professor Durham states 'there were some remarkable similarities and a few differences in outcomes'.

Although more than half of equine pastures contain ragwort, little time and effort appears to be spent controlling the plant.

More than half (59%) of veterinary surgeons who completed a BEVA survey had not seen any suspected ragwort toxicity cases during the previous 12 months;

and those who had only saw 'approximately two cases per annum, suggesting that suspected ragwort toxicity is not commonly seen in equine practice'.

This was point was supported by the fact that the condition was only confirmed in 30 per cent of the suspected cases in the BEVA survey and 21 per cent in a survey carried out by the British Horse Society; and a pathology survey indicated that simple evidence of liver disease in a horse is not enough for suspicion of ragwort involvement because fewer than 1 in 12 liver biopsy and autopsy specimens examined showed supportive evidence of ragwort toxicity.

The article concludes that 'the term "suspected ragwort toxicity" has little real meaning, and should not be used unless good

epidemiologic reasoning for its suspicion can be established'.

Conclusions

Management of hepatic disorders in horses can be challenging for the veterinary surgeon. Owners commonly become disillusioned with the inability to provide a specific cause for their horse's disease, as well as the typically long duration of treatment required, and the possibility of recurrence in some cases. Horses with a low biopsy score should, however, have a good prognosis as long as sufficient time and supportive treatment is provided. ■



PPD Questions

1. Which combination of clinical signs and biochemical abnormalities is most consistent with liver dysfunction in the horse?
 - A. Weight loss; diarrhoea; increased GGT concentration; increased CK concentration
 - B. Head pressing; icterus; increased SDH; increased GGT
 - C. Laminitis; depression; increased albumin; anaemia
 - D. Depression; weight loss; decreased bile acids; decreased GGT
 - E. Seizures; tachypnoea; increased creatinine; increased AST

2. Which hepatic disease has recently been associated with a novel Flaviviridae?
 - A. Chronic active hepatitis
 - B. Tyzzer's disease
 - C. Theiler's disease
 - D. Pyrrolizidine alkaloid toxicity
 - E. Equine infectious hepatitis

3. Which statement regarding pyrrolizidine alkaloid toxicity is true?
 - A. The prognosis is generally good as long as the horse is removed from the pasture once a diagnosis is made
 - B. A definitive diagnosis can be made by measuring GGT, AST and bile acid concentration
 - C. It can be ruled out as a differential diagnosis if the animal is grazing a pasture in which pyrrolizidine alkaloid-containing plants are not identified
 - D. Megalocytosis identified on a biopsy sample is diagnostic
 - E. Treatment should involve long-term antibiotics and corticosteroids

4. Which statement regarding the function of the liver is true?
 - A. Kupffer's cells are tissue fixed macrophages that are important phagocytic cells
 - B. Metabolism of fats does not occur in the liver
 - C. The major site of ammonia metabolism is within skeletal muscle
 - D. Bile acids are important in the absorption of amino acids
 - E. Regeneration of hepatic tissue cannot occur

5. Which diet is most appropriate for the management of a horse with signs of hepatic encephalopathy?
 - A. Low calorie diet with fat supplementation
 - B. Hay with a protein concentration less than two per cent
 - C. Barley with a vitamin and mineral mix
 - D. High-calorie, low-carbohydrate diet
 - E. A diet to meet the energy requirements of the animal with no specific restrictions

1.B 2.C 3.D 4.A 5.E
Answers

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[Equine Quarterly Disease Surveillance Report link]

http://www.aht.org.uk/skins/Default/pdfs/DEFRA_report4q_2014.pdf



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Wendy worked in the equine and veterinary industries before graduating as a veterinarian from Massey University in 1990.

Employment in various roles (including veterinary nursing and lecturing) led to an interest in education and she gained a Graduate Diploma with an endorsement in distance education in 2008. This was followed by a Masters in Equine Science from Aberystwyth University in 2010.

Wendy's major interests include equine behaviour and education within the animal industry, and she currently divides her time between freelance work within these fields and writing fiction and non-fiction.



*Suggested Personal & Professional Development (PPD)

BEHAVIOUR

Understanding equine behaviour – why is it important in veterinary practice?

Ask any horse owner whether understanding behaviour is an important attribute for veterinary staff and he or she will say “Yes”; while veterinary staff pride themselves on their knowledge of behaviour. Despite this, its relevance to many aspects of veterinary practice can be overlooked.

Safety

The ability to read equine body language and predict likely reactions is crucial to ensuring safety of staff, clients, and the horse (**Figure 1**). Equine veterinarians have a high risk of injury, particularly from pleasure horses held by clients, and owners are often unprepared and unskilled in dealing with the unpredictable behaviour associated with pain or veterinary manipulation (British Equine Veterinary Association, 2014). As such, both staff and client training can be critical for reducing personal and financial loss.



Figure 1. Identifying the cause of aggression can increase safety.

Welfare

Safety also links directly to equine welfare, and the Animal Welfare Act 2006 is likely to become an increasingly potent piece of legislation. Of the five ‘needs’ stated, the opportunity to perform normal behaviour and the need for companionship relate directly to behaviour, while protection from suffering includes alleviating distress (**Table 1**).

Meeting these needs isn’t always achievable during the entire course of veterinary treatment, but they must be incorporated as much as possible throughout the duration of a clinical case.

Behaviour is also crucial to the ‘recognition, assessment and relief’ of both pain and stress (Bayne, 2000). Eustress is regarded as ‘good stress’, which disturbs the equilibrium yet increases a horse’s ability to cope; whereas distress is ‘bad stress’ and can delay

healing, as well as causing long-term health and behavioural problems.

Unfortunately, there are no specific criteria that assess when a horse has progressed from eustress to distress but, as stress is inherent in veterinary practice, clinics need to be proactive in minimising its effects.

A simple example is scratching the withers (a preferred site for allogrooming), which reduces the heart rate and has a calming effect, probably via

the stellate ganglion of the parasympathetic system (Le Blanc, 2013a).

Use of behavioural techniques for restraint can also directly reduce stress – for instance, squeeze-induced somnolence in foals (via rope restraint) induces relaxation and sleepiness without drugs (Pickles et al, 2014) and is also perceived as more ‘natural’ by the client.

Horses in isolation or on long-term box rest are particularly susceptible to limitations

Table 1. The five animal needs stated under the Animal Welfare Act (Crown, 2006)

For the purposes of the Animal Welfare Act, an animal’s needs shall be taken to include:

- its need for a suitable environment
- its need for a suitable diet
- its need to be able to exhibit normal behaviour patterns
- any need it has to be housed with, or apart from, other animals
- its need to be protected from pain, suffering, injury and disease.

Table 2. A case study of a horse performing unexpected action owing to previously learned behaviour

	Case study
Presentation	A 16-year-old mare demonstrated occasional exaggerated high steps when ridden in rising trot on the left rein only. The action increased when the horse was asked to go forward using leg aids or whip taps.
Relevant history (in hindsight)	Very sensitive to the aids and previously taught some passage and piaffe with a different rider, although not performed for many years. Recently clipped to remove a heavy winter coat.
Clinical examination	No abnormalities detected.
Solution	Tightening the girth by one hole 'cured' the behaviour, although the action could be reproduced if the mare is again ridden with a loose girth.
Analysis	The clipping of the horse is believed to have allowed enough saddle movement to occur at the rising trot to simulate signals for passage/piaffe, with the mare attempting to respond to an aid taught years before. These movements are usually initially taught on the left rein.

under the Act, but boredom and distress can be reduced by environmental enrichment, which increases stimulation and the horse's control over its environment (Gill, 2014). However, experience from zoos indicates that programmes must be tailored to individuals and continually evaluated (ibid).

Stereotypic behaviour can be triggered by stress, whereas targeted enrichment can reduce its incidence. Studies show that anti-weaving grids and crib-biting straps increase distress, by removing the horse's coping mechanism (Cooper & McGreevy, 2007), yet these are still sometimes found in veterinary clinics. Alternatively, simple changes such as providing mirrors, social contact, and high fibre foods can reduce the occurrence of stereotypic behaviour (ibid).

Diagnosis

Various sources cite equine wastage as a consequence of behavioural problems to be 50 per cent or greater; while a recent survey found that 91 per cent of horses demonstrated ridden behavioural problems (Hockenull & Creighton, 2013). Behavioural problems, therefore, impact both on welfare and the diagnosis of neurological and musculoskeletal problems;

however, owner interpretation can be misleading – headshaking versus shaking the head through impatience, for example – and some behaviour may be normal for the horse but unwanted by the owner.

Difficulties also occur because behavioural reactions can depend on previous – as well as current – experiences and training. To avoid unnecessary treatment, aspects such as learned behaviour, handler/rider effects, and the horse's inherent behaviour all need to be considered as a differential diagnosis for cases without obvious causes. A detailed history can assist – an 'off colour' horse may be grieving for a bond-mate – but, as with many aspects of equine practice, diagnosis can be challenging (Table 2).

'Ambulancing' versus holistic care

Anecdotally people tend to regard veterinary surgeons as simply an Accident & Emergency service, rather than realising that they have been trained to provide advice and action on all aspects of health and welfare. If clients do not receive information from their veterinary clinics, then they will use the internet, paraprofessionals and untrained lay people, whose advice and products will not always solve the problem – the increasing use of mineral and

herbal calmers being just one example.

This not only reduces potential income to clinics, but can also be detrimental to horse welfare, and to the client-veterinary relationship. So, ideally, veterinary staff must be able to correct misleading information, explain behavioural aspects of pain and distress, and to provide solutions to both primary behavioural issues and those emerging as a result of medical issues.

Equitation science

The science behind equitation is a growing area of research; however, many terms are misunderstood. Interestingly, McGreevy & McLean (2010) found that horse owners had a poorer understanding of behavioural terms than dog owners.

This is sometimes perpetuated by misuse of terminology and supporting science by veterinary surgeons themselves – for instance, the debate as to whether early handling of foals is imprinting versus habituation (Sellnow, 2001). With no definitive evidence to back 'imprinting' over later handling, and with possible welfare issues, it is important that vets clarify processes with fact-based information.

When there is a lack of knowledge, clients can sometimes interpret terminology on an emotive basis rather than a scientific definition – regarding negative as 'bad' rather than a subtraction (Table 3).

New research into areas such as visual lateralisation can be utilised by veterinary clinics to minimise issues. Horses are routinely approached and handled from the left side, with information processed in the right hemisphere; however, studies indicate that most horses demonstrate greater reactivity and flight response when novel items are initially seen by the left eye (LeBlanc, 2013b). In practice, this could mean that there would be an increase in acceptance of novel diagnostic/treatment equipment if an initial approach is made to the horse's right visual field instead.

Other ways that learning mechanisms can be important include understanding when classical conditioning will lead to poor associations – pain linked to veterinary staff and correct use of operant conditioning to induce desired behaviour, such as whether a horse is motivated by positive or negative reinforcement (Pearson, 2014). This can increase the likelihood of a co-operative patient and a satisfied client.

Table 3. The behavioural definitions of positive and negative reinforcement and punishment, with practical examples

	Reinforcement = increases repetition of behaviour	Punishment = decreases repetition of behaviour
Positive = adding something (either wanted or unwanted by horse)	<ul style="list-style-type: none"> ■ giving a carrot ■ scratching the withers 	<ul style="list-style-type: none"> ■ electric fence (shock) ■ anti-chew paste
Negative = removing something (either wanted or unwanted by horse)	<ul style="list-style-type: none"> ■ relax lead rope pressure ■ remove hand pressure as horse steps away 	<ul style="list-style-type: none"> ■ ignore the horse (removes attention) ■ remove a carrot (if horse tries to bite, for example).

Client satisfaction

The recent article on owner expectations highlights an increasingly important factor in modern practice, with a direct financial impact on the clinic. Client perception that equine veterinary staff are aware of current training methods and topical behavioural research is crucial, particularly with an increasing demand for ‘natural’ and ‘positive’ methods.

Clinics can underestimate what clients are willing to pay for, and veterinary nurses and other trained staff may be under-used in this respect. Personal advice to clients, and individual behavioural consideration for patients, can provide value-added services for a relatively low cost, particularly for owners whose emotions have a higher input than their knowledge.

A key example of where client satisfaction can be increased applies to restraint. Use of devices such as nose-twitches are disliked by some clients, and horses themselves often react adversely to their use. Although not always avoidable, behavioural training to accept standard veterinary procedures can reduce twitch use – for example, retraining a needle-shy horse to accept injections reduces both equine and owner stress (Pearson, 2014).

Other examples where veterinary nurses could add value include providing enrichment for horses on box-rest, follow-up calls to owners treating horses at

home (medication techniques and dealing with the rebound effects of confinement) and detailed history-taking of a horse’s behavioural preferences *before* hospital stays.

Horses that are easy to medicate and treat save time and money and, therefore, increase clinic efficiency; while owners of pleasure horses prefer the vet who their horse ‘likes’, sometimes in the face of adverse treatment outcomes. Therefore, behavioural techniques that reduce the horse’s reaction to unpleasant experiences can greatly improve client satisfaction.

Litigation

In a society in which litigation is becoming increasingly prevalent, any of the factors discussed here create a risk; so it is important to minimise them by considering behavioural aspects of each case – from history taking through to discharge and beyond.

Along with obvious examples relating to injury and welfare, unexpected responses could lead to owners claiming that insufficient care was taken – the appearance of stereotypic behaviour in a horse that had not previously exhibited it, for instance. The veterinary clinic can support its defence by documenting behavioural and physiological parameters, and the measures – especially enrichment – taken to counteract stress.

Future research

Keeping up to date with emerging research allows veterinary staff to answer client questions – why a cloned

horse won’t behave the same as the original, perhaps – and to consider aspects not previously considered. For example, the controversial area of epigenetics investigates the effect of the environment on genes, including before birth.

Supported by studies in mice, transgenerational epigenetic inheritance indicates that stress of a parent can affect the subsequent behaviour of the next generation (Franklin & Mansuy, 2010). If this

is proven in horses, then handling of stallions during sperm production and of mares during pregnancy could affect the future behaviour of unborn offspring, and may be a consideration for treatment procedures undertaken by veterinary surgeons. ■

Some practical implications

- veterinary nurse clinics should not be limited to small animal practice; equine clinics could include topics such as training for veterinary visits and procedures, and medicating safely
- if not already included, then behavioural questions should be added to admission forms to allow a horse’s preferences to be catered for and behavioural advice included in discharge forms or brochures
- differential diagnoses should include learned behaviour and human-generated effects as possible primary causes of behavioural problems, particularly for complex problems without an obvious physical finding
- to improve a horse’s hospital experience, staff need time to observe horses and to provide enrichment for in-patients. Horses destined for euthanasia need particular care – a horse on its own calling out in distress can leave a lasting negative impression on its owner
- provide value-added services such as personal phone calls to allow clarification and advice to be given on behavioural issues, such as altered demeanour caused by pain
- ask “What has this horse learnt from my visit/its hospital stay, and could I have made the experience better?”
- as with other services, ask clients if you are meeting their expectations for behavioural issues and handling. There is no one simple way to measure horse ‘happiness’; however, it is easy to measure how happy the client thinks their horse is. A client’s perception of their horse’s happiness and whether veterinary clinic staff have made their horse as ‘happy as it can be under the circumstances’ can be crucial to future business.

PPD Questions

1. Knowledge of visual lateralisation could potentially be used to:
 - A. Increase acceptance of novel equipment
 - B. Provide enrichment for horses in isolation
 - C. Reduce the incidence of stereotypic behaviour
 - D. Modify the perception of the lateral visual fields
2. The withdrawal of a titbit from a horse that is trying to bite is termed:
 - A. Negative reinforcement
 - B. Positive reinforcement
 - C. Negative punishment
 - D. Positive punishment
3. A suitable management technique for a horse that is 'weaving' while in the veterinary hospital is to:
 - A. Give herbal calmers
 - B. Provide a safety mirror
 - C. Place an anti-weaving grille on the door
 - D. Isolate the horse to prevent copying by others
4. The 'needs' stated by the Animal Welfare Act 2006 that relate specifically to equine behaviour include all of the following except for:
 - A. Protection from suffering
 - B. Exhibiting normal behaviour
 - C. Freedom from fear and distress
 - D. Being housed with other animals
5. The process of mimicking allogrooming has the effect of:
 - A. Increasing the heart rate via the sympathetic nervous system
 - B. Decreasing the heart rate via the sympathetic nervous system
 - C. Increasing the heart rate via the parasympathetic nervous system
 - D. Decreasing the heart rate via the parasympathetic nervous system

Answers
1.A 2.C 3.B 4.C 5.D

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Time to up the pace on equine welfare

After years of campaigning by rural groups, the new Control of Horses Act finally came into force in England on 26 May. It gives landowners greater powers to deal with horses 'fly-grazing' or left illegally on their land.

The Country Land and Business Association (CLA) worked closely with a coalition of rural organisations and animal welfare charities to drive the Private Members' Bill through Parliament following its introduction by Julian Sturdy MP in 2014.

According to a report posted by the Rural Services Network, landowners can now take fly-grazed horses to a place of safety immediately, notifying local police within 24 hours. If no owner is identified after four working days, the landowner can take action such as re-homing the horses to charities or selling them privately.

CLA regional director, Ben Underwood, said: "We pressed for this new law so that farmers and landowners can act for swift resolution when faced with the problem of horses illegally abandoned on their land. Fly-grazed horses can damage land, crops and fencing, restrict space for livestock and cost money to provide for their welfare and safety."

Tip of the iceberg

In recent years, fly-grazing has been an increasing problem across the country. A National Farmers Union survey in 2012 found that six per cent of its members – amounting to well over 1,000 farmers – had direct experience of fly-grazing.

Last autumn, six charities and the country's largest rural organisations teamed up to publish a report entitled *Stop the Scourge. Time to address unlawful flygrazing in England*. The report

estimated that more than 3,000 horses were being fly-grazed causing 'misery for horses, landowners, animal welfare organisations and local authorities'.

But welcome as the Control of Horses Act is, it is only addressing the tip of the underlying equine welfare iceberg that has been forming over the past decade of austerity as a consequence of the prevailing economic climate and over-breeding.

The continued poor economic climate has meant that horses – which can cost up to £200 per week to look after – are suffering as people cut back on veterinary costs, routine care, shelter and feed. Organisations have reported a rise in hoof and worm problems, as horse owners cut costs by reducing veterinary checks.

Despite this scenario, some dealers and horse owners continue to breed excessive numbers of horses and ponies in the belief that they can still make a profit. In reality, prices for horses have dropped significantly and a pony can be bought for £5 at some markets. Meanwhile horse owners are having difficulty rehoming their unwanted horses and, increasingly, cannot even give them away.

Space within rescue centres in Britain is limited too and under severe pressure as the number of horses coming into centres continues to rise. Undoubtedly these numbers would be higher still if the charities had capacity to take in more. However in response to the increasing number, many organisations over the past three years have had to restrict admission owing to a lack of resources.

So what is the answer?

Realistic approach

High on the list must be a more realistic approach to the practicalities and costs of horse ownership, together with better education of potential owners *before* they embark on the journey.

According to an online report by *Equine World*, the annual costs of keeping a horse or pony at grass livery range between £3,100 - £4,420; at DIY stabled livery, £5,070 - £6,975; and at full livery, £6,890

- £10,095. These are in line with estimated costs published by the British Horse Society and in *Horse & Hound*.

So the temptations to cut corners are immense – stabling in converted pig sties or an adapted up-and-over concrete garage and access to a pocket handkerchief-sized, barbed wire-fenced piece of scruffy land at the back of the house or across the road, not being unusual at all. We have all seen it. And in some cases, visited and treated individual horses and ponies being kept in these conditions.

Perhaps the time has now come for us to step up to the plate?

We can play our part by:

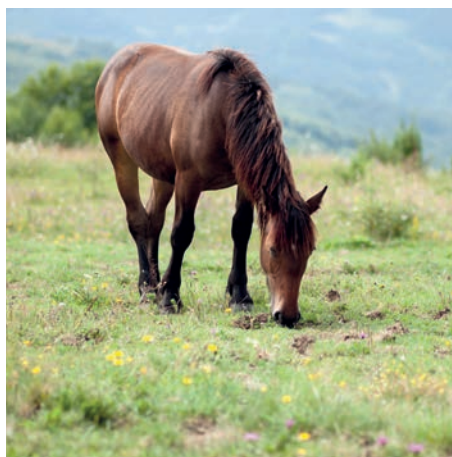
- making sure that the horse-owning public – and more especially the not-yet-horse-owner-but-thinking-about-it-public – recognise this crisis and the role they can play in preventing its escalation by facing up to their welfare responsibilities and the true costs of proper horse ownership
- encouraging new horse owners to rehome or foster horses and ponies from charities rather than purchase animals from markets and dealers
- ensuring that all our equine clients have their horses and ponies microchipped
- giving clear, strongly-worded advice on when not to breed from a horse – if it has poor conformation or genetic defects, for instance
- sharing best practice with 'fringe groups' – welfare charities and local authorities have many good case studies on working with travelling communities to promote better horse care, including discounted passport, microchipping and gelding clinics. ■

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Equine World www.equine-world.co.uk/buying_horses/cost_horse.asp



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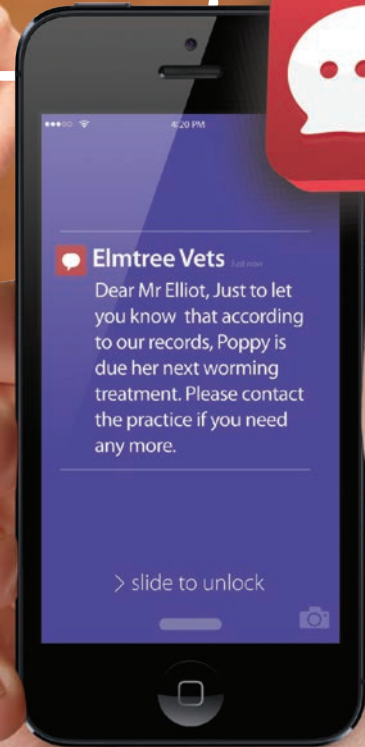


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SPECTRUM ECM FEATURE



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David qualified in 1974 and after nine years in farm animal practice worked as a veterinary investigation officer for the AHVLA in Carmarthen and Winchester, retiring in 2013. He has a special interest in the health and welfare of all farmed ruminants and in diagnostic pathology.

David is honorary vet to the British Goat Society, chairman of the Goat Veterinary Society, an honorary reader at the University of Surrey and visiting lecturer at London, Bristol, Liverpool and Glasgow universities. He is also a former president of the British Cattle Veterinary Association.

Goat health planning and therapeutic management

Although the principle of 'health planning' is widely adopted within the farm animal sector and also adopted by farm assurance schemes, it is not so widely used in the UK goat sector. This is in part owing to the relatively small number of goats kept in the UK (around 98,000) and the wide variety of reasons that we keep them.

At one end of the goat-keeping spectrum, we have commercial dairy herds, with the largest numbering in excess of 4,500; whereas goats also make excellent pets and can be kept in groups of only two or three (**Figures 1 & 2**).

In addition, some goats are kept on specialised meat-rearing units (Boer and Boer-cross); others such as Angora and Cashmere goats are kept for fibre

production, and many hobby goat keepers rear their pedigree goats for showing.

One of the fundamental principles of health planning has always been the rider that each and every plan must be farm specific – although employing generic, species-specific factors – and this is perhaps even more valid with our goats, for the reasons outlined above. There is certainly no 'one fit, quick fix' plan.

For many goat owners, the concept may be one that they have already embraced, and this is particularly relevant to the commercial sector providing farm-assured milk to supermarkets. To many, however, particularly within the hobby sector, it may be less familiar.

Goat health plan

Such a plan should encompass more than just 'health', and should also give some basic information on management and nutrition – both of which underpin the health programme itself.

A good starting point is to consider each of the Animal Welfare Act 2006 'welfare needs of kept animals' in turn, and include examples relevant to the goat itself. Subsuming these needs into any goat health plan also ensures that every owner is at least conversant with the legislation to which they should all be signed up!

Animal Welfare Act (2006)

This Act makes owners and keepers legally responsible for ensuring that the welfare needs of kept animals are met, to the extent required by good practice.

These include the need:

- for a suitable environment
- for a suitable diet
- to exhibit normal behaviour patterns
- to be housed with – or apart from – other animals (if applicable)
- to be protected from pain, injury, suffering and disease.

Figure 1. Housed goats on a typical UK commercial dairy goat unit.



Figure 2. Pet/'hobby' Pygmy goats.



*Suggested Personal & Professional Development (PPD)

GOAT HEALTH



Figure 3. Goats are browsers – take care to make paddocks safe and ‘goat proof’.

If we now consider examples for each of these in turn, with reference to our health plan:

Suitable environment

All goats should have access to shelter at all times – they do not like getting wet! Buildings must have:

- good ventilation (not too cold/draughty)
- plenty of natural light – artificial light to enable goat inspection at all times
- space to move around (minimum 1.75 sq m floor space/goat)
- good access to food and water
- a dry bed to lie down on.

Buildings must also be ‘goat proof’ because they are naturally inquisitive and will investigate anything with their mouth. So electricity cables

and light switches should be out of reach – remember they can reach up to two metres above the floor on their hind legs. They can also learn how to open gate catches!

When the goats are outside, ensure the fencing is ‘goat proof’, because their natural browsing instinct can have them caught up in badly maintained fences or hedges (**Figure 3**). Ensure they do not have access to poisonous plants or shrubs – rhododendron seems to be particularly attractive, yet is potentially lethal (**Figure 4**).

Tethering of any type is to be discouraged at all times.

Suitable diet

Goats are browsing – not grazing – animals, and every effort should be taken to ensure that any diet fed should



Figure 4. Rhododendron is attractive to goats, but potentially lethal.

fulfil this need. For forage intake, hobby goat keepers will often cut ‘browsings’ consisting of hedgerow, shrub and tree clippings brought into the goats when they are housed. Beware of potentially poisonous plants (**Figure 5**).

Goats in the commercial sector tend to be fed on a maize and grass silage-based total mixed ration (TMR), the constituents of which do allow a degree of browsing as goats feed.

When they are provided with a supplementary feed, it is important to ensure that all goats can feed together if provided with a course mix, otherwise those feeding first will select the ‘best bits’, with the more timid and late feeding goats having the ‘leftovers’. If this is not

possible, feeding pellets will override this behaviour, and ensure all goats receive their full requirements.

Dietary intake should be sufficient to provide maintenance for all goats, plus the demands of, for instance, pregnancy or lactation. It is important to ensure that goats do not become too fat (avoid titbits) or too thin.

Normal behaviour patterns

Goats are gregarious, friendly animals and thrive in any environment in which they can express their normal behaviour, including climbing, hiding (and escaping!). A simple straw bale (**Figure 6**), an old picnic table or a chair placed in a field can provide hours of fun! Plastic barrels are increasingly being seen on

Figure 5. Goats eating browsings – cut branches from trees and shrubs (Photo: British Goat Society).

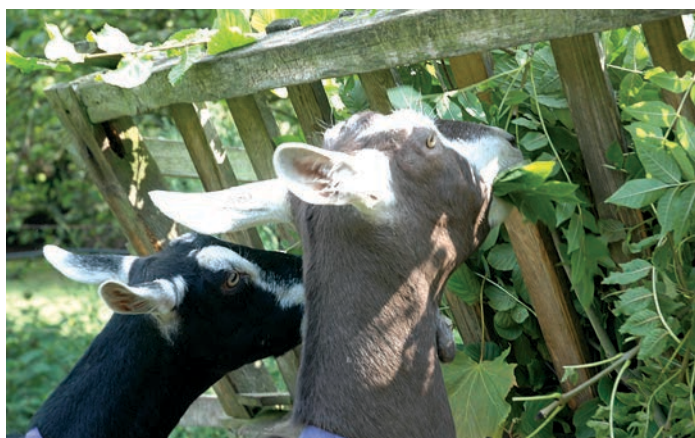


Figure 6. A simple straw bale provides hours of fun! (Photo: Sue Smith).



commercial units – which goats can lie in or on, and roll around.

Housing with, or apart from, other animals

When kept as companion animals, goats may live well into old age – and geriatric goats can present a particular problem; care should be taken to house them away from younger more boisterous individuals. Heavily pregnant females, lame goats or goats with large pendulous udders should be treated similarly – but always house them with companions, never alone.

Protected from pain, injury, suffering and disease

Although this item is last on our list, it is under this heading that most of our health plan input would be placed.

Biosecurity

Every plan should include information describing the principles of biosecurity, and some examples of how these could apply to the unit itself.

Added animals

Where possible these should be sourced from units of a known health status, and ideally kept in 'quarantine' facilities for a minimum of two weeks. They should be examined regularly for any visible evidence of infectious disease – sarcoptic and choriocytic mange, foot rot, caseous lymphadenitis (CLA) – that could spread to other goats; and examination by a veterinary surgeon at some stage during quarantine should be encouraged.

A simple blood test for caprine arthritis/encephalitis (CAE) is advisable during quarantine. If the goat is in a known TB

area, or clients are purchasing goats from such an area, then consideration should be given to both pre- and post-movement testing using the comparative skin test. A leaflet on TB in goats is available to download from the Goat Veterinary Society website.

Administration of a 'combination' wormer dose is advisable during quarantine too, bearing in mind that no wormer has a marketing authorisation for use in goats, and that dose rates of any products used (under cascade) should be increased accordingly. This will reduce the likelihood of 'buying in' resistant nematodes.

If the clostridial vaccination status is not known, then a primary dose of a 4-in-1 vaccine should be given, followed by a second dose four to six weeks later and then eventual inclusion in the herd vaccination programme.

In smaller herds

In smaller herds (particularly pedigree herds), there is the added problem of goats visiting – often a series of – shows during the 'show season'. Those events covered by the British Goat Society (BGS) insist that goats are tested regularly for CAE, so this is of minor concern. Given the insidious nature of this disease, however, owners should be cautious of attending shows where testing is *not* a prerequisite.

It is generally not necessary to lay down strict rules regarding show animals, but a reminder of the potential risks should be entered into the plan. Many smaller herds, that



Figure 7. Goat disbudding must be undertaken by a veterinary surgeon.

do not have the full farm equipment at their disposal, will borrow items from each other. These may include weigh/handling crates, hurdles, trailers and even drenching guns. The potential risks from such items should be emphasised.

Routine health control measures

Neonatal kid care

The secret of successful neonatal kid care is attention to detail:

- kids should be born into a clean and dry environment, the navel should be dipped/sprayed with a suitable astringent
- colostrum (preferably from the kid's own dam) should be consumed within the first six hours (50-75 ml/kg), with at least two more feeds in the first 24 hours. It is important to know the CAE and Johne's disease status, as both can be passed to the kid via contaminated (particularly pooled) colostrum, and other specific measures should be put in place
- disbudding, if deemed necessary, must be

undertaken by a veterinary surgeon, and usually within the first seven days (**Figure 7**)

- successful and ongoing kid rearing is dependent on a consistent feeding regimen, with strict attention to hygiene.

Vaccination protocols

A strategic approach to vaccination is of particular importance in goats:

- all goats should receive vaccination against clostridial disease, and have a clear protocol in place. In the author's opinion, the vaccine of choice is Lambivac (MSD Animal Health); although it does not have a marketing authorisation for use in goats. The primary course is as indicated in the data sheet, but boosters should be given at least every six months. In pregnant does, a booster dose should be given four weeks prior to kidding to boost colostral immunity
- Johne's disease vaccination has an important part to play in units attempting to control the problem, and the Gudair vaccine (Virbac) has a product licence for use in goats
- Pasteurella vaccines may be

"If the goat is in a known TB area, or clients are purchasing goats from such an area, then consideration should be given to both pre- and post-movement testing using the comparative skin test"

Table 1. Recommended anthelmintic dose rates for goats compared with those for sheep (Adapted from Bartley, 2009)

	Current sheep dose rates (mg/kg)	Recommended goat dose rates (mg/kg)
Benzimidazole	5	10
Levamisole	7.5	12
Ivermectin	0.2	0.3 - 0.4
Doramectin	0.2	0.2 - 0.4
Moxidectin	0.2	0.2 - 0.4

used strategically on goat units with a known problem (usually in kid-rearing phase) and any available pasteurised vaccine available for sheep in the UK can be used following manufacturer's recommendations (although again with no product licence for goats in the UK). Avoid using combined clostridial and pasteurised vaccines – use them as separate vaccines, at separate times

- other vaccines should only be used if there is a known problem, such as Orf or Q Fever
- suitable advice should be given to ensure vaccines are stored and used correctly.

Worming protocols

Goats appear unable to mount the age-dependant resistance to nematode parasites that we recognise in sheep and cattle. This means that in any control programme, adult goats of all ages – that may have been exposed to contaminated pasture – must be included. As a result, it also follows that pasture – often very limited in area in the case of 'hobby' keepers – can quickly become heavily contaminated with nematode eggs and thus effectively 'worm sick'.

Within the commercial sector, this susceptibility to nematodes at all ages is almost the sole reason why the majority of herds are housed throughout their lives – milk production on contaminated pasture being unsustainable.

It is important to ensure that goats are only wormed when it is necessary, and regular faecal egg count monitoring is to be encouraged. Bear in mind that there are a number of nematode parasites shared with sheep and cattle, so any health plan must take shared grazing patterns into consideration.

Goats are considered as a 'minor' species – and as such, there are no anthelmintics with a marketing authorisation for use in goats. Any treatment or control protocol must use existing products under 'cascade' principles with designated milk and meat withhold times of seven days minimum and 28 days minimum respectively.

We have undoubtedly been under-dosing goats with anthelmintics; and this, coupled with the need to worm more regularly, has undoubtedly had an influence on anthelmintic resistance patterns within the goat sector. **Table 1** gives the current recommended anthelmintic dose rates for goats compared with those for sheep.

Foot care

As with sheep, regular foot care is necessary in goats, to ensure that claw overgrowth does not occur. The frequency of examination will be dependent on the environment in which they are kept. Foot lameness should be dealt with promptly – the lesions seen predominantly mirroring those found in sheep.

Goat abortion

As with sheep, many of the causes of abortion in goats are infectious including enzootic abortion, *Campylobacter* and Q Fever. Any goat that aborts should be isolated, and the products of abortion removed, together with any contaminated bedding.

Consideration should be given to submitting material for laboratory examination, ensuring where possible that placenta is included.

Geriatric goats

In the pet and hobby sector, it is not unusual for goats to be kept well into their teens, and it is inadvisable to allow females over 10 years of age to breed. Care should also be taken to ensure that dental abnormalities do not occur as a result of molar tooth loss and compensatory overgrowth. They also become increasingly susceptible to chronic aseptic laminitis when the foot becomes hard and 'box shaped'; and also to age-related osteoarthritis – both of which

can be controlled initially by the suitable use of NSAIDs and analgesics (under cascade).

Legislation

Despite the many reasons we keep goats in the UK, they are all classified as farm animals and as such, should:

- be kept on a registered holding, with a valid holding number
- carry suitable and visible ear tag identification
- have all movements off and onto the unit entered into a suitable movement book
- have all pharmaceutical products administered recorded in a suitable 'medicines book'.

Goat medicine availability

As already stated throughout this article, there are few products with a marketing authorisation for use in goats in the UK and, on many occasions, products will be used under cascade prescribing principles (VMD, 2013). >>>



Global warming could help goat populations thrive

There are some factors affecting goat health – climate change, for instance – that are largely beyond our control. Yet higher temperatures, caused by global warming, could help some goat populations to thrive.

Also an interesting study on feral goats, published in *Oikos* a couple of years ago, showed that two major factors are important for wild goat survival – daylight length and ambient temperature.

By referring to maps of where goats lived, the researchers were able to establish that no populations could survive above 60 degrees latitude unless farmers brought them

in at night. North of this line, temperatures in winter are too cold, food too sparse and days too short for goats to eat enough to stay alive.

Warming global temperatures, however, could make conditions bearable at these higher latitudes.

The researchers looked at one specific population on the Isle of Rum, off the northwest coast of Scotland, to see how they were responding to climate in relation to day length.

“As temperatures have started to climb by bits of a degree over the last half century we’ve been seeing the numbers of goats on the Isle of Rum increasing,” said principal

researcher, Professor Robin Dunbar from the University of Oxford, in an interview for Planet Earth Online.

Currently, the goats living on Rum barely have enough winter daylight hours to eat in and they struggle to keep warm. But as the climate changes – bringing warmer temperatures – goats need less food and less time foraging to survive.

“As the climate warms, goats will be able to live further north, says Professor Dunbar. “It’s about one degree latitude further north for every one degree warmer in mean annual temperature. Although here in the UK this may be offset by changes in the Gulf stream and other climate factors.” ■



PPD Questions

1. Outline the Animal Welfare Act 2006 generic 'welfare needs' that can be applied to a goat.
2. Give at least six goat health problems that can result from the introduction of purchased goats.
3. Clostridial vaccination is one of the most important preventive measures on goat units. Describe such a protocol.
4. Give at least three factors to take into consideration when devising a nematode control programme for goats?
5. Even pet Pygmy goats must be registered with Defra; list four pieces of relevant legislation that must apply as a result?

Answers

1.
 - For a suitable environment
 - For a suitable diet
 - To exhibit normal behaviour patterns
 - To be housed with, or apart from, other animals (if applicable)
 - To be protected from pain, injury, suffering and disease.
2.
 - CAE
 - CLA
 - Foot rot
 - Sarcoptic and Chorioptic mange
 - Resistant nematodes
 - TB
3. The vaccine of choice is Lambivac (MSD Animal Health); although it does not have a marketing authorisation for use in goats. The primary course is as indicated in the data sheet, but boosters should be given at least every six months. In pregnant does, a booster dose should be given four weeks prior to kidding to boost colostral immunity.
4.
 - Goats never produce the age-dependent resistance to nematode parasites we recognise in sheep and cattle, and remain susceptible throughout their lives
 - Land can quickly become 'worm sick' owing to constant contamination by goats of all ages
 - There are shared nematode parasites with sheep and cattle that may have grazed the same pasture
 - There are no licensed anthelmintics available for goats in the UK – all products should be used under cascade principles
 - Dose rates need to be increased for each anthelmintic class.
5.
 - They must be kept on a registered holding, with a valid holding number
 - They must carry suitable and visible ear tag identification
 - All movements off and on to the unit must be entered into a suitable movement book
 - All pharmaceutical products administered must be recorded in a suitable medicines book.

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<http://planetearth.nerc.ac.uk/news/story.aspx?id=1411&cookieConsent=A>

Counting the costs of the countryside

It is that time of year when hundreds of thousands of tourists visit the picturesque parts of the UK to delight in all that these more remote, rural communities have to offer.

They savour local foods and customs, they imbibe local brews and stunning views, and marvel at the beauty and tranquillity of the countryside. But how many of the visitors give a thought to the farmers who play a crucial role in maintaining the distinctive landscape of such areas, whilst at the same time trying to eke out a living?

The average visitor's image of a hill farmer is somebody who must be happy because they are doing what they love in idyllic surroundings. Studies, however, have indicated the contrary – that farmers may be three times more likely than the average person to commit suicide.

Tourists don't see the loneliness or anxiety about finances and paperwork. They just think farmers are content in what they do out in the fresh air, that they are fit and happy people, who make shed loads of money.

As journalist, Sarah Todd, wrote in an article in *Farmers Weekly* (13 October 2012): 'In days gone by, farmers could stop and talk to a few familiar faces about the harvest or how lambing was going; there was an understanding of what would be happening at certain times of year on a farm. Nowadays villages can be full of unfamiliar faces. There isn't the recognition, interest in or understanding of the local farmer and, as a result, farmers can feel isolated and lonely.'

A recent report, *Hill Farming in England*, 2013/14, from Rural Business Research (RBR), quantifies the livelihoods of hill farmers and helps us build a picture of the stressful realities of their everyday lives, spent grappling with farmland situated in the euphemistically named Less Favoured Area (LFA) of the country.



Farming on the edge

The total area of land classified as LFA in England is 2.2 million hectares. Of this, 1.8 million hectares are farmed – about 17 per cent of the total farmed area of the country. These are areas where practical farming is more difficult because of poor climate, soils and terrain, which in turn lead to lower yields and higher production and transportation costs. This is farming 'on the edge'.

LFAs include almost all of the upland areas in the North of England (including the Pennines, Lake District and North York Moors), the Peak District, the English part of the English-Welsh border, Exmoor, Dartmoor, and parts of Cornwall. In England, 28 per cent of beef cows and 41 per cent of breeding sheep are on LFA grazing livestock farms.

The typical LFA farm has 147 hectares of enclosed land and often has access to an area of common grazing. It is part owned (69 hectares) and part rented (78 hectares) and most of the farm (85 hectares) is in permanent grass.

The average LFA farmer is 57 years old, has 27 beef cows and 363 breeding ewes. Cattle and sheep youngstock and fatstock make up the total to 82 cattle and 694 sheep.

On average, these farms only earn some 65 per cent of their total revenue from crop and livestock farming activities, with 20 per cent coming from the Single Farm Payment and 12 per cent from specific agri-environment payments. The balance of revenues (four per cent) is earned from non-farm activities, mostly associated with tourism, recreation and non-agricultural contracting.

Farming at a loss

According to the RBR report, the crop and livestock farming side of the business covers its variable costs and earns a respectable gross margin of £24,020 per farm. However, because this side of the whole farm business is assumed to incur most of the fixed costs (85 per cent), the average LFA farm is shown as making an Agricultural Business Income loss of minus £13,162 (before unpaid labour) per farm.

Add in the nominal unpaid labour allocation of £24,362 – invariably supplied by the farmer and his or her family – and the loss becomes minus £37,525.

So although there is substantial variation amongst the farms in terms of their financial performance, most of them could not survive in their present form as commercial businesses without the public payments – including those much-maligned EU subsidies. And without those farms, there would be no countryside as we know and cherish it.

Farming for our future

There is a need for us to make the general public more aware of the part that farmers play in maintaining some of the most attractive parts of our countryside as living, working landscapes for everyone to enjoy.

They need to be made aware that there are costs attached – not only costs of a financial nature that are to a large extent being met from the public purse, but also costs of a more emotional nature being met on a personal level by the hill farmers who devote their lives, for meagre material gain, to keeping our national heritage alive. ■



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Bruce graduated from the University of Edinburgh's Royal (Dick) School of Veterinary Studies in 1992. Following graduation, he spent time in the avian and exotic department at Utrecht University further studying the veterinary care of birds and exotic animals.

On return to the UK, Bruce spent six months in mixed practice and a short period in small animal/exotics practice, before setting up his own dedicated practice 20 years ago. He works exclusively with birds and exotic animals, on both first-opinion and referral bases and has contributed chapters to BSAVA manuals and several articles in UK and US-based veterinary publications.

Bruce has been keeping reptiles and amphibians for over 35 years and amphibian medicine is a particular clinical interest.



**Suggested Personal & Professional Development (PPD)*

ANURANS

Some notes on commonly kept amphibians – frogs and toads (Anurans)

General knowledge of amphibian set-ups is best obtained from appropriate general husbandry literature, following hobbyist forums and, ideally, keeping one or more species yourself. Here, space precludes a detailed discussion of general set-ups, and only specific details for individual species/groups are provided.

Amphibian enclosures may be broadly categorised as aquatic, semi-aquatic or terrestrial; although the distinction between the three may be blurred, particularly between semi-aquatic and terrestrial. It should also be noted that different life stages often have different requirements (descriptions in this article are for post-metamorphosis adults) and also that different seasons will affect this.

Many species return to water for their breeding season – perhaps requiring conversion from terrestrial to semi-aquatic, or to a 'more aquatic' semi-aquatic set-up. Again this can vary in duration – briefly, purely for breeding, to remaining aquatic for several months.

Aquatic is fairly self-explanatory, but it does usually involve the keeper in similar considerations to fish – that is, filters and other water condition stabilising/modifying equipment may need to be used and understood. For amphibians, 'aquatic' covers both gill-breathing species (such as the axolotl) and air-breathing species (such as clawed frogs).

Semi-aquatic can run the range from basically aquatic with a small hauling-out platform, to different ratios of land to water, so particular care is needed for this general

term/description as to what is appropriate for the species in question.

All terrestrial enclosures will normally have some element of water for amphibians – remember that soaking, not drinking, is the primary water uptake behaviour for most species. Most amphibians should have a water dish of at least sufficient size that they can get into it fully; although, for some species, care is needed to ensure that they can get out easily – drowning is possible, even for amphibians.

Essentially then the categories below are very broad, and more detailed specific species information should be sought where possible.

Notes are provided on size – unless otherwise specified, length given is snout-vent length (SVL) – longevity, natural history, class of enclosure, along with specific notes on husbandry and common health conditions. (Except where otherwise stated, these notes apply to adults – space precludes a discussion of the breeding characteristics and larval stages).

Diet is not generally specifically covered, as essentially all adult amphibians are insectivorous/carnivorous. In some anurans, early larval stages are herbivorous or even nourished by the parents in various

ways. Health notes only include conditions particularly associated with that species – generally common conditions, such as metabolic bone disease complex, are not generally mentioned.

Amphibian taxonomy is in quite a state of flux. The species (Latin) names used are believed current at the time of writing but may change. Be wary of common names, which may or may not be used correctly in a given case, and may even be made up by breeders/sellers.

Horned frogs (Pacman frogs)

These are often described as a 'mouth on legs' and generally have voracious appetites. Pet species are quite brightly patterned green/brown.

Species

There are various *Ceratophrys* species, most commonly *C. ornata* (Ornate, Bell's or Argentine horned frog) and *C. cranwelli* (Chaco or Cranwell's horned frog). Crosses between these two (fantasy horned frog) are also common.

Description

These frogs are rotund (obese individuals may be wider than they are long) with short, squat legs. Their natural colour is patterned green/brown – in captivity, hypopigmented and albino individuals are available.

They are named after the fleshy 'horns' above each eye, though these are often relatively small in the common pet species.

"Horned frogs are often described as 'a mouth on legs' and generally have voracious appetites"

“White’s tree frogs generally make reasonable pets and tend to be relatively tolerant of handling”

Adult size

Adults are up to 15cm long and up to several hundred grams in weight.

Sexing

Sexing is often not possible in horned frogs. Males tend to be smaller, call more and may develop nuptial pads on their front toes during the breeding season.

Longevity

Ten years is generally considered a good life span for these frogs in captivity.

Natural history

These frogs are from South America and found in ground litter and debris in habitats ranging from rainforests to drier areas – mostly sub-tropical to temperate and with a distinct rainy season. They are ambush predators and eat anything they can fit in their mouth; which is voracious even by amphibian standards.

Even in good climatic conditions, they may be dormant for much of the year, and only feed for a few months. Overfeeding is, therefore, very common in captivity.

Breeding occurs in the rainy season and may be encouraged by a period (weeks) of slightly drier conditions.

Class of enclosure

The class of enclosure is ‘terrestrial’.

Specific husbandry notes

The following are the main points relating to husbandry:

- recommended temperature range 20-28°C
- naturally ‘burrow’ into shallow scrapes in substrate, so this behaviour should be

- allowed for in captivity by providing reasonably deep substrate
- the water dish should be shallow
- since they don’t move much, it is particularly important that hides/cover are distributed throughout the thermal gradient
- best kept individually
- diet of invertebrates and small rodents – the latter best strictly limited to avoid obesity.

Specific health notes

These frogs are:

- prone to obesity
- metabolic bone disease complex is not uncommon
- substrate or cage furnishing ingestion can occur during ‘feeding strikes’
- dormancy occurs naturally (usually associated more with dry season rather than temperature, as such) and may be triggered in captivity – a differential diagnosis for lethargy/inappetence.

Similar species

The African bullfrog or Pyxie frog (*Pyxicephalus adspersus*) requires basically similar conditions and tends to be longer-lived.

Clawed frogs

Clawed frogs include various *Xenopus* species, the commonest in captivity being *Xenopus laevis*. Some hybrids exist.

Description

The body is flattened dorsoventrally and the eyes fairly dorsal. A tongue and teeth are absent, the front toes are unwebbed and the hind toes fully webbed – the digits on the hind feet have short black claws and the front toes are long and pointed (**Figure 1**).

The natural colour of the upper body is mottled brown/olive with whitish colouring ventrally (albinos common in captivity). There are a series of lateral line organs which give a ‘stitched’ appearance along the flanks.

Adult size

Females may reach 15cm snout-vent length, whereas males are smaller, at around six to eight centimetres. Bodyweight is up to around 100g.

Sexing

Females have visible cloacal papillae.

Longevity

Some individuals may live more than 20 years in captivity.

Natural history

These frogs are widely spread in sub-Saharan Africa and are typically found in still, often cloudy/stagnant bodies of water. Feral colonies exist widely throughout the world (including parts of the UK); they hunt largely by touch, stuffing prey into their mouth with their forelimbs.

These species have been associated with the spread of chytrid fungus, to which they are relatively resistant. They are used extensively in biomedical research.

Class of enclosure

Xenopus species are aquatic. Although they are air-breathing and can travel over land if necessary, they normally live full time in water and do not need hauling-out platforms. They do need to be able to come to the surface to gulp air.

Specific husbandry notes

The following are the main points relating to husbandry:

- any water currents (from filter outflow, for example) should be minimal (currents can stress them)
- relatively temperature-tolerant, but recommended temperature range is 20°-26°C
- ownership is illegal in several US states.

Specific health notes

These frogs are:

- commonly prone to obesity
- susceptible to many fish parasites and diseases.

Similar species

Dwarf clawed frogs (*Hymenochirus* species) are much smaller (maximum size two centimetres) but otherwise generally similar in appearance and care. Not generally so resistant to the chytrid fungus.

White’s tree frog

The current species name is *Pelodytes caerulea*, formerly *Litoria caerulea* (originally *Rana caerulea*).

Description

They generally make reasonable pets, tend to be fairly ‘laid back’ and relatively tolerant of handling, although this should never be excessive (**Figure 2**).

Adult size

The normal adult weight of White’s tree frog is 60-140g; but larger individuals may reach over 200g. Their body length can be up to 10cm.

Figure 1. A clawed frog.



Figure 2. A White’s tree frog.



Sexing

This is by means of nuptial pads on the medial surface of the first digit in males. Generally, these pads are only visible during the breeding season.

Longevity

Twenty years has been recorded for this species in captivity; although the life span of most tree frogs seems to be less than this.

Natural history

These frogs are widely distributed in Australasia (various species/subspecies). Reproduction naturally occurs following a dry/aestivation period, which should be reproduced in captivity if breeding is to be attempted.

Class of enclosure

These frogs are arboreal terrestrial.

Specific husbandry notes

The following are the main points relating to husbandry:

- full-spectrum lighting is strongly recommended
- they can tolerate relatively high temperatures – a 28°-30°C 'hot spot' is recommended, although cooler areas must be available.

Specific health notes

These frogs are:

- commonly affected by metabolic bone disease
- often develop abscesses
- prone to some natural colour changes over time, as well as occasional temporary patches of colour change that seem to occur without any apparent pathology.

Similar species

Several other *Litoria* are found in captivity, and other tree frogs are available as pets – being generally similar to White's, but usually smaller and less robust. They invariably require lower temperature ranges and tend to be more stressed by handling/disturbance.

Species include American green tree frog (*Hyla cinerea*), European green tree frog (*Hyla arborea*) and milk frog (*Trachycephalus resinifictrix*).

Red-eyed tree frog and related species

The red-eyed tree frog (*Agalychnis callidryas*) is relatively delicate and easily distressed.

Description

Red-eyed tree frogs are generally long-limbed, 'lanky' species with eyes that are notably red with vertical pupils. Their dorsum is bright green (often darker in younger individuals), their flanks have yellow/blue stripes and the ventrum is pale cream. Feet/toes are orange, with expanded toe tip 'sticky' pads.

Adult size

Females are up to around seven centimetres in length, whereas males measure only approximately four centimetres from snout to vent.

Longevity

These frogs, on average, live up to about 10 years; although this may be extended upwards as more experience keeping them is acquired.

Natural history

Red-eyed tree frogs are found naturally in South and Central America in humid areas near ponds and streams. They are nocturnal, spending the day hiding in leaves and 'hunched up' to conserve water.

Class of enclosure

These frogs are arboreal terrestrial.

Specific husbandry notes

In the wild, red-eyed tree frogs do come down to the ground to feed, and will do so in captivity.

Specific health notes

As with other tree frogs, colour changes – including temporary patches of pigmentation – can occur without apparent pathology, although it may

also be associated with physical/chemical trauma, as well as pathogens or other pathology.

Similar species

Waxy monkey tree frogs (*Phyllomedusa* spp) are also seen in captivity, being notable for spreading a waxy secretion over themselves to improve their waterproofing, and also for being significantly uricotelic, whereby urate accounts for a significant proportion of their nitrogen excretion.

Arrow poison frogs (dart frogs, dendrobatids)

Dendrobatid keeping is often considered a bit of a 'sub-hobby' in that many enthusiasts keep a variety of species, and/or no other amphibians.

Species

A variety of *Dendrobates* and *Phyllobates* species are kept. Many are CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora)-listed and common ones include *Dendrobates auratus*, *D. azureus*, *D. tinctorius* and others.

Description

These are small, brightly coloured, fairly lean frogs. Their bright 'warning' skin pigmentation usually consist of a black mottled base, patterned with some other colour (**Figure 3**).

Adult size

The adults reach two to five centimetres from snout to vent, depending on species, and weigh between 10-25g.

Longevity

Some individuals have been reported to live over 20 years; but a life span of five to 10 years is more common.

Natural history

Classically, these frogs are found on the floor of rain forests in South America; although their habitat does extend into the edges of streams, marshland and shrub land. A common feature of all these areas is their relatively high humidity.

These species are diurnal, active hunters of small invertebrate prey and they are 'variably arboreal' depending on individual species. Both sexes may be territorial to a greater or lesser extent. The tadpoles are carnivorous from hatching and dedicated 'parental care' is shown by many species.

Class of enclosure

These frogs are semi-aquatic with a degree of arboreal requirement that varies with the different individual species.

Specific husbandry notes

There are some key husbandry points relating to dendrobatids:

- care is needed when handling them because,

Figure 3. *Dendrobatid* in an enriched enclosure – note the fruit is food for the fruit flies the frogs are feeding on, not for the frogs themselves.



when first caught from the wild, the skin secretions of some species are potentially fatal; although, with time in captivity, the toxicity fades (toxins are derived from invertebrate prey in the wild)

- high humidity is important, but some ventilation is necessary
- temperature requirements are variable – generally towards the warmer end of the spectrum and should be mid-to-high 20s
- water containers should be shallow – these species are not strong swimmers
- as usual with amphibians, full-spectrum lighting is controversial; however, access to some is generally recommended
- as noted, both sexes may be territorial, so sufficiently large enriched environments are necessary to house groups.

Specific health notes

These frogs are prone to spindly leg syndrome in development.

Similar species

A variety of dendrobatids are kept – and many commonly bred – in captivity.

Oriental fire-bellied toad

The species name of this toad is *Bombina orientalis*.

Description

Its shape is relatively flattened dorsoventrally; while its skin is patterned dark green/black on top and its belly coloured bright yellow/orange with black spots (**Figure 4**).

Adult size

The oriental fire-bellied toad can be up to five centimetres in length from snout to vent.

Sexing

Sexing is not possible outside the breeding season. However, during the breeding season, males develop dark nuptial pads on their forelegs and the digits of their front limbs.

Longevity

A life span of 15 years has been recorded in captivity.

Natural history

These amphibians are commonly found in streams and ponds and their surrounds in China, Korea and Vietnam. They are fairly secretive and breed in spring following a period of brumation/hibernation.

Class of enclosure

These toads are aquatic/semi-aquatic.

Specific husbandry notes

The following are the main points relating to husbandry:

- balance of water versus land can be variable; and they may be kept successfully in either predominantly terrestrial or predominantly aquatic enclosures – either way, they do need some land area
- in terms of ambient temperature, the warmer end/hot spot may range up to 28°C, although the cooler end should be much lower (approximately 18°C); in aquatic set-ups, water temperature should be around 22°C–24°C.

Specific health notes

There are no specific health points to note other than the fact that individuals will tend to lose colour somewhat in captivity unless carotenoids are provided.

Similar species

Several similar species that may be seen include the yellow-bellied toad (*Bombina variegata*), European fire-bellied toad (*Bombina orientalis*) and the giant fire-bellied toad (*Bombina maxima*). Some of these require somewhat different conditions to *Bombina orientalis*, so species identification is important. ■

Further reading

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Many care sheets are available on the internet. These are of variable quality, so consulting and comparing several is advisable. Similarly there are many mailing lists and forums – some can be quite useful, although care is always needed as to their veracity.

Further information:

www.amphibian.co.uk
www.caudata.org
www.anapsid.org
www.frogforum.net

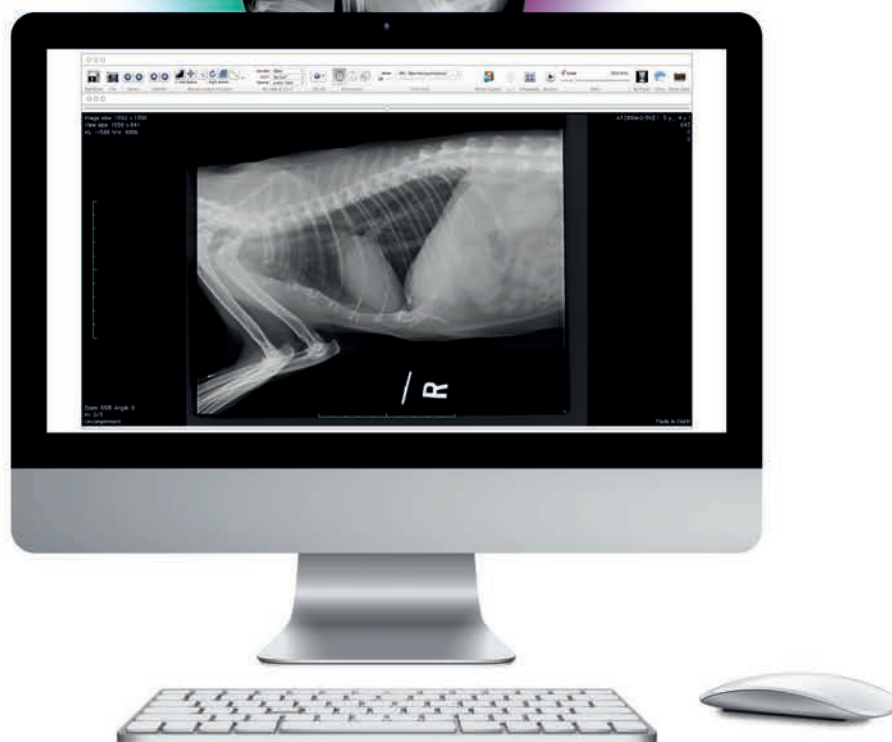
Figure 4. A fire-bellied toad.



PPD Questions

1. What is the natural diet of most adult amphibians?
2. Are the aquatic clawed frogs air (lung) or gill breathers when adult?
3. Why are horned frogs particularly noted for obesity?
4. Name a notable physiological feature of waxy monkey frogs?
5. Is territoriality a significant potential issue in male dendrobatids, female dendrobatids, both or neither?

- Answers**
1. Live food – invertebrates and small vertebrates
 2. Air (lung)
 3. Naturally dormant much of the year in the wild (and generally inactive, sit-and-wait predators)
 4. a) They are largely uricotelic; b) they secrete and spread a waxy waterproof covering on themselves
 5. Both



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Is your website fit for purpose?

It is generally felt that once a new website has been published, it no longer needs any attention. However, the hard work is only just beginning. Keeping your website up-to-date is vital to the credibility of your surgery. Fresh content not only attracts new clients, but it also keeps existing clients coming back. This article lists a few tips to help you keep your website current, including advice on updating content and making sure that the design is search engine friendly.

With nearly 38 million adults (76 per cent) in Great Britain accessing the internet every day, 21 million more than in 2006 (Office for National Statistics), now is a better time than any to re-evaluate your existing website.

Websites today are all about fresh content; the ones that generate the most traffic are those where the subject matter is constantly being added to, changed and improved. Users now expect to see or learn something new each time they visit your website, and those that do so are more valuable, because you are giving them a reason to return.

Fresh content

Blogging is a great way to add new content to your site on a regular basis. Even if you don't think that your practice has much to say, there is always something going on that could warrant a blog post. You could comment on a veterinary news story, write about an upcoming event such as an open day, or pen a good story about a case your practice has dealt with recently – just make sure to obtain the consent of the pet owner first.

Your staff might be taking part in a charity event, or your practice could have treated its 1,000th patient. Even if you think that your news is not very exciting, a news article relevant to veterinary practice will help to keep your clients coming back for more.

Another way to keep clients returning is to integrate your



website with social media. Platforms such as Twitter and Facebook are good outlets for letting clients know that you have added new content that they should take a look at. The other benefit of Twitter is that it allows for instant customer service. Not only does it enable your clients to contact you free of charge, it also avoids their getting frustrated by being put on hold on the telephone.

However, encouraging your clients to follow you on social media can be a challenge – so offering 'giveaways' or discounts can entice people to sign up, as can showcasing their comments on your website or next email promotion.

Furthermore, images or videos not only help keep clients returning to your website, but they also have the added benefit of showing potential clients what your practice can do. You might like to create a gallery page which is updated regularly. You could upload photos of staff members, clients and their pets, open days and other events. Similarly you could

upload video clips – perhaps a 'behind-the-scenes' tour of your practice, an interview with a member of staff, or even pet care advice.

Visibility and SEO

How high your website appears in an online 'search' depends on search engine optimisation (SEO). For example, if somebody was to search for the term 'veterinary practice in [your town]', SEO would help your site appear in the results, improving the chance of that person contacting you and eventually becoming a client.

The objective is to get your practice website to show up on the first page of search results, which is achieved by optimising your website and its content through veterinary SEO.

Fresh content applies to SEO because, if you aren't constantly updating your site, there's nothing to entice the search engines to crawl and rank your web pages higher than those of your competitors. Updating your site frequently means that search engines will be able



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WEBSITES

to find your pages more readily, potentially resulting in higher rankings and increased viewership.

Your blog or news page is one of the best ways of keeping your website popular with search engines. Within your blog posts, it is important to include words, phrases or terms that people most commonly use when searching online. For a veterinary practice, phrases such as 'vet in [your town]' or '[your town] animal clinic' will improve the chances of your website being found in local searches. It is important strategically to place these keywords throughout the content of your website; but be careful not to overdo them as this can actually get your site penalised by search engines!

Links can also improve the visibility of your website. Search engines know that if you have more links, then you're probably a trustworthy site and will, therefore, rank you higher in search results. So, the aim is to get a number of quality links to your website from other reputable websites.

Producing engaging, quality content is one of the best ways to encourage others to link back to your site. However, like keywords, it is not about the quantity of links you have. Instead, it is more about the quality – too many links can result in your website being viewed as 'spam'.

Social media also attracts the search engines. Having a live social media feed built into your practice website allows your site to constantly speak to search engines. By having new Facebook posts or tweets consistently updating on your

website, search engines will understand the information that you're putting out and it will likely want to trawl your website (Garvey, 2014).

Design for mobile devices

Millions of searches for a veterinary surgery are made every month on Google in the UK, and a high proportion of these searches are made on mobile devices, such as phones and tablets. By not factoring in these potential customers, then you could be missing out on potential clients.

Mobile compatibility can help your website gain higher rankings on search engines. For example, when using a mobile, Google ranks websites that are mobile compatible better than those that are not. This means that websites have a better chance of achieving a higher search rank if they load faster, look better in resolution and are easier to navigate on a mobile device.

The first step in making your website 'mobile friendly' is to understand how much traffic is coming from mobile devices. A service called Google Analytics can help you with this. Google Analytics generates detailed statistics about a website's traffic and traffic sources. It can also measure conversions and sales.

Speak to your web team about getting Google Analytics linked to your website and, once you are set up, log into your Google Analytics web account and click on 'Mobile'. Here it will show you how many visitors are coming to your website via mobile and on what device. The bigger the percentage, the more critical it is to be mobile (Fox, 2013).

It is also worth testing how friendly your website looks on a mobile or tablet. The best way to do this is simply to bring up your website on your own mobile. Alternatively, you can use web tools such as MobiReady, W3C mobileOK Checker or iPadPeek – simply

enter the URL of the page you want to view in the search bar and it will show you the page on your computer screen as if it were on a mobile device.

To make your website more friendly, there are a number of plug-ins available that can transform your website into a mobile-friendly version. Choosing the right method will depend on your existing site and what you are trying to achieve – again, your web team will be able to help you with this.

Calls to action

Because your website is open all the time, it must create the right first impression. The internet has become the primary way for local pet owners to find information and make decisions on where to take their pets for veterinary treatment (Severidt, 2013) and because of this, it has become essential for veterinary surgeries to integrate 'calls to action' into their websites.

A 'call to action' (CTA) is a marketing term which refers to any prompt or trigger that encourages a person to take action. These are very important, as without them you could be missing out on potential new clients. The most popular manifestation of CTA in websites comes in the form of buttons that, when clicked, perform an action ('Schedule an appointment now!', for example) or lead to a web page with additional information ('Click here for more details', for instance) (Gube, 2009).

However, they can also come in the form of banners, graphics or text; and placement of CTAs in prominent places, such as at the top of a web page, can yield better results because users are more likely to notice them and take action. Having some 'white space' around your CTA button can also draw the eye and encourage

customers to click through or contact your surgery.

Little steps, big results!

People tend to feel more comfortable working with web experts when it comes to updating their web content and improving their SEO. However, with an understanding of these basic practices, you will soon begin to see that they are easy to implement without external help. Even if you only write a blog post once a week, tweet something every other day, or upload new images every other month, you will soon start to see an improvement both in your visitor numbers and in your website's search rankings, which ultimately will help your practice to grow. ■

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"Blogging is a great way to add new content to your site on a regular basis"



Deborah Croyle

Following successful careers in customer service and people management, Deborah joined the veterinary business sector in 2002, and has held roles as diverse as receptionist, practice manager and business director. She has a miniature dachshund which was born blind, another older dachshund, three cats, a rabbit and a tortoise.

What do your team members say when they're not speaking?

You spend a lot of time and effort – and rightly so – giving the best impression to clients, even to taking unspoken messages from their posture and gestures, and being aware of your own in response. But what do you do when you turn away from the client and relax with your colleagues? Is your body language then more honest and revealing?

Of course, you know about body language, and can easily spot a lie, aggression, or fear; and you are well aware that open gestures can be considered as positive, whereas closed gestures are considered to be negative. Similarly you know instinctively when someone is angry with you – when their body language is visible.

In a work situation, however, many people will suppress this body language because they don't wish to show their emotion, or because they think it is more professional not to show it. As a veterinary professional or manager you know you need to appear enthusiastic when asking your team to promote the latest dental offer, for example. They will take their cue to be enthusiastic far more from your body language (55 per cent) than from your words and tone combined, important though these are.

But what do you get back from your team? When you ask a colleague to undertake a task, how do you know how the request has really been received and will be acted on? If they are happy to comply, they will probably nod and smile – and the smile will reach the eyes not just the mouth – and the general posture and gestures will be relaxed. However, they may not be so happy.

Some obvious signs

Firstly, there are some very obvious signs. If they exhale heavily, roll their eyes, heave their shoulders, and roll

Imagined sights

Imagined sounds

Inner feelings and emotions

Recalled sights

Recalled sounds

Self-talk or internal conversations

Figure 1. Watching someone's eyes will reveal much about what they are really thinking.

their arms outward in an exaggerated shrug, they may be about to have a good moan about how they feel put upon, but will probably do the task, even if not willingly.

If, however, they fold their arms, straighten their legs as though bracing themselves, stiffen their back and put their hands on their hips you will recognise it as an aggressive posture. As with all animals, when people want to appear dominant they make themselves look as large as possible. Cats' fur stands on end, dogs' coats bristle, and people stand with their legs braced slightly apart and elbows out. In this case they may be not only preparing to refuse to do the task, but also preparing a verbal attack, such as "Why do you always ask me to do that?" or "Can't somebody else do it just for once?"

More subtle signs

There are also some more subtle signs. The person in question may have their

upper body facing you and apparently be paying attention. However, if their lower body – and especially their feet – are pointing elsewhere, that direction may be where their thoughts lie, such as towards the door. This may mean 'I'm too busy, I've got loads of more important and urgent things to do' or 'But I'm going for my break or finishing my shift in a few minutes'. If their eyes flicker towards another piece of work or to the doorway, this may be giving you the same message.

Similarly, if a colleague is angry with you, they may nonetheless want to give the impression of harmony and paying attention. In this instance, you might notice that they are keeping their face deliberately blank and devoid of natural body language. However, their lips will be narrowed and pressed together more tightly than usual; their eyes too will be narrowed slightly and their eyebrows frowning very slightly. Be careful of this one; if they are suppressing their natural body language they are doing



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the same to their emotions, and this may explode later in a much more volatile manner than if it had been vented at the time.

Eye movement

An even more subtle indication is revealed by watching people's eyes and the direction they follow when they are thinking about something (**Figure 1**).

So, for example, you have asked a colleague to drop off a bunch of keys to a keyholder, who has not received them...

- imagined sights – up and to their right (not your right – but see below); they are visualising something imaginary such as where they might have left the keys
- recalled sights – up and to their left; they are visualising something they know, such as what they actually did with them
- imagined sounds – level and to their right; they are imagining what something would sound like; maybe composing what they will say to you
- recalled sounds – level and to their left; they are recalling something they know, such as remembering your emphasising the importance to the keyholder
- inner feelings and emotions – down and to their right; feeling guilty or apprehensive

"In a work situation, however, many people will suppress this body language because they don't wish to show their emotion, or because they think it is more professional not to show it"

- Self-talk or internal conversations – down and to their left – 'How am I going to get out of this?'

These observations may help you decide whether a person is recalling an incident or making something up. It should never be taken as infallible on its own, not least because on occasion this may be reversed left to right for left-handed people. However, taken in conjunction with other components of body language and the words and tone a person uses, it is a useful guide.

Clusters not singles

One of these components on its own – whether of eye movement, facial expression, posture or gesture – should not be taken as confirmation of a person's thoughts; but several together may give a truer indication of their feelings.

So, they may rub their nose because they have an itch; but if they also rub their collar and ear and cover their mouth while they speak, they may not be speaking the truth. Check the meaning of such clusters of gestures dependent on the context, so that if the other person does this, you could ask "Are you sure that's right?"

Mirror and lead

You can also use body language to build rapport and lead a person in a conversation. So, when taking that colleague to task over the keys, don't start off aggressively, but observe their body language. They may have a 'closed' posture (arms folded and legs crossed) as they believe that they are in for a hard time with you – or they are at least nervous; they may have a scowl or similar expression.

Mirror their body language at the start of the conversation to reflect their closed posture, then after a minute or so gradually unfold your arms. If you have built rapport with

them they will follow you and unfold their arms. Then uncross your legs and if you have maintained rapport they will uncross theirs.

You can do the same with your facial expression – gradually start to smile more and raise your eyebrows a little. Having achieved this rapport, there is a greater chance they will now be more open with you.

Be clear, these measures are not the same as 'faking it', which will usually be recognised as false – you cannot do this effectively if you are still seething inside because your body language will be at variance with your words and tone, and so will give a mixed message. Similarly smiles that switch on and off as instantly as a light bulb are quickly interpreted as insincere.

And finally, a caveat

But beware, you may also misinterpret body language if the speaker is from another culture – for instance, some cultures regard any eye contact as challenging. There are certain hand gestures that mean one thing in some countries and something else in others. Britain, America, Canada, Australia, and New Zealand share similar gesture meanings, whereas these differ between European Latin countries, the Middle East, the Far East, and Africa. ■

"You can also use body language to build rapport and lead a person in a conversation"

PPD Questions

1. How would you know when body language is being suppressed?
2. Why should you read all a person's body language rather than relying on one expression or gesture?
3. Why should you never rely absolutely on body language to interpret meaning?
4. Why is it important to act the same as you are thinking?

Answers

1. When a person's expression appears deliberately blank and their movements appear controlled or restrained
2. That one expression or gesture may be there for other reasons – folded arms alone may not show defensiveness, just that a person is cold
3. You may read too much into any one posture or gesture. It is also liable to national and cultural differences
4. Your inner thoughts and emotions are likely to leak out and show through, so if you are putting on false body language, the two will give a mixed message



Anne-Marie
Svendsen-Aylott
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Anne-Marie is an inspirational leadership coach and trainer.

Her focus is on helping businesses create a culture of change where employee motivation and happiness is in focus. All her training is grounded in research and psychology and provides in-depth skills in communication.

Anne-Marie qualified as a veterinary surgeon, has worked for many years in sales, marketing and training and now runs the company, PurpleCat Coaching.

Creating a map for success that drives happiness

Have you ever wondered how you came to be where you are today? And thought about what you could do differently to find a route to being happier? Thinking about how to create specific mental maps that drive you towards successful happiness is key.

It is common for people to focus on a goal – “I want to get promoted” – without thinking about what the benefits are on the way. The more we focus on the future, the more it takes us away from what we are currently doing and the more we are likely to forget just why we are doing what we are doing.

Finding meaningfulness

Our brains are constantly choosing what to focus on and what to dwell on, based on our internal markers. In his book *Before Happiness*, Shawn Achor refers to these markers as ‘meaning markers’. Meaning is about focusing on what makes a difference to us

– what helps us get out of bed in the mornings with a smile on our faces (**Figure 1**).

Meaning is about why we are doing something. When we find work more meaningful we have lower stress levels and blood pressure than when we don’t (Edmans A, 2012; Rath and Harter, 2010).

Meaning is a deeply personal thing and not something that comes from the place in which you work. Even menial and repetitive work can be meaningful – think of the cleaners at a hospital who are aware that their efforts are directly reducing the likelihood of severe infections

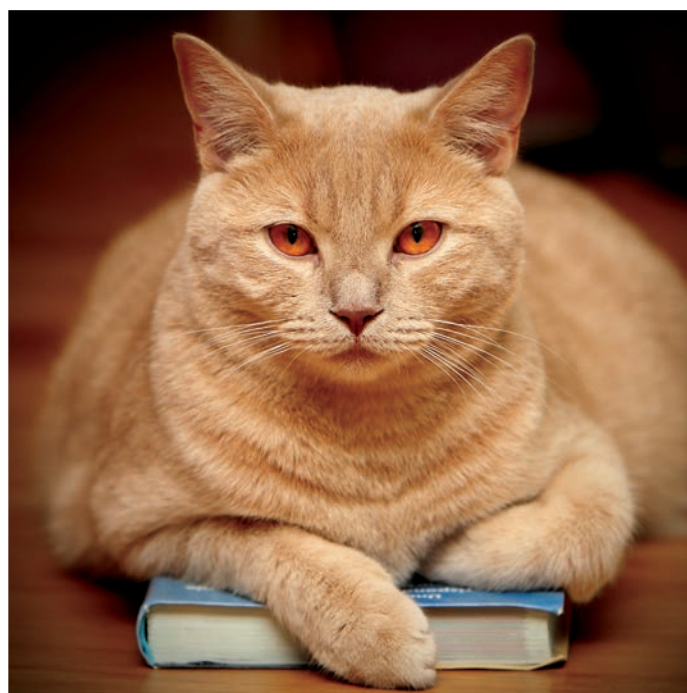
developing in the patients. By focusing on how what they do makes a huge difference to the individuals that come to the hospital, they realise the meaningfulness of their seemingly simple tasks.

In order to drive happiness, it is important to identify the right meaning markers – the ones that are the deep, positive drivers.

Definition

Meaning markers are mental signposts that stand for what you consider important and valuable and for anything with which you feel a deep emotional connection. Examples could be family, helping someone have a breakthrough, learning something new or seeing your child sleeping soundly at night.

Figure 1. What is personally meaningful to you on an everyday basis? What puts a smile on your face? (Photo: Manuel Cacciatori).



Think for a moment – what do you find most enjoyable about what you do? What puts a smile on your face during the day? What are the aspects of your routine work that you might actually enjoy – and what is it about it that has personal meaning for you? What are the skills you most want to improve?

Now think – what is missing from that list that is actually really important in your world? Also consider drawing a graph of the previous year and how you felt at the time. Add in the reasons why you might have felt happy or sad – this might give you some more points



*Suggested Personal & Professional Development (PPD)

HAPPINESS



Figure 2. By what are you being mentally hijacked? What are you focusing on that you worry about or that you mistakenly think is truly important in your life? (Photo: Reynernmedia).

for your list. Congratulations! You have found some of your meaning markers.

Now think about what you don't enjoy about work – what is the purpose of this task? How can you make it fit with some of your meaning markers?

The more positive meaning markers we find, the more likely we are to be able to find a route to finding life meaningful as well. Be aware that external meaning markers – such as progressing in your career or making more money – can accidentally derail you. Ask yourself *why* these markers are important – what it is that they will allow you to do that will put a smile on your face?

Maybe it is about learning new skills or reducing the stress levels at home. If on the other hand all you can think of are negative things – then you have been hijacked and your focus is about what you want to *avoid* rather than on what you *want*. This has the potential to lead to procrastination and negative emotions (**Figure 2**).

Once you have your positive meaning markers, it is time to reorientate your map from negative to positive. Think about something that you want to accomplish; whether it

is in your personal life or your work life. Take out a piece of paper and write down all the resources you have available that might help you – including skills, strengths and people you know with additional knowledge and skills.

Ask yourself some questions

What are your mental hijackers at work and at home? What derails you and leads you to procrastinate or do stuff other than what you need to do?

Get involved

One of the best ways to help you feel more positive about where you are and what you are doing is, paradoxically enough, to start helping others. Many people fall into the trap of looking at what they can get from their work and then become increasingly frustrated at what they view as the failure of their colleagues and their managers to give them things.

Here is an ice-cold fact of life. If you do not give at work – you won't get ahead either. Not only that – the expectation of receiving something from others sets you up for constant disappointment. Interventions encouraging participants to engage in acts of kindness have been shown to increase

well-being among both adults and children and that means that giving support to others can directly help you increase your own happiness (Buchanan and Bardi, 2010; Otake K, 2006; Akinin LB, 2012).

Start to look around – what can you do to help other people? What are the small acts of kindness and support that might make the difference? Even if it is 'just' taking the time to have proper eye contact and to truly listen to what they are actually saying – it can make a difference both to you and to them.

Focus on getting it right – rather than on what can go wrong

Consider how you view your reality. Are you always looking for – and predicting – what might go wrong? In that case, you are handicapping yourself.

When we spend time and energy mapping how to escape from the negatives in our lives rather than moving towards the positives, we dramatically lower our chances of finding opportunities. When people are in a negative mind-set, they literally see less of what is around them – their range of vision is narrower than when they are positive (Fredrickson B, 2009).

It is good to do contingency planning in case something goes wrong – but only *after* you have planned for success. That way your programme the brain to focus primarily on the positives and to stay with your positive meaning markers.

Ask yourself – how can I stop myself if I focus on the negatives? What are the kind words I can say to myself that will allow me to refocus back on the positives while still maintaining a realistic world view?

Case story

Jennifer is a lovely nurse and very popular with everyone. The only challenge is that whenever someone comes up with a suggestion, her first reaction is to focus on all the things that potentially could go wrong. Every instance quickly gets turned into how the practice and herself could be massively and negatively impacted in the future, based on her worst-case scenarios. This also drives a generally pessimistic mood and a quick temper as her anxiety flares up at every suggestion possible.

Keep checking

As we go through life, our priorities change. We start a job focusing on career advancement – maybe owning a practice – only to find some years down the line that practice ownership is taking us away from the things that we truly enjoy. This is one of the challenges for many vets. They originally decided to study to become a veterinary surgeon because they enjoy the scientific challenge and working with animals – yet now their main focus may have shifted to managing people and dealing with disgruntled clients.

Unless we take the time to revisit our maps regularly, we may not notice where the disgruntlement comes from.

Is management appropriate for what we enjoy doing? If yes, then maybe the meaning markers and the map need updating. If no, how can we change what we do? Can you make do with slightly less money if that means you have more time with your loved ones and more time to enjoy your life? Only you have the answers to these questions.

Ask yourself – where am I right now? What are my meaning markers? What is the goal I would like to reach and what is it about it that makes it personally meaningful to me? If my focus is on money – what is it that I am hoping to be able to buy? And what am I giving up to get there?

You are in control of your happiness. Only you can create meaning in your life (**Figure 3**). Even the best work and the best workplace cannot do that for you. And when you realise that you have the power to change how you interpret things around you and to focus on how what you do has personal meaning to you – even the worst workplace and the most horrible colleagues may become bearable, until you can find an alternative.

Practice and people well-being

Three of the key components to help ensure a good atmosphere and an engaged team that can effectively drive practice profits are trust, strength and warmth, with the former quality being the most important.

Trust generates improved problem-solving, and lack of trust is stated as being one of the major reasons why people choose to leave a job.

People experience trust when they know exactly what the practice stands for and where it is going. A strong vision, consistent behaviours and a management style that sets the example by demonstrating

trust in the organisation's people will actively build positivity and motivation.

The key thing about trust is that it has to be a living, breathing entity; and the vision must be one that everyone knows, to which everyone refers and that drives every decision in practice. It is

also essential to keep people informed at all times, so they have the security of knowing exactly what is going on.

People feel better when they know they are trusted because it means they know they can be honest about how they feel. ■



Figure 3. You are in charge of your own happiness. Choosing to focus on your own positive meaning markers can help you grow your own resilience and optimism. (Photo: Hartvig Kopp Delaney).



PPD questions

1. What are 'meaning markers'?
2. How do you create a list of your own meaning markers?
3. If you are constantly thinking of negative things as meaning markers – what could this be a sign of?
4. What is one of the best ways to start feeling more positive?
5. Who is in control of your happiness?

- Answers**
1. Mental signposts that focus you on what is important and valuable to you and with which you have a deep emotional connection.
 2. Write a list of what is really important to you on an everyday basis – the personal why of what puts a smile on your face. Then consider what you might have forgotten that is truly important to you.
 3. That you have been mentally 'hijacked' and started focusing on what to avoid rather than on what you want.
 4. Helping other people.
 5. You yourself.

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Recommended reading

For more detail on how to create your mental maps and how to use your meaning markers – Shawn Achor (2013). *Before Happiness: 5 actionable strategies to create a positive path to success.* Virgin Books.

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Poor communication – it has a lot to answer for

A large proportion of claims handled by the Veterinary Defence Society (VDS) are, they say, simply the consequence of poor communication between practice and client.

Mistakes are made because of poor communication between staff and it is probably fair to say that the majority of dissatisfied clients and disaffected staff are so, through poor communication of some kind. We clearly need to hone up on our communication skills – but this is easier said than done.

George Bernard Shaw said: “The single biggest problem in communication is the illusion that it has taken place.” How true. Communication may be seen simply as the act of transferring information from one person or place to another; but in reality there are a multitude of barriers in the way, particularly as our choice of communication methods expands.

The ‘message’ we are trying to convey can so easily become ‘lost in translation’, such that by the time it is received all sorts of different interpretations or meanings can be attributed. The sender of information has to formulate and encode their message in a way that enables it to be sent to the receiver. How they do this, of course, depends on the medium – e-mail, telephone, memorandum, for instance – that they use.

Once received, the message has to then be ‘decoded’ by the receiver. Hopefully the information sent remains the same when received; however, there are various pitfalls between sending and receiving that can seriously affect the understanding of the message. For example, the way it is interpreted,

the personalities involved, power relationships, hidden agendas and so on.

Ambiguity can also cause problems. So a simple statement such as, “I can do it tomorrow” can be interpreted as: “I will do it tomorrow” or “I can do it tomorrow if you want me to”.

Add to this the variety of communication channels and that people’s preferences vary in how they wish to receive communications and we can see that it’s not so easy to get the process right. For example, texting client reminders for pet vaccination or worming treatment may suit many clients – but not all. And sometimes too much communication can be as bad as too little.

Good communication with clients certainly helps the ‘bonding’ process and, in the same way, a good internal communication system helps to bond staff to the practice. Effective lines of communication in practice are vital and it’s important to choose the model that suits the particular circumstances in which your employees work and the size of the organisation.

Whatever model is chosen, everyone must understand how the system works so that the accepted lines of communication are not bypassed. For example, if information is normally passed downwards from the practice manager to the head nurse and then to the nursing team, bypassing the head nurse would leave her/him feeling undermined and possibly de-motivated, as well as causing confusion to the rest of the team.

The key to good teamwork is good communication and, as a manager, when communicating with the team it is important to be clear about who should be told, when they should be told, what they should be told and in what format/medium this should be done.

We sometimes hear comments such as, “Why don’t they do as I asked?” There are often very good answers to this especially if an e-mail has been sent assuming no response means agreement, or a meeting has been held without minutes or an agenda. Always make sure that

there is feedback from any message sent confirming receipt, understanding and agreement.

There are a number of ‘must do’s’ if communication is to have a chance of succeeding:

- check everything you write and send – spelling, tone, grammar – so that there are no mixed messages
- deliver bad news in person or, if necessary, on the phone – but not an e-mail
- don’t put off difficult conversations, they will only become more difficult
- respond rather than react to information received – so no terse replies in e-mails if you have been upset; pick up the phone instead and always make time to think through responses so as to avoid knee-jerk reactions
- don’t assume one size fits all – people have different personalities, needs and learning styles and, therefore, need to receive information in the form that best suits them. So adapt accordingly
- make sure your message is understood by asking people to respond – especially to e-mails.

Murphy’s Law states that ‘If anything can go wrong, it will’; and so it can be with communication if we don’t get it right. In a rather light-hearted article in *AU-24 Concepts for Air Force Leadership*, its authors, Pine and Bauman, quoting Murphy’s Law in the title, have created a further four laws:

- communication usually fails – except by chance
- if a message can be understood in different ways, it will be understood in just that way which does the most harm
- there is always somebody who knows better than you what you meant by your message
- the more communication there is, the more difficult it is for communication to succeed.

If we are not to succumb to the above laws in practice, we need to up our game and improve our communication techniques. ■

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www.au.af.mil/au/awc/awcgate/au-24/contents.htm



Industry Profile



Your name: Phil Sketchley
Position: Chairman
Company: Animal Medicines Training Regulatory Authority (AMTRA)

Briefly, how did you become involved with the animal health/veterinary sector?

After graduation in 1973, I worked in the human pharmaceutical sector until I moved to Leo Animal Health in 1986 – my first foray into the animal health sector and the veterinary world. In 1987, I was appointed as national sales manager for Glaxovet and I haven't look back since and have really enjoyed almost 30 years working in the industry and with the profession.

How did your career evolve?

My first role was as a human medical 'rep' – and eventually sales manager – with Leo Laboratories for whom I worked for some 13 years, promoting medicines to GPs and, latterly, to Trent teaching hospitals.

I often joke that I have only moved jobs 'voluntarily' on four occasions in 40-plus years; because, through acquisition and mergers, I have worked in sales and marketing management roles for over 10 different companies, including Pitman Moore, Coopers PM, Willows Francis, Fort Dodge (Webster's, Cyanamid and Duphar) and Centaur Services. So much so that I used to call into the office regularly just to check if the company name had changed again!

I was involved with NOAH committees in the late 1980s as chairman of the Companion Animal Committee; but it wasn't until 2001 that I took the post of CEO at NOAH, some 13 years ago. That job brought me into the world of regulations and working closer with a wide range of industry stakeholders and, of course, the veterinary professions and their respective associations.

What are the most significant changes to the veterinary professions that you have witnessed during your association with them?

When I first joined the animal health industry, 70 per cent of the market was in livestock products. Now, by contrast, over 55 per cent is in the companion animal sector, thanks to many new products that innovative companies have brought to the market. I suppose the most significant of these are the flea and worming products, NSAID analgesics and an ever-increasing range of vaccines for all species.

All of these have brought significant benefits to the veterinary profession and the welfare of the animals under its care.

One of the most challenging times for the profession and the industry as a whole was during the Competition Commissions Inquiry in the late 1990s/2000 and the subsequent Marsh

Report. At the time this seemed to send shock waves through the profession; yet, thankfully, we all survived. I recollect being asked a question – when sitting on a panel at a veterinary congress back in 2004/5 – about what I thought the impact these inquiries would have on the profession. I remember that I wasn't very popular when I said I thought we might look back and be grateful that the Inquiry had taken place because it was a 'wake-up call'. I thought I was going to be sent home without any supper!

On reflection, however, I think I might have been proved right. Since then we have seen an exponential growth in practice management and the marketing of veterinary services, together with the provision of a much broader subject base for CPD, to include management and finance as well as clinical subjects. As a result, practice turnover is now generally much less dependent on medicine sales and more income and benefit is derived from enhanced services and professional fees. So I believe this is one of the most significant and positive changes that I have seen during my career.

What do you think are the most critical issues facing veterinary professionals today; and how should they be tackled?

This could be a long list but not all necessarily with a negative impact as I feel there is a comparable list of opportunities.

A couple of years ago there were rumblings, emanating from 'Europe', over the possibility of 'decoupling' – the separation of dispensing from prescribing. This could have devastating impact on the current business models for 'UK Vet plc' because – whilst it is reducing – there is still a significant dependency for practice income to be generated from the sales of animal medicines. Encouragingly, decoupling does not appear to be in the current thinking of the Commission's draft new veterinary regulations, released in Autumn 2014. However, I feel that is no reason for complacency.

I am not saying we should decouple as I believe it would have unintended consequences on animal health and welfare, but we must remember that several member states are already decoupled and the profession in them survives and prospers; so perhaps there are some lessons we can learn from our European veterinary colleagues. No one likes change, but if it is planned and controlled gradually in 'peacetime', rather than being forced through legislation in a short time frame, then I believe it won't all necessarily be negative.

On the downside, farmers and companion animal clients will be asked to accept that professional fees have to be increased to compensate. This is worrying because we don't want animal owners to think twice before calling their vet as this may impact negatively on health and welfare.

The other issue is, of course, antimicrobial resistance (AMR). This a serious subject and we will all have to work together to minimise further development of resistance. By *all*, I mean the animal health industry, the veterinary professions and the medical profession. The Responsible Use of Medicines in Agriculture Alliance (RUMA) is holding a conference on 3 November to address some of the issues involved.

What do you think are the most critical issues affecting the pharma industry at the moment?

Very much aligned with the comments on the previous page. But the animal health industry is well versed in change and kept well briefed – through NOAH and the International Federation for Animal Health (IFAH) – on regulatory impacts and has the strategic skills to adapt and adopt accordingly.

‘Costs-to-market’ for new products is perhaps still the greatest issue; and, whilst our industry and the profession acknowledge the need for regulations, we have to make sure these are not over burdensome, such as to inhibit or discourage the development of vital new medicines and vaccines.

The Veterinary Medicines Directorate (VMD) has taken a pragmatic approach to the interpretation of the Veterinary Medicine Directives (2005) which has benefited the profession. We must remember, however, the current review of these Directives will result in a new set of European Regulations, such that in 2017/18 all member states will have a single set of Regulations, as opposed to Directives; so it is important we work together to make sure they are fit for purpose.

How do you rate the relationship between the pharma industry and veterinary practice today?

I believe it is good and continues to improve. The veterinary professions have embraced the management and marketing skills advocated by the industry and have adopted them in their practices to good effect. I know from my sales management experience that many former colleagues in industry prefer to work with practices that want to grow their business by x per cent rather than be ‘pinned down’ for an extra y per cent discount!

What could be done to improve things?

More attention, perhaps, to the point I make above with regard to working synergistically across the industry.

What would be your assessment of the current relationship between vets and agriculture as a whole?

I believe that this is a good relationship too. We have seen a huge and positive development in farm health planning and knowledge transfer between industry, vets and farmers. The same can be said for the education of pet owners.

How can those relationships be improved; and do you think that Defra is fit for purpose or actually cares any more?

My experience with Defra has been mainly through the VMD, as an executive agency of Defra. I believe that it is ‘fit for purpose’ and that it works well with the profession and the animal health industry.

I know the veterinary profession has, in the past, been concerned about the perceived indifference by Defra towards the control of endemic diseases – the belief that these are very much a farming industry problem and, therefore, its responsibility to sort out. I represented NOAH on the BVD committees with Defra several years ago, and it is encouraging now to see a more positive ‘joined up approach’ and concerted action to eradicate this disease – which is probably just as damaging to animal health as TB, if not more so in the context of productivity.

Do you think that global initiatives such as ‘One Health’ make any real difference at a grass roots level?

I think they are/it is starting to. In my role at NOAH, I was closely involved with such initiatives – both at a UK level and a European

level with IFAH. We regularly encountered a lot of finger pointing between the medical and veterinary professions about who was to blame for AMR. I think we have turned a corner now and there is a wider acceptance that it is joint responsibility for all to address and work together – the professions, industry and the regulatory bodies as well as the end users.

But I am concerned that some people have not yet grasped the seriousness of the situation and we need to continue with focused awareness communications and, more importantly, a concerted action plan to ensure all antibiotics are used responsibly.

What measures work best when it comes to increasing public awareness of problems such as antibiotic resistance and zoonoses?

This will always be a challenge; although initiatives such as EAAD (European Antibiotic Awareness) and a huge number of conferences and training on AMR are starting to have an impact. The new European Regulations contain a series of proposed measures to address AMR in the animal health sector, but I know many in the profession and in the industry are fearful that we may have restrictions placed on usage of antibiotics that are not based on science or backed up by facts.

What does AMTRA do?

The answer is in the name – Animal Medicines TRAINING and REGULATORY Authority.

In essence, we provide a framework for ensuring adequate provision of training and qualification of SQPs (Suitably Qualified Persons) followed up by ongoing CPD for maintenance of SQPs on the Register. AMTRA works under the auspices of the VMD and is appointed by the Secretary of State as regulator for the POM-VPS and NFA-VPS medicine categories. There are now over 6,000 fully qualified SQPs in the UK with nearly 1,000 working in veterinary practices, which illustrates the importance of their role in UK animal health.

Anything you would like to add yourself?!

Why do many in the profession (and indeed some of my colleagues in industry!) refer to animal medicines as ‘drugs’. I believe use of this term causes unnecessary negativity in the eyes of the public and consumers.

This concern has been illustrated in many consumer attitude surveys and I believe we could all help reduce the finger pointing regarding the veterinary use of medicines – by the media, politicians and in the eyes of those who don’t understand their importance – if we all made a conscious effort to stop the use of the ‘D’ word, especially in communications to animal owners and the public in general. I introduced a ‘swear box’ in the NOAH committee room, so if anyone said ‘drugs’ instead of ‘medicines’ they paid a fine that went towards National Pet Month!

Finally, I am delighted to have been awarded Honorary Associate Membership of the BSAVA, the NOAH Award for contributions to Animal Health and, Honorary Associateship of the RCVS. I have tried to ‘do my bit’ in bringing the animal health industry and the veterinary profession closer together and I have thoroughly enjoyed the last 30 years working with them – and will continue to do so during my retirement from a full-time post. ■



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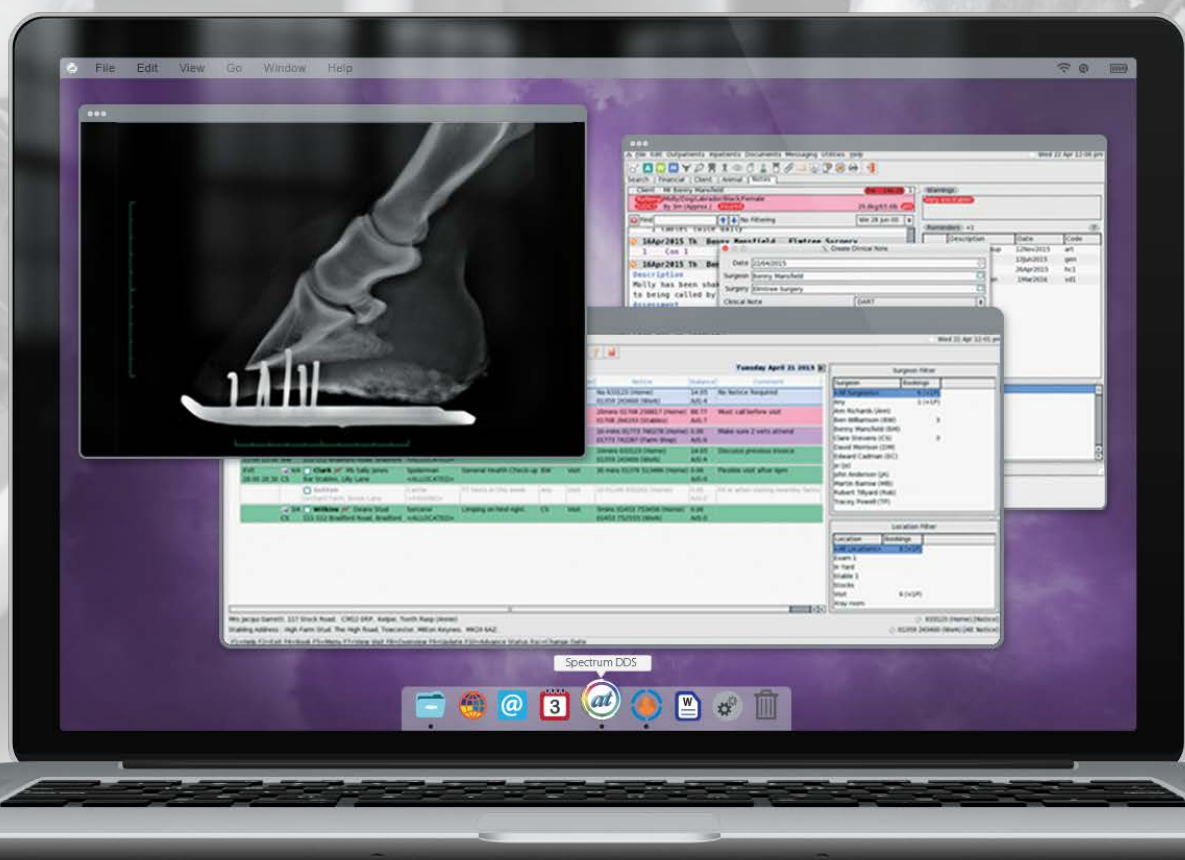
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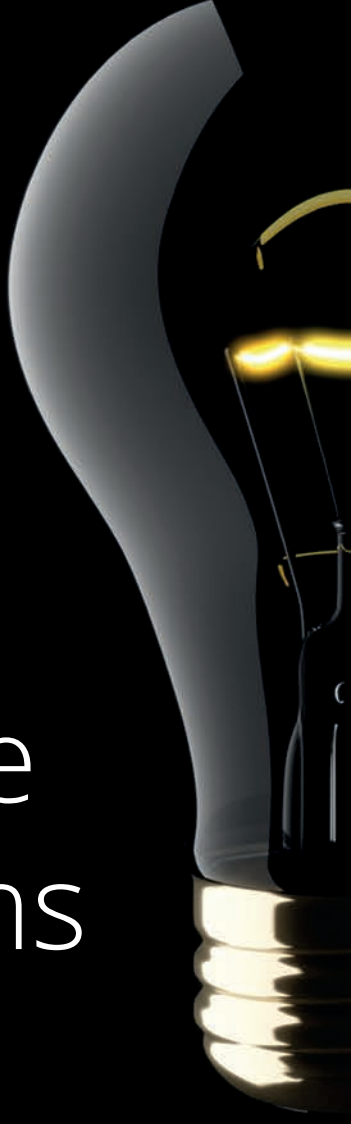
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