ONLINE EDITION
VOLUME FOUR | ISSUE ONE | JAN/FEB 2016

Veterinary PracticeToday

THE JOURNAL FOR PERSONAL & PROFESSIONAL DEVELOPMENT

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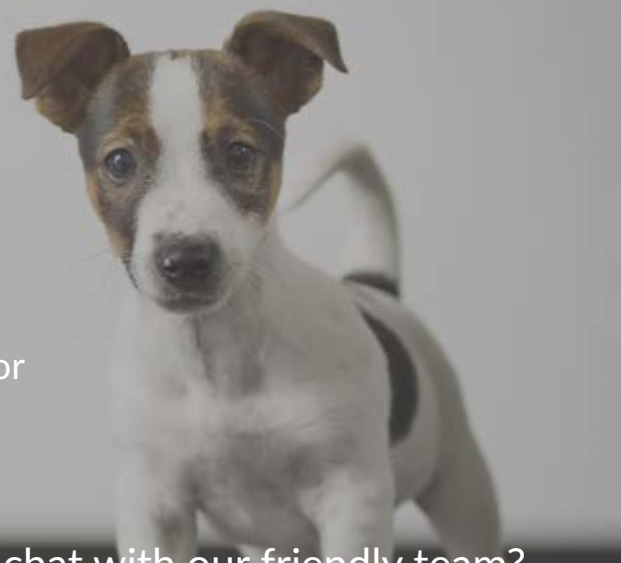

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UP FRONT...

The opening of a new year is a temptation for all editors to indulge in platitudes about fresh starts and new beginnings; to pen warm fuzzy clichés about all pulling together and seeing the glimmer of light from new dawns. But not for this one. Instead, a dose of reality.

The veterinary professions have probably never faced such profound and critical challenges as they do at this time.

The rift between their regulatory body and its members grows ever wider as the RCVS launches grandiose quixotic scheme after scheme to tackle grass roots problems that actually require unpalatable grass roots solutions, not yet more imposed standards and qualifications that divide colleagues and dilute precious, hard-earned resources.

To its credit, the reformed BVA and its affiliated associations are fighting a rearguard action against government indifference and an emasculated Defra, as animal health, welfare and self-sufficiency in food production feature less and less in the Treasury frame.

Recruitment of qualified veterinary surgeons and nurses to practice continues to prove difficult, despite the significant growth in the number of graduates emerging from yet more and more UK veterinary schools. Anomalies abound and there is much navel-gazing as to the attitude and expectations of new graduates joining a career that is also a vocation.

Stress and the well-being of the professions is being addressed by several organisations. There is, however, a particular reluctance by the RCVS and the veterinary schools to admit that the solution to these problems might just lie (at least in part) in the selection of students who have the emotional aptitudes and communication skills required for general practice.

At last year's BVA Congress, Professor Chris Proudman from the School of Veterinary Medicine, Surrey, pointed out the difficulties of educating veterinary students for a largely unknown future. "There is a need to differentiate between education and training," he said.

He described the results of a study carried out involving both academics and practice clinicians. It identified different emphases in terms of the perceived knowledge and skills required by new graduates. So, for example, practice clinicians thought that 'leadership skills' were as important as 'clinical reasoning'; and that 'breadth of knowledge' was preferable to the 'comprehensive knowledge' favoured by the academics.

Contributing from the floor, a consensus of practising veterinary surgeons emphasised that much more needed to be done in selecting and training students for the realities of veterinary practice rather than leading highly academically driven individuals into an environment in which their expectations could not be met.

David Watson
Editor

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Printed in Great Britain by Swallowtail Print Ltd, Norwich
Tel: 01603 868862 www.swallowtail.co.uk

Veterinary PracticeToday

Publisher
Published six times a year by Vision Media, a department of Central Veterinary Services Ltd.

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ISSN: 2053-440X

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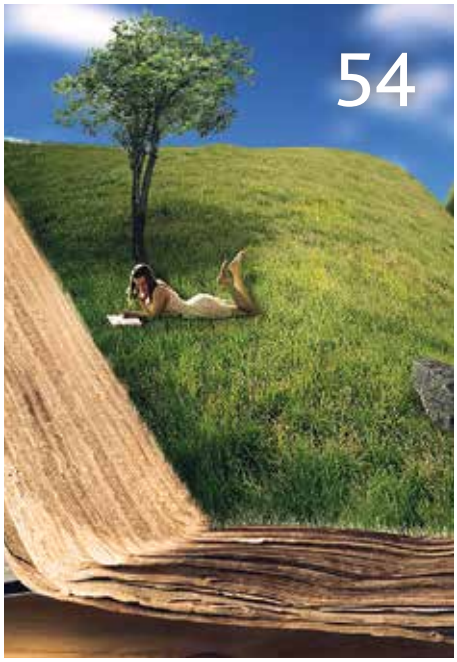

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Vocation or career?

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VOCATION OR CAREER

I write as someone who has had the good fortune of being able to enjoy both a vocation in charity work and a career in veterinary medicine. Other colleagues have not had that opportunity, and for many young veterinary graduates the realities of these two options – vocation versus career – are confronted far too late in their professional lives.

It helps to have some idea of what we are talking about. So what is the difference between a 'vocation' and a 'career' (as we are using the terms here)?

Call to alms

A vocation is, philologically, derived from the Latin 'to call'. It is something that one feels called to do for its intrinsic value. The concept is classically associated with a call (from God) to (Roman Catholic) pastoral care. But, as Max Weber pointed out, post-Reformation Christians have also used the term to relate to some non-religious careers.

Nowadays it is commonly used to describe certain professions – such as veterinary practice or human medicine – that are usually thought of as archetypal caring professions. One might claim to have a 'calling' to be a stockbroker or a 'hit man', but we would not normally think this is quite what we mean! A vocation should be something altruistic, for the benefit of others.

On the wagon

In comparison, a career is a 'path through life', derived from the Latin word for wagon. In some cases, a person's career is a sequential progression through stages of a career 'ladder' – for example through intern, resident and specialist. In others, the career can be a continuous service in one place – for example within one GP practice.

In comparison to a vocation, I am using the word 'career' to describe a job valued because of its indirect benefits to oneself. This value might be the money obtained. It might be the status of having a title or position. It might be job security or work life balance.

Skills and likes

So how is one called to a vocation?

One concept is that one's vocation is linked to one's skills – it is a (or the) role to which one is particularly suited. For some of us, this ability might be scientific proficiency (although that would call us more to being scientists); for others it might be relating to humans (in which case, other jobs such as a doctor or nurse might suggest themselves more readily). For many of us, the calling is the ability to relate to animals.

Another concept of a vocation is linked to one's preferences – a role to which one is particularly drawn. We might enjoy working with animals and people; serving our colleagues and community. These are parts of the role that can call to us, as they are valuable in themselves. But there is a subtle distinction here – preferences for certain components of a role may make it

"The key point to make about vocations and careers is that one can do both"

a vocation; whereas preferences for certain consequences of a role – such as money – may not.

So what then are the benefits and costs of a vocation as opposed to a career? I would highlight a few.

Intrinsic enjoyment

In a vocation, everything you do is intrinsically valuable. You have chosen that vocation because it is a 'good thing to do'. In some cases, even the frustrating parts of the work are enjoyable – precisely because they are valuable.

For example, working with difficult owners in a charity practice can be more challenging for the same reasons that it can be valuable – for example, when these are owners who struggle (or do not want) to look after their animals properly and we are tasked with achieving a better outcome for the animal. This does not mean that it is not annoying when an owner presents a five-day diarrhoea at midnight; but can help you to see everything as part of that wider work.

In comparison, because a 'career' is not something that you think has intrinsic value, then it is perhaps less enjoyable in itself – its value is in the enjoyable things it allows you to obtain. Indeed, you enjoy these indirect benefits outside work, but the stress during the day. This uncoupling of the enjoyment from the time when it is performed not only risks the day job being less enjoyable, but also that it is more frustrating because it is something you have to 'get through'.

Sacrifice

A flip side of a vocation can be that you have to work harder and/or for less money. If the vocation is something valuable – not because of pay, but in itself – then there is a moral reason to work harder than the pay rewards.

Indeed, part of doing valuable work has to be that one provides more value than the money itself would pay for. If you do not do more than an average replacement could, then what are you adding? If you earn as much money as you would elsewhere, then what sacrifice are you making (and how can you feel good about it)? You want to go above and beyond, because you believe in the cause. Legally, I cannot expect staff to work beyond working hours, but morally I expect to do so myself.

Veterinary surgeons are generally not paid enough for their skills and efforts. That can be a source of annoyance for those in a career – they are doing it for the money, but do not get enough (and could perhaps gain more in another role). But in a true vocation, you (hopefully) do not mind that.

Can do both

The key point to make about vocations and careers is that one can do both. One cannot do everything – life forces us to make choices. But one can choose to progress in a career that fits with one's vocation.

Indeed, in all veterinary jobs there are aspects of vocation and aspects of 'day-job'. Whatever is altruistic and intrinsically rewarding is vocational. What is indirectly beneficial to oneself is the career. I loved working in practice because I considered it a vocation – my current role, as chief veterinary officer of a charitable organisation, may be more obviously 'vocational'; but both are directly valuable work if approached in the right way (and the converse is also true).

> "Sometimes it is more about how we approach each day and each case"

> "In a vocation, everything you do is intrinsically valuable"

Many parts of our work could be either. Performing a surgery may be seen as part of a vocation (to help the animal) and/or as part of a career (to complete one's Diploma case book). Seeing an emergency overnight could be something in our contract or to fulfil RCVS rules (which will make us annoyed and resentful) or something to help animals in urgent need (which will make us enjoy it). Helping an impoverished owner or charity may be something that provides lower income (which will make us feel frustrated and 'used') or something that helps animals who need it (which will make us feel rewarded and special).

Sometimes it is more about how we approach each day and each case. Whatever one's life-choices, we can choose between vocational and career approaches every day, in every case. Each time we choose to do something for its own good, or for the good of others, then we are being called to our vocation. ■

- the three factors that have greatest influence on the choice of career path for students and graduates alike are: intellectual satisfaction; location; a supportive environment
- the reality for graduates often does not match their expectations. While 37 per cent of graduates report that their working life has lived up to expectations – and 13 per cent report it has exceeded them – half say that their working life has not met all the expectations they had when they first entered the profession
- once vets start work, their career ambitions appear to shift away from clinical practice
- the proportion of graduates wanting to work outside of clinical practice (18 per cent) is double the proportion of students who say they hope to do this (9 per cent)
- more than half of graduates (55 per cent) report that they are looking for a change in work and 10 per cent are considering leaving the profession entirely
- vets who have been qualified for five or more years are the least optimistic about the future; and they are least likely to feel that their veterinary degree has prepared them for their current work.

[Vet Futures: '*Voices from the Future of the Profession: survey of vet students and graduates*', July 2015]

Victoria Bowes
RVN Dip. RSA MIfL QTLS

Victoria is a qualified veterinary nurse with 15 years' experience in both small animal and emergency practice environments. She has been a lecturer at Warwickshire College for the past 10 years and is currently course manager for veterinary nursing.

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

**Suggested Personal & Professional Development (PPD)*

NURSING

Isolation and barrier nursing

This article discusses the importance of effective infection control in your patients that require isolation. The techniques of barrier nursing will be discussed and protocols for implementation given. One of the most important factors discussed will be the required room set-up and equipment, and also the WHO six-step hand hygiene technique. Veterinary nurses must understand the importance of infection control but also the importance of holistic individualised care required by the patient.

Isolation is a protocol put in place to ensure that contagious diseases are kept to a minimum in the hospital environment, and the infected animal is provided with the correct standard of care. One thing that we must not forget about our patients in isolation is that even though personal protective equipment (PPE) and infection protocols are in place, the psychological needs of the animal must be met.

There is a term called reverse isolation, which is when we isolate the animal from others for its immune protection. The reasons for this usually stem from diseases resulting in immunosuppression.

Aims for the isolated patient

One main aim is to try and kill the pathogenic organism. A risk for any animal suffering from a serious infection – whether it be bacterial or viral – is that it may be susceptible to a secondary infection. Protocols will be put in place to prevent this from happening. The key aim is to provide nutritional, symptomatic and clinical nursing care to the patient (Harris and Rock, 2011).

The most common diseases requiring isolation are shown in **Table 1**.

Infection transmission and control measures

Disease transmission can occur either through direct or indirect contact (Aspinall, 2006). Direct contact should not be occurring in a veterinary practice if effective isolation protocols are in place. Direct contact is when the animal physically touches the surface of another animal.

Indirect contact is the spread of the disease via fomites as discussed below. If an animal is suspected of being a carrier of a disease – or to continue to shed the disease after recovery – then client education is critical to ensure full understanding of disease control and prevention. This can be completed by the veterinary nurse during a nurse clinic appointment or at the point of discharge from the hospital environment.

Table 1. Common diseases requiring isolation

- MRSA (methicillin-resistant *Staphylococcus aureus*)
- MSSA (methicillin-susceptible *Staphylococcus aureus*)
- canine parvovirus
- infectious canine hepatitis
- leptospirosis
- canine distemper
- kennel cough
- non-specific vomiting and diarrhoea
- feline panleukopenia
- feline upper respiratory tract disease (cat flu group)
- feline infectious peritonitis (FIP)
- feline leukaemia virus (FeLV)
- feline immunodeficiency virus (FIV)
- ringworm
- *Campylobacter*
- *Salmonella*.

Glossary of terms

Isolation – the separation of an animal away from other individuals or species, preferably in a completely separate ward.

Quarantine – a period of time during which an animal, that has arrived from another place, requires complete isolation from others owing to the risk of exposure to certain diseases it may have contracted from its original home or another country.

Barrier nursing – a set of extreme infection control measures put in place to protect an animal or person from infection with a highly contagious disease.

Nosocomial infection – a hospital-acquired infection, the significance of which many pet owners have become aware of (Polton and Elwood, 2006).

Fomite – an inanimate object that can be a source of infection.

Infection may be passed between animals within the veterinary hospital in any number of ways; but they will all involve contact with infectious body fluids, such as faeces, blood, pus, vomit, saliva, urine, ocular, nasal and vaginal discharge, and wound exudates (Harris and Rock, 2011).

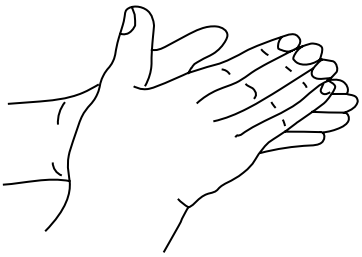
The hospital environment lends itself to transmission of infection, so staff must be vigilant and effective with their infection control methods to prevent diseases from spreading. A significant mode of transmission is via the air.

It is recommended that hospital kennels have approximately 12–14 air changes per hour. This will prevent the air from becoming stagnant and stale, and will also remove contaminated air from the isolation unit. Air changes are paramount for the implementation of effective infection control; *but* they must have adequate filtering systems and the air must be removed from the facility and not be redirected into other areas of the veterinary practice.

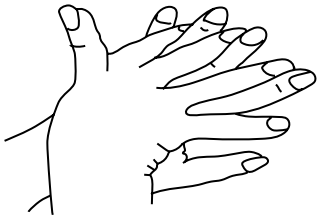
Work surfaces and sinks can be another major source of infection transmission. These should be completely cleaned after use using the correct protocol and an appropriate disinfectant, applied for the contact time designated in the manufacturer's instructions.

Animal accommodation should be cleaned using disposable equipment and an appropriate cleaning regimen. It should be cleaned first with a detergent and suitable equipment to remove all organic matter. 'Locker' type kennels should always be cleaned using the following sequence: ceiling, sides, back of kennel, floor and the front door/grill.

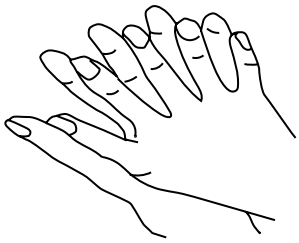
Fomites are a serious cause for concern in isolation kennels.



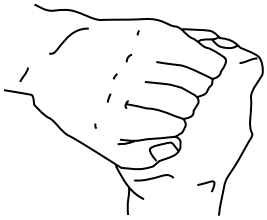
1. Palm to palm



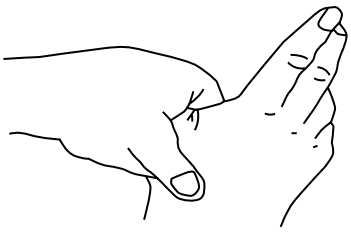
2. Right palm over left dorsum and left palm over right dorsum



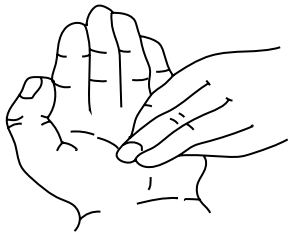
3. Palm to palm fingers interlaced



4. Backs of fingers to opposing palms with fingers interlocked



5. Rotational rubbing of right thumb clasped in left palm and vice versa



6. Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa

***Figure 1**. The basic technique for washing hands effectively.*

This is why it is recommended that kennel furnishings are either disposable or made from materials that can be sterilised appropriately. Common fomites in the isolation facility include:

- cat litter trays
- food bowls and utensils
- thermometers
- pens
- clipboards
- handling equipment
- drip stands
- clinical equipment, e.g. needles and syringes.

Siegal et al (2007) have shown that contaminated hands are a common denominator in indirect contact transmission, especially if correct hand hygiene is not used in between examining/nursing different patients. So, for instance, this could be from touching a previous patient or touching contaminated surfaces without employing effective hand hygiene methods. Thermometers, pens and stethoscopes may spread pathogens if they are not cleaned between patients.

Effective hand hygiene

Hand hygiene is one of the most influential factors in reducing the transmission of infectious agents (Siegal et al, 2007). This should be incorporated in the infection protocol within the veterinary practice. When we discuss hand hygiene, we discuss the use of both antibacterial soap and the use of alcohol-based hand gel – the techniques we apply can really affect our infection control procedures.

Hand hygiene should be carried out when we have come into contact with anything that could be considered an infectious agent and before we carry out any procedures with animals. A commonly forgotten instance is between patients within the hospital kennels.

The technique demonstrated in **Figures 1** and **2** is that recommended by the World Health Organisation.

Isolation area

The isolation area should have a separate entrance and exit from the main part of the veterinary practice and footbaths with disinfectant solutions should be placed at these entrance and exit points. Hand washing

facilities must be available inside the isolation area.

There should be an area for storage of clinical supplies and accommodation equipment; and an appropriate surface available for preparation of medication and food/water, as required. There should be enough space to enable all the necessary care and disinfection of the facilities, and separate services, such as water, drainage and waste (Harris and Rock, 2011). There should be a designated area to allow staff to put on the appropriate PPE before entering the isolation facility. Wellington boots may be supplied in addition to PPE.

Isolation and barrier nursing protocol

We isolate an animal to ensure there is a physical barrier to prevent potentially infective micro-organisms from transferring directly to other animals or via staff members.

Barrier nursing requires that the care-giver wears PPE that is disposable because when treating animals in isolation facilities the equipment needs to be worn and disposed of immediately after treating each individual.
The following is a list of required PPE for the isolation area:

- powdered latex and non-latex examination gloves in various sizes (unpowdered for staff with powder allergies)
- disposable plastic aprons
- disposable plastic shoe covers
- face masks – moulded and flexible, that attach to the back of the head
- theatre hats that keep hair tucked in
- full body biosecurity suits with hoods
- goggles
- footbaths.

Nursing care should be provided on a one-to-one basis for effective barrier nursing to be implemented – the clue is in the name, barrier nursing. If there are not the facilities for this then the nurse should leave the isolated patient until last, after the care of all the other hospitalised patients has been completed.

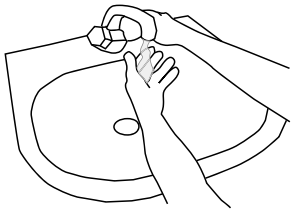
Time must be allowed to ensure that the patient's needs can be adequately met – to the same level and standard that other animals are receiving in the main hospital facility. Tender loving care will help mitigate possible adverse behavioural problems triggered by hospital stays within the isolation accommodation.

Conclusion

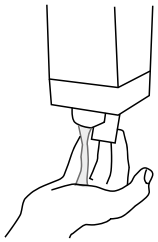
Nursing patients with infectious diseases is a fine balance between giving the patient the required nursing care and maintaining the imperative infection control procedures. Ensuring the cleanliness of the veterinary practice is a vitally important role of the veterinary nurse

***Figure 2**. The WHO recommended technique for washing hands.*

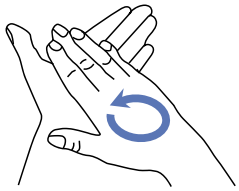
Washing your hands properly takes about as long as singing 'Happy Birthday' twice, using the images below.



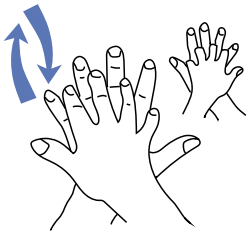
1. Wet hands with water



2. Apply enough soap to cover all hand surfaces

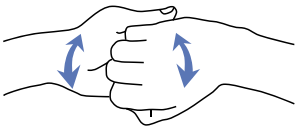


3. Rub hands palm to palm

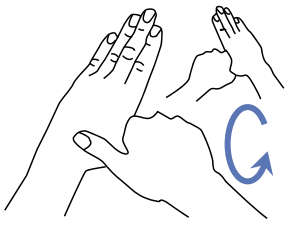


4. Right palm over left dorsum with interaced fingers and vice versa

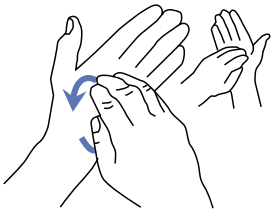
5. Palm to palm with fingers interlaced



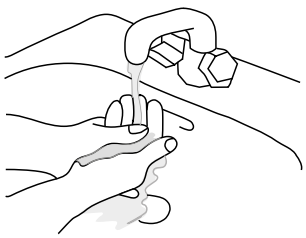
6. Backs of fingers to opposing palms with fingers interlocked



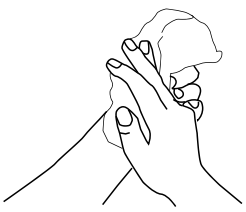
7. Rotational rubbing of left thumb clasped in right palm and vice versa



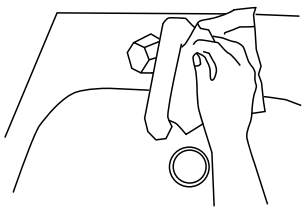
8. Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa



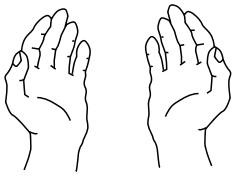
9. Rinse hands with water



10. Dry thoroughly with a single use towel



11. Use towel to turn off faucet



12. Your hands are safe

(Bowes, 2014). We must not forget that, even when requiring isolation, patients need the same amount of contact and stimulation from members of the nursing team as those on standard wards.

One important protocol is the requirement for hand washing procedures to be of a gold standard. The use of UV gels by nurses following good hand hygiene techniques within the clinical area will emphasise the veterinary practice policy on hand hygiene. ■

Gloves will be changed before commencing clinical treatment. Also they would be changed between patients.

PPD Questions

1. The definition of isolation is:
   - A. the complete separation from other animals
   - B. a period of time when an animal is completely isolated from other animals and barrier nursing is in place
   - C. an extreme set of infection control procedures
   - D. an inanimate object that can be a source of contamination

2. A common clinical occurrence requiring isolation is:
   - A. kidney disease
   - B. vomiting and diarrhoea
   - C. flea infestation
   - D. pyoderma

3. What are the recommended air changes per hour in a veterinary hospital?
   - A. 4-6
   - B. 6-10
   - C. 10-12
   - D. 12-14

4. The correct method of cleaning a cage is:
   - A. sides, roof, floor, door
   - B. roof, sides, floor, door
   - C. floor, sides, roof, door
   - D. roof, door, floor, sides

5. The definition of a fomite is:
   - A. a paratenic host
   - B. an inanimate object that can be a source of contamination
   - C. an organic object that can be a source of contamination
   - D. a parasite that can spread infection

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

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Nurse-led clinics in the management of feline chronic kidney disease

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Alice graduated from Hartpury College having gained a BSc(Hons) in Veterinary Nursing Science. She initially spent time working in a mixed first-opinion practice in Bristol. In April 2011, Alice moved to join the nursing team at Langford Veterinary Services. At first she worked in all areas of the hospital, but found her real passion lay with feline medicine; so she now works as a core feline nurse within the Feline Centre and has completed the 'ISFM Certificate in Feline Friendly Nursing', achieving a distinction.

*Suggested Personal & Professional Development (PPD)

RENAL DISEASE

Following the initial diagnosis of a chronic condition, patients will often require follow-up treatment and support to help manage their illness. A veterinary nurse-led monitoring clinic is a great way to support such cases and allows staff to assist in the long-term control of chronic conditions, such as feline chronic kidney disease. Management of these cases by both the veterinary surgeon and a nurse can provide a number of benefits.

Feline chronic kidney disease (CKD) is a condition commonly diagnosed in veterinary practice and, as such, lends itself to veterinary nurse involvement through the medium of a monitoring clinic. CKD patients will require regular visits to the practice to follow their disease progression and to ensure that owners are correctly implementing the necessary treatment – and or – management protocols within the home.

A CKD monitoring clinic allows nurses to help manage these cases through regular contact with both patient and owner and provides helpful advice and practical tips for use within the home, tailored around the patient's prescribed management.

In order to perform a smooth-running clinic, well-structured, appropriate information should be gathered and used to guide the consultation.

In the case of CKD it is vital to ensure that you first have a good understanding of chronic kidney disease and how it effects the cat. Then it is important to carry out a clinical examination of the patient with consideration of relevant findings, such as hydration status and weight.

It is useful to perform blood pressure (BP) measurements, to consider what additional urinalysis and blood tests are relevant and, in conjunction with the case veterinary surgeon, appraise the level of treatment. Suitable advice can then be provided to the client on how best to medicate the patient and introduce new diets, where necessary.

Finally, the provision of good literature and direction to online information will aid in client compliance and understanding.

What do the kidneys do?

Healthy kidneys are vital for normal bodily function and have many important roles including:

- excretion of waste products – urea and creatinine via urine, for example
- regulation of normal body water content
- regulation in the levels of sodium, potassium, calcium and phosphate
- regulation of body acidity levels
- production and activation of vital hormones – erythropoietin, for instance, the hormone that stimulates the production of red blood cells from bone marrow.

What is kidney disease?

Feline kidney disease is said to be one of the top five significant conditions of the senior cat and describes a slow, progressive irreversible deterioration of renal function. Its cause can be considered under two main categories – congenital or acquired. Polycystic kidney disease is a congenital form, typically seen in Persian cats; whereas acquired conditions may be caused by trauma, toxins, cancers, inflammatory conditions or bacterial/viral infections.

Presentation of kidney disease can be sub-divided into two forms – acute and chronic.

***Figure 1**. Blood tests facilitate a more accurate assessment of the severity of kidney disease.*

IRIS stage	Creatinine concentration (µmol/L)	Comments
I (non-azotaemic)	<140 (within reference)	Some other renal abnormality present (e.g. inadequate concentrating ability; abnormal renal palpation)
II (mild CKD)	140-250	Clinical signs usually mild (e.g. PU/PD) or may be absent
III (moderate CKD)	251-439	Many extrarenal clinical signs may be present
IV (severe CKD)	>440	Increasing risk of systemic clinical signs and uraemic crisis

Table 1. IRIS* staging for chronic kidney disease

* Source: www.iris-kidney.com

Acute renal disease describes a sudden loss of kidney function; whereas chronic kidney disease is considered a progressive condition that has been present for at least two weeks.

Early signs of CKD are very subtle and the disease may not be detected until it has become advanced. A reduction in urine specific gravity (<1.035) is an early indicator of CKD, suggesting the kidneys are unable to conserve water. However, even this clinical assessment may only be made when the kidneys have already lost 65 per cent of their functioning mass.

Clinical signs of CKD may include polyuria, polydipsia, weight loss, reduced appetite, poor coat, vomiting, lethargy, dehydration, systemic hypertension, anaemia and behavioural changes. The condition is irreversible because nephron regeneration cannot occur; however, with appropriate management long periods of good quality life can be achieved.

How is chronic kidney disease diagnosed?

Diagnosis is best achieved via blood (**Figure 1**) and urine testing and initial assessments are usually carried out by the consulting veterinary surgeon. It is a good idea, however, for the nurse to become aware of the cat's baseline results at this stage and have an understanding of their meaning to aid in the follow-up at the monitoring clinic.

Azotaemia will invariably be a finding in the blood results of a CKD patient, which is the term used to describe the high levels of urea and creatinine demonstrating the kidneys inability to excrete waste products efficiently. Alongside these changes, increased phosphate and calcium levels may also be noted.

Hyperphosphataemia occurs in cats suffering from CKD because the kidneys are no longer fully able to control the amount of phosphate that is absorbed and excreted from the body. This can put them at great risk of developing renal secondary hyperparathyroidism. Hypokalaemia may also be evident, as well as signs of non-regenerative anaemia.

It is important to remember that cats suffering from chronic renal disease are often dehydrated, which worsens their azotaemia to such a degree that it may be essential to rehydrate the patient prior to blood testing in order to allow a more accurate assessment of the severity of the kidney disease.

IRIS staging

IRIS refers to the International Renal Interest Society which was created to advance the scientific understanding of kidney disease in small animals. Its primary objective was to establish an internationally recognised set of guidelines on the diagnosis and treatment of renal disease (**Table 1**).

Staging of chronic kidney disease is undertaken following initial diagnosis in order to facilitate appropriate treatment and monitoring of the patient. It is based initially on fasting blood creatinine levels and is then sub-staged based on proteinuria and systemic blood pressure. By using the IRIS staging we can understand the severity of the kidney disease and use it to tailor the monitoring clinic appropriately.

***Figure 2**. Urine testing is an important tool in the diagnosis and management of chronic kidney disease.*

Urine assessment

Urine testing is also an important tool in the diagnosis and management of chronic kidney disease (**Figure 2**). Client contact with the nurse via monitoring clinics will allow methods of urine collection to be explained and then for the sample to be examined. The use of a refractometer will allow urine specific gravity to be observed.

Cats suffering with CKD will produce less concentrated urine showing a decrease in specific gravity (<1.035). Dipstick testing is also useful for the detection of urinary tract infections which, if evident, should be addressed and treated appropriately according to veterinary advice. It is important to remember that urine dipsticks are not always a good indicator of accurate protein levels and, therefore, it may be advisable to carry out a urine protein:creatinine (UPC) ratio too.

In general, most proteins are too large to pass through the kidney filters into the urine. However, in the case of kidney disease, the glomeruli are damaged which causes leaks to occur. A UPC of >0.4 is said to be proteinuric and that <0.2 is non-proteinuric. It is important to remember that high blood pressure can contribute to proteinuria owing to the increased pressure within the kidneys, so management of hypertension is essential.

Figure 3. *Hypertension is often noted in cats suffering from kidney disease and it is essential to ensure this is assessed accurately and consistently as part of the monitoring clinic. This can be achieved during the consultation, provided the cat is relaxed enough.*

Figures 4 & 5*. Subcutaneous fluid administration may be required to increase hydration. In selected cases, it is possible to teach owners how best to do this at home.*

Blood pressure

Hypertension is often noted in cats suffering from kidney disease and it is essential to ensure this is assessed accurately and consistently as part of the monitoring clinic (**Figure 3**).

A good technique should be adopted and consideration should be made regarding the cats' anxiety levels – the 'white coat effect' versus true hypertension. It is good practice to perform the BP reading early on during the consultation before the cat has been handled.

In some cases, it may be necessary to hospitalise the cat for the day to gather several readings to confirm a true hypertensive result. Blood pressure readings of <150mmHg suggest minimal or no risk of organ damage, 160-179mmHg indicate moderate risk, and >180mmHg indicate severe risk of organ damage. When consistent hypertension is noted, consultation with the case veterinary surgeon will be required to determine whether the use of antihypertensive medication is necessary.

Clinical examination

The initial clinical examination is likely to be led by the veterinary surgeon. It is a good idea, however, to adopt the habit of performing a basic assessment of your patients every time they return for a monitoring check-up. As veterinary nurses, we can consider where best our observation and advice is deployed in relation to the cat's condition. For example, because hydration status and weight can both be affected by CKD, these are two aspects we can pick up on and offer advice to clients regarding methods to provide increased water and calorie intake.

Management

Correct management of CKD is paramount and will involve supportive treatment to slow the progression of disease. These measures can be tailored accordingly, depending on the stage of the CKD, and may address the following: diet, the prevention of dehydration, potassium supplements and phosphate binders, anti-hypertensive drugs, treatment for anaemia (if indicated) and anti-emetic, where required.

The nurse-led monitoring clinic will facilitate support for both patient and client by providing practical advice on how best to implement treatment plans.

Hydration

Hydration is one of the most important aspects of CKD management. Offer advice on ways in which to increase oral water intake by means of water fountains, increased availability, optimal location of the water source and attention to the type of bowl.

Feeding a 'wet' diet is invaluable and adding water to any pre-existing diet will also help compliance. Also suggest pouring on small quantities of broth from cooked chicken or fish to improve palatability.

Despite these measures, for some cats, subcutaneous fluid administration may be required to increase hydration. In selected cases, it is possible to teach owners how best to do this at home but they should be chosen carefully and have the risks explained to them (**Figures 4** and **5**).

Diet

Specialist renal diets are appropriate for IRIS stage II and upwards. In these cases, it is important to advise owners on why appropriate dietary management is needed to help reduce phosphate and sodium, and increase potassium and calorie intake.

This is also an opportunity to advise owners on how best to introduce a new diet – for example by increasing palatability via warming, trying 'wet' and 'dry' types (including different 'brands'), and ensuring appropriate location of the 'feeding station' at home.

Medication

It is vital at the outset to point out to clients that treatment (prescribed by the veterinary surgeon) for CKD will not reverse the condition but only manage the complications of the disease.

Phosphate binders may be applicable when dietary change is not accepted or where further reduction of phosphate is required.

Antihypertensive medication may be required to lower blood pressure and appetite stimulant/anti-emetic may be necessary to improve the appetite.

Always provide owners with practical advice on how best to medicate their cat through the use of appropriate handling, tablet 'poppers', gelatine capsules to allow administration of multiple medications in one go and the use of commercial 'treat sticks' in which to hide tablets.

Owner compliance

Provide owners with up-to-date literature on CKD, create 'in house' record log books for owners to bring to their appointments to help review progress at home, provide regular contact via reminders and telephone calls to ensure better compliance and, therefore, better long-term management of cases.

Summary

Implementation of nurse-led monitoring clinics within the veterinary practice environment is a great way to provide both patients and clients with essential support during the management of a chronic disease. It also offers an opportunity for veterinary nurses to further expand their knowledge and experience.

By providing clients with much-needed practical advice – in cases of feline chronic kidney disease, for example – it is to be hoped that long-term management of patients within the home environment can be vastly improved. ■

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PPD Questions

1. Describe the function of the healthy kidney and how this is altered when chronic kidney disease is evident
2. Describe IRIS staging
3. What blood pressure reading would suggest a severe risk of organ damage?
4. Which supportive methods may be used to slow the progression of CKD?

Answers

1. The healthy kidney is used for the excretion of waste products (e.g. urea and creatinine via urine); to regulate normal body water content and levels of sodium, potassium, calcium and phosphate; to regulate body acidity levels; and, finally, for the production and activation of vital hormones (e.g. erythropoietin – the hormone that stimulates the production of red blood cells from the bone marrow). Chronic kidney disease causes an alteration in the normal functioning of the kidney, which can result in azotaemia, hyperphosphataemia, hypokalaemia and for some anaemia
2. IRIS refers to the International Renal Interest Society which was created to advance the scientific understanding of kidney disease in small animals. Its primary objective was to establish an internationally-recognised set of guidelines on the diagnosis and treatment of renal disease. Staging of chronic kidney disease is undertaken, following initial diagnosis, in order to facilitate appropriate treatment and monitoring of the patient. It is based initially on fasting blood creatinine levels and is then sub-staged based on proteinuria and systemic blood pressure
3. >180mmHg
4. Dietary change, the prevention of dehydration, potassium supplements and phosphate binders, anti-hypertensive drugs, treatment for anaemia (if indicated) and anti-emetic, where required

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AT VETERINARY SYSTEMS

Ivan Crotaz
BVetMed MRCVS

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

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

**Suggested Personal & Professional Development (PPD)*

RABBIT DISEASE

Treating the older rabbit

Standards of care are increasing in rabbits now to the point where many will live for 10 years – and sometimes longer. Vets will increasingly find older rabbits being presented with a range of problems, many of which can be successfully managed.

Treating the older rabbit is not all bad news. Although they are more prone to organ failure and neoplasia, tooth growth rates are reduced such that previously difficult-to-manage dental conditions become easier. Fibrous tissue produced to wall off infections is often well established and very effective by this age as well, making some infections easier to manage than in young animals.

There is a series of points to consider when treating older rabbits.

Check husbandry and history

Correct husbandry is always important in rabbits, but never more so than in elderly patients. The high prevalence of subclinical disease and immunosuppression means that even minor husbandry errors will contribute to increased mortality. Small improvements in husbandry can have significant effects on outcome.

Normally, rabbits should be fed a diet consisting mainly of hay and grass, with supplements of a good quality extruded pellet food and fresh leafy green vegetables. However, rabbits with chronic dental disease will often have missing molars or entire molar arcades. The pellet ration may need to be increased and hay presented in different ways – feeding chopped hay, or higher quality hay mixed with freeze dried grass or dried herb leaves may result in a higher fibre intake.

Dietary components should be adjusted on the basis of bodyweight/condition and the appearance of any caecotrophs. Rabbits fed on an insufficiently fibrous diet will have large sticky caecotrophs frequently smeared around the tail base. Be aware that conditions resulting in insufficient grooming (such as spinal pain) can also do this.

Older rabbits are likely to have subclinical or clinical upper or lower respiratory infections and degenerative joint diseases. Housing needs to be well insulated and sufficiently well ventilated to maintain dry, ammonia-free conditions. Older rabbits can still be very resistant to cold weather if well sheltered and fed on a high fibre diet.

Rabbits will 'litter train' rapidly – the use of a litter tray does keep living areas more hygienic. Exercise should be encouraged; although entrances should be adapted for arthritic rabbits that may need shallow angled ramps rather than steep ramps or steps.

Careful clinical examination

Careful clinical examination is essential, covering all body systems. Special attention should be paid to the teeth, looking for malocclusion, gingivitis, hypersalivation, missing teeth or pain. Root elongation is commonly found as part of the spectrum of dental disease in rabbits.

Careful palpation of the maxilla and mandible – comparing one side against the other – can often identify sites of dental disease. Bony swelling may not represent an active lesion; but when both swelling and pain are identified, clinically significant dental disease is likely.

Although dental disease is a common cause of anorexia and weight loss in elderly rabbits, it is obviously not the only cause. If otoscopic examinations and external examination of the head of a sick rabbit are unremarkable, further

***Figure 1**. Uterine adenocarcinoma in a 5-year-old female rabbit – adenocarcinomas might be a cause of chronic abdominal pain.*

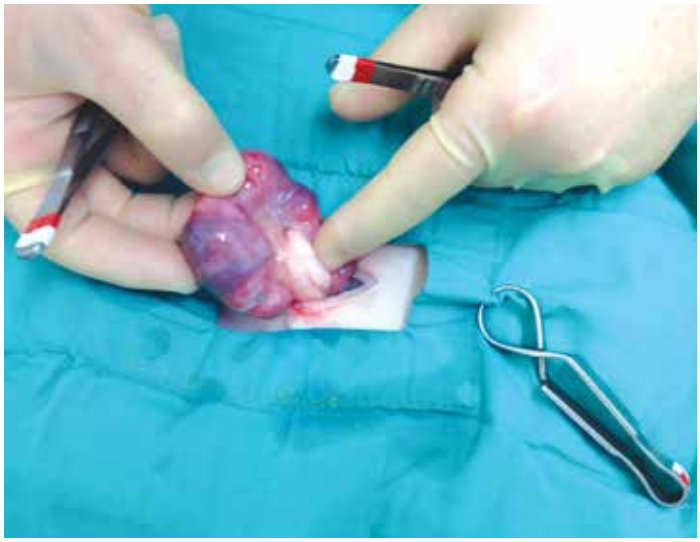

***Figure 2**. Slightly oblique lateral skull radiograph.*

***Figure 3**. Lateral skull view showing incisor malocclusion – molar occlusion appears to be normal at this time and there is a wider than normal radiolucent area at the apex of the mandibular incisor.*

work-up is recommended before anaesthetising the patient for a 'dental'. Renal and hepatic diseases are commonly reported in rabbits – an inappropriate anaesthetic might be very dangerous in these cases.

Great attention should be paid to any pain response during examination – the rabbit may jump or twitch, or behave differently when one part of a structure is palpated. It is especially useful when examining the head to palpate each side of the head at once, making any pathology more obvious. Chronic pain from disease results in many of the observed clinical signs in dental disease, uterine neoplasia and other diseases of older rabbits.

Uterine adenocarcinoma is a very common disease in middle-aged and older female rabbits (**Figure 1**). The incidence has been reported as 4.2 per cent at two to three years of age, rising to 79.1 per cent in five- to six-year-old rabbits (Asakawa et al, 2009). Adenocarcinomas tend to grow slowly and metastasise late in development.

Clinical signs in the early stages can be vague and non-specific – such as episodes of ileus – presumably arising from abdominal pain. Later signs include weight loss and haematuria. Surgical excision is often curative, provided the mass is removed before metastasis. The mass can sometimes be palpated during abdominal examination.

Further investigation

Blood sampling rabbits is relatively easy, especially if the patient is 'towel wrapped'. The jugular vein is the easiest vessel from which to obtain samples – the cephalic vein and lateral ear veins can be used, although they are more difficult to access.

EMLA cream (Astra Zeneca UK) applied to the clipped venepuncture site 30-45 minutes prior to sampling can be helpful to prevent pain and ease handling. The dewlap and free subcutaneous fat often needs to be gently pushed sideways to expose the vein in the jugular canal.

Be careful not to hyper-extend the rabbit's neck during the procedure. Rabbits with upper respiratory diseases may struggle to breathe during jugular sampling, so oxygen supplementation can be useful as well as using alternative sites, or taking only a minimal blood volume. Taking up to one per cent of the rabbit's bodyweight of blood is considered safe (Ramer et al, 1999).

Rabbit blood clots rapidly; although this does not normally cause problems as long as blood tubes are filled rapidly and gently mixed as soon as they are filled.

Urinalysis can be very rewarding from a clinical point of view. Calcium carbonate sediment may be a normal finding in rabbits, and is generally found to be a fine white precipitate that readily re-suspends into the sample on shaking. Thicker sludgy precipitates associated with clinical signs of urinary disease should be investigated further.

Urine specific gravity can vary between 1.003-1.036 and the pH is alkaline at 8-8.2 (Harcourt-Brown, 2002). The colour of normal rabbit urine may vary between pale yellow or white, through to deep brown and red. This variation is invariably the result of the urinary excretion of pigments of plant origin. Commercial dipstick tests readily distinguish between natural urine colour and haematuria.

Gentle bladder massage and expression onto a clean surface is the easiest way to obtain urine samples. Urine culture can be of value. However, sterile collection via cystocentesis (if necessary) should be done while the rabbit is under anaesthesia – the risk of iatrogenic intestinal trauma is very significant.

Imaging

Radiography is an extremely useful diagnostic modality in rabbits. Some radiographs can be taken without sedation, but head views will almost always need some kind of chemical restraint (see *Veterinary Practice Today* **3**(6): 12-15 [Nov/Dec 2015] for some suggested doses).

Skull radiographs are indicated for any cases of recurrent dacrocystitis or epiphora, facial abscesses or recurrent tooth malocclusion (**Figure 2**). The author finds a left and right slightly oblique lateral view most useful to assess dental disease. This slightly separates the molar arcade which aids assessment of the dental anatomy.

Straight dorsoventral views are also useful. The head needs to be extended in order to obtain a straight view, and wedging a pad of soft material between the incisors will part the molar arcades if a detailed assessment of the occlusal surfaces is needed.

***Figure 4**. Lateral spinal radiograph showing extensive vertebral spondylosis – spinal pain or arthritis are common causes of ileus, issues with caecotrophy and perineal scalding in older rabbits.*

The alveolar bone should be assessed. A small radiolucent halo is normally present at the apex of each tooth, where the germinal tooth tissue lies. This radiolucent area is generally larger in young rabbits. Large radiolucent areas or generalised loss of bone density around the tooth apex may indicate dental disease or infection.

Figure 3 shows a suspiciously enlarged radiolucent area around the apex of the mandibular incisor. In the healthy rabbit, the ventral border of the mandible should be thick and smooth with no areas of new bone formation. There should be no penetration of this layer by the tooth roots, and tympanic bullae should be assessed for signs of thickening that might indicate deep ear infections.

High-quality radiographs are needed to accurately assess abdominal contents. The radiographic appearance of the abdomen varies throughout the day as the colon and caecum fill and empty. Small gas bubbles in the intestines may be normal, but these would not usually coalesce into large areas of gas and would not normally distend the intestinal outlines – large accumulations and intestinal distension are associated with serious pathology.

Small amounts of radio-opaque material in the bladder can be a normal finding. Kidneys should be about 1.25 to 1.75 times the length of the L2 vertebra (Hinton and Gibbs, 1982). The uterus should not normally be visible; if it is, then uterine adenocarcinoma should be suspected.

Some specific points

Upper and lower respiratory diseases are common in older rabbits and many of these present as chronic episodic diseases. Infections can spread via the Eustachian tubes to the inner ear, and involve the pharynx, oral cavity and sinuses – an assessment of the whole head is required.

It is important to realise that the bacterial flora involved in these infections may change over time and antibiotic choice can be guided by cytology smears or culture and sensitivity testing. Sedation is usually required in order to take deep nasal swab samples, but the risk of sedation needs to be assessed carefully in these obligate nasal-breathing patients.

Upper respiratory disease is not always going to be caused by a simple bacterial infection. Nasal foreign bodies, periapical dental abscesses and abscesses arising from fractured or retained tooth roots are all possible factors. Careful examination and imaging can be very helpful to identify underlying causes. Remember the influence of environmental factors too; so improving air quality can make a big difference to clinical outcomes.

In a similar way, not all lower respiratory diseases are related to pneumonia. Neoplasia (especially lymphoma), cardiac disease and pleural effusion are all diseases that are seen in older rabbits, so thoracic radiographs are very helpful to aid differentiation of these conditions.

Renal disease is a common differential diagnosis in older rabbits. Typically these patients present with weight loss – with or without anorexia – and no evidence of dental disease or pain. Treatment mainly involves identifying and resolving various factors, such as *Encephalitozoon cuniculi* infections, bacterial infections and urolithiasis. There are no consistently successful treatments for the underlying renal disease itself at this point, although intravenous fluid therapy is useful to assist initial stabilisation.

Surgical treatment of dental disease is not always necessary in older rabbits. Spurs causing soft tissue ulceration still need to be removed – but these are much less common in old rabbits owing to the low tooth growth rates at this age. Root disease is often very effectively managed with long-term analgesia.

If tissue damage is not identified and root pain without abscess formation appears to be the main presenting problem, it is sensible to assess the response to analgesia before deciding to operate. Older rabbits can do very well on long-term analgesia for many years even with very significant dental pathology.

Pain management

This is the single factor that will make the most difference when treating chronic disease. Dental disease, upper respiratory infections, pneumonia, degenerative joint diseases, spondylosis (**Figure 4**) and urinary tract diseases all result in chronic pain. Rabbits are prey animals and show few clinical signs of pain.

Non-steroidal anti-inflammatory drugs (NSAIDs) are commonly used in rabbits (see *Veterinary Practice Today* **3**(6): 12-15 [Nov/Dec 2015] for doses). In the author's experience, significant side effects are rare, but gastric ulceration is found in rabbits (Lord, 2012). Rabbits cannot vomit, so ulceration is difficult to diagnose and weight loss and anorexia are the most likely

clinical signs. Meloxicam oral preparations are palatable and well accepted by rabbits.

Treatment success can be tracked by weight gain – normally, measurable weight gain is seen within five to seven days of pain resolution. There is little published evidence on safe duration of use, but anecdotal reports support appropriate long-term use of NSAIDs in rabbits.

Summary

Management of the older rabbit is best achieved by the diagnosis of the underlying disease and any other complicating conditions. Much of this can be done in the consulting room through a careful physical examination, combined with some simple diagnostic tests. ■

PPD Questions

1. Which of the following might be a cause of uneaten caecotrophs accumulating around the tail base and perineum?
   A. incisor malocclusion
   B. inadequate dietary fibre levels
   C. pinal pain
   D. all of the above

2. Which of the following clinical findings is unlikely to be a factor involved in disease of the urinary tract?
   A. polyuria and polydipsia
   B. fine white urinary sediment that readily re-suspends in urine
   C. weight loss
   D. haematuria

3. Which of the following clinical findings might indicate underlying dental pathology?
   A. chronic upper respiratory infections
   B. weight loss
   C. reduced hay intake
   D. bony swelling on the ventral border of the mandible
   E. all of the above

4. Which one or more of the following differential diagnoses should be considered for a rabbit with an increased respiratory rate and effort, no upper respiratory changes and a normal heart rate?
   A. sinusitis
   B. pneumonia
   C. space-occupying thoracic lesion
   D. pleural effusion

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

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Jane Ellison
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.

*Suggested Personal & Professional Development (PPD)

POISONS

Possible poisonings of unknown origin – an approach

One of the commonest enquiries to the Veterinary Poisons Information Service (VPIS) is, apocryphally:

"*I have a dog who was found fitting by the owners. He is young, and has no prior history of epilepsy. He has access to the garden and had been completely normal two hours before. The fits are resistant to diazepam...*"

The unknown exposure is clearly a challenge and we realise that our input is part of the differential diagnosis process. In our story, the dog could have epilepsy or some disease process with which, frankly, we can't help. On questioning, we learn that our dog is also hot and unresponsive. The fitting has improved with the administration of diazepam, but the amounts given threaten his respiration. On examination, the dog had clearly vomited recently.

We have access to our database of more than 200,000 cases which gives us a robust and powerful tool for searching not only by agent, but also by species and clinical effects. The number of significant 'diagnostic' clinical effects is limited when compared with the vast number of 'agents' that could cause poisoning and, therefore, an approach that we can use is looking for syndromes or 'toxidromes'. This relies on the looking for clusters of effects that point to, not necessarily a particular agent, but a class of agent.

An early example in human medicine is the 'Mad Hatter' syndrome – irritability, low self-confidence, depression, apathy, shyness or erethism. This was, it later transpired, caused by exposure to mercury vapour in the making of felt. Not a risk that many animals have; indeed, mercury exposure is (in most developed countries) closely controlled and subject to environmental controls. However, the confluence of clinical signs and other circumstantial evidence can help pinpoint a toxicological cause.

Toxidromes

Table 1 outlines toxidromes by vital signs – an approach to a patient with an unknown overdose, derived from Ericsson TB et al (2007).

The table looks at an approach from a human point of view and, as a veterinary professional, one needs to be careful to understand species differences and the potential of other confounding factors – possible other agents involved, other disease states, age, time course and so on.

One specific veterinary example is that in humans and dogs, opioids will cause constricted, even pinpoint, pupils, but this is not the case in cats.

Figure 1. *Human toxidrome flow chart.*

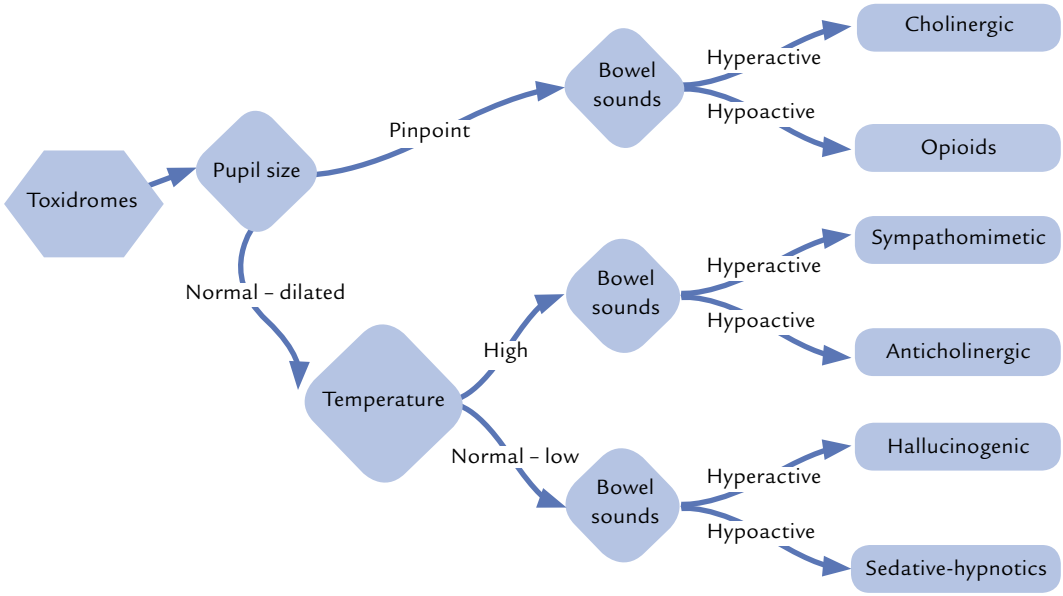

Table 1. Toxidromes by vital signs (Ericsson TB et al, 2007)

(PACED)	Propranolol/beta-blockers, poppies (opiates), propoxyphene, physostigmine Anticholinesterases, antiarrhythmics Clonidine, calcium channel blockers Ethanol or other alcohols Digoxin, digitalis
Tachycardia (FAST)	Free base or other cocaine forms Anticholinergics, antihistamine, antipsychotic, amphetamines Sympathomimentics, solvents, strychnine Theophylline, tricyclic antidepressants, thyroid hormones
Hypothermia (COOLS)	Carbon monoxide Opioids Oral hypoglycemics and insulin (unlikely unless iatrogenic) Liquor (alcohol) Sedative-hypnotics
Hyperthermia (NASA)	Neuroleptic malignant syndrome, nicotine Antihistamine, alcohol withdrawal Salicylates, sympathomimetics, serotonin syndrome Anticholinergics, antidepressants, antipsychotics
Hypotension (CRASH)	Clonidine, calcium channel blockers Rodenticides (has arsenic, cyanide) Antidepressants, aminophylline, antihypertensives Sedative-hypnotics Heroin or other opiate
Hypertension (CT SCAN)	Cocaine Thyroid supplements Sympathomimetics Caffeine Anticholinergics, amphetamines Nicotine
Tachypnea (PANT)	PCP (phencyclidine (uncommon in UK), pneumonitis (chemical), phosgene ASA (acetyl salicylic acid) and other salicylates Noncardiogenic pulmonary edema, nerve agents Toxin-mediated metabolic acidosis
Bradypnea (SLOW)	Sedative-hypnotics Liquor (alcohols) Opioids 'Weed' (marijuana)

Figure 1 is a human toxidrome flow chart, which is potentially useful, but again species differences need to be taken into account.

Keep an open mind

Clearly it is also important to understand the circumstances surrounding any exposure – inside versus outside cat, recent walk, living in a rural area, access to bridle paths, owner' s medicines/risk of illicit drug use, and, in dogs, being aware of their normal or usual behaviour. These combined with clinical features may help to push poisoning up the list of possible diagnoses.

Asking the right questions of the owner may elicit details that could potentially be relevant in the diagnosis, and these details may have been overlooked or deemed unimportant (or even forgotten) had they not been brought to mind by these questions.

One reasonably common exposure that *probably* occurs, and where there is no supporting circumstantial evidence, is ethylene glycol in cats (**Figure 2**). Although ethylene glycol is clearly very toxic in other animals, the behaviour of cats and their extreme sensitivity to ethylene glycol mean that they may present to owners – and then to the surgery – *in extremis*. Often the tell-tale signs are hyperglycaemia and hypocalcaemia; this combination with signs (clinical or laboratory) of metabolic acidosis is very suggestive of ethylene glycol. Cats with accompanying acute kidney injury have a poor prognosis.

Sometimes single clinical signs may be helpful

Sudden onset blindness in a dog might suggest many diagnoses – up to 180 according to Cornell University and mostly nothing to do with toxicology! However, in our experience, if blindness is mentioned in a dog, with minimal other effects and history reveals close connection with sheep or horses, then avermectins are on the list of possible causes.

Again, asking the owner if the animal has access to stables, horse yards, bridle paths, lives on a farm or has any other contact with horses, especially if worming has recently been carried out, gives useful information; or at least may lead to ivermectins/avermectins being ruled out of the equation.

Sudden onset of convulsions, as in our initial story, with no observed prodromal signs, might suggest a number of agents. Here the circumstances may be key to narrowing the agent down; although sometimes the treatment plan may not be much changed by such accuracy.

The case in point

So back to the dog in our initial scenario:
"*Diazepam has had little impact. He has foul smelling vomit and diarrhoea. The convulsions, grand mal-like, are self-terminating, with continuous whole body tremors. The dog is not orientated and is increasingly hot.*"

Treatment now needs to be aimed at the control of convulsions and temperature. A conversation with the owners about possible euthanising of the patient may be considered, as there is a lack of response.

If a tremorgenic toxin is a possible cause – and diazepam is of limited effectiveness – we would think maybe metaldehyde slug bait? Is there blue/green discolouration of the mouth/anus or vomit/diarrhoea? Does the owner use metaldehyde?

Tremorgenic mycotoxins? A foul smell might point in this direction.

In both cases ramping up the sedation needs to happen – escalating to propafol, adding in methocarbamol?

In our case, there is no history of metaldhyde use and no blue/green discolouration. So tremorgenic mycotoxins move up the list. Mycotoxins are fungal metabolites that cause toxicity in humans and animals – tremorgenic mycotoxins are present in many mouldy foods, silage and compost.

The owners, on further discussion, say they have a new compost heap, with which the dog is intrigued. So this would make us think that mycotoxins are a good fit. Importantly, while the presentation and illness are stormy and alarming, most animals, who are seen early and whose tremors are controlled, do recover without long-term sequelae.

Knowing – or suspecting – tremorgenic mycotoxins will alter the treatment options; so we would suggest use of lipid infusion (see later), as the toxins are lipid soluble and case experience suggests this will be valuable. Note, however, that we would not recommend this for metaldehyde.

In our case, we were correct and the dog, while started on propofol, improved markedly after two courses of lipid over 90 minutes.

Intravenous lipid infusion procedure

Intravenous lipid infusion was discussed in a recent edition of *Veterinary Practice Today* [**3**(3): 34-35, May/June 2015], but as a brief re-cap, it is used as a component of parenteral nutrition in human and veterinary medicine.

Ensure tissue perfusion and oxygenation are maximised prior to administration of lipids because animal studies suggest an adverse outcome of resuscitation and lipid infusion in the presence of hypoxia, possibly owing to changes in the binding capacity of the lipid.

Give 1.5 ml/kg of 20% lipid emulsion IV as a bolus dose. Then start an intravenous infusion at the rate of 0.25ml/kg/min. The duration of infusion has not been established but it should be given for 30 minutes in the first instance and can be repeated one or two times, if there is no improvement.

Administration of lipid infusion should be followed by monitoring of vital signs (pulse, blood pressure, respiratory rate and oxygen saturation) and an ECG. Amylase concentrations should be measured if there is clinical evidence of pancreatitis.

Concerns have been raised about interaction with other lipophilic drugs. Administration of lipids in animals receiving therapy with lipophilic drugs, such as propofol, has been raised as a potential concern; however, the use of lipid is expected to reduce the need for such emergency therapy.

The potential effect of lipid infusion on concentrations of other therapeutic agents including antidotes should be assessed on an individual case basis. In addition, only a small quantity of lipid crosses the blood brain barrier and for propofol at least the effect of lipid on propofol-induced sedation is expected to be low.

The risks are unknown in the context of treatment of drug toxicity but it is generally well tolerated. Serious adverse effects have not been reported from the use of lipid infusion in acute poisoning. There is also the potential for delayed toxicity as the toxin diffuses out of the lipid or as the lipid is metabolised.

Recurrence of toxicity has been reported following cessation of lipid administration in human cases, hence the recommendation for a bolus dose and then an infusion.

The disposition of the drug or toxin after lipid infusion is unknown; there are no studies investigating this issue. Lipid infusion has been used in pregnancy and extremes of age are not a barrier to its use – it has been used in the management of local anaesthetic toxicity in humans aged two days to 92 years.

The exact mechanism of action is not fully understood but various hypotheses have been proposed: the lipid component formed in the blood may act as a 'sink' or 'shuttle' leading to drug redistribution; or in cases with drugs causing cardiac toxicity, lipid may have a cardiotonic effect.

Conclusion

So, to conclude. From our point of view, the number of toxins is endless, but the number of somatic reactions is limited. When we are asked about a possible, but unknown, toxin – which may well be only part of your differential list – we will use some, or all, of the reasoning above to help you rule things in or out, or at least generate an alternative area of questioning for the owners. Sometimes this is very satisfying and we can more or less guide you to the right answer.

As a final thought, here are some more useful clues:

- hyperglycaemia with hypocalcaemia is indicative of ethylene glycol
- blindness should lead you to consider moxidectin/ivermectin
- swollen face/paws may indicate paracetamol
- conjunctival injection could point to cannabis
- lameness with no obvious cause may have resulted from chronic anticoagulant rodenticide ingestion. ■

Figure 2. *One seriously common exposure is ethylene glycol in cats.*

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Fashion versus function

The ever-popular Jack Russell terrier has recently been recognised as a breed by the Kennel Club. This will be an interesting exercise as these plucky little dogs do tend to come in all shapes and sizes. Some may feel it a pity that in years to come they may all look identical, because in some respects their non-conformity is one of their charms.

Jack Russells are undoubtedly a popular choice of pet; but in terms of breed popularity, Kennel Club figures showed that in 2014 the Labrador retriever was still by far the most popular breed.

There is, however, a shift in fashion from native to foreign breeds. Ownership of the French bulldog – owned by celebrities such as Jonathan Ross, Reese Witherspoon and Hugh Jackman – has increased by 1,724 per cent since 2004; while the Portuguese water dog (as owned by Barack Obama) increased by 129 per cent over the same period. At the other end of the scale, one of our once famous native breeds – the Pembroke Welsh corgi – has been listed as a vulnerable dog breed by the Kennel Club.

The public's popular choice of dog breeds is bound to fluctuate and it is inevitable, in this social media and celebrity age, that choice is quite heavily influenced by these factors. Indeed, Kennel Club research has shown that one in five people's choice of dog breed is influenced by celebrity dog owners, films and TV; while half were influenced purely by the look of the dog, making no reference to temperament or the care it would need. It seems to be very much a case of choice by fashion over function and this maybe helps to explain the rise in abandoned pets when owners discover that 'looks are not everything'.

However, there is a more worrying side to the desire for fashionable or exotic breeds and that is the persistent breeding of animals that are simply not fit for purpose.

The number of pugs given up to Battersea Dogs and Cats Home has doubled in the past five years, leading the charity to fear that it could be a consequence of the health problems associated with the breed. Other brachycephalic breeds, are being brought to the centre with life-threatening illnesses. Last year, Battersea vets operated on 20 dogs – many of them pugs – to help open their airways.

Centuries of breeding have produced the pug's squashed face and over-long soft palate, restricting its nostrils and making it harder for it to breathe, as well as suffering more than their share of health problems such as eye diseases, joint disorders and skin conditions.

It could very easily be argued that breeding such animals that are in permanent discomfort and are prone to real suffering should be classed as cruelty. A look at the widely accepted five freedoms of animal welfare confirm this fact.

The five freedoms

- freedom from hunger and thirst
- freedom from discomfort
- freedom from pain, injury or disease
- freedom to express normal behaviour
- freedom from fear and distress.

We can see that as far as many pugs are concerned, probably only the first freedom is fulfilled; and even this may be compromised if they have difficulty eating because of breathing problems.

Pugs are not the only breed to suffer for their looks. Among the worst affected breeds are Shar-Peis whose skin folds – much admired by their owners – lead to skin-fold dermatitis leading to pyoderma, problematic facial folds and eyelid problems. Affected puppies are often brought into veterinary surgeries for eyelid resections to enable them to see properly prior to their being sold on to new owners who, whether aware or not of the operation, may go on to breed from the animal.

Vets carrying out this operation are certainly providing for the immediate needs of the puppy and giving it a better life; but hopefully they also warning of the consequences of breeding from such an individual and *reporting their action* as provided for by the Kennel Club and recommended by the RCVS and the BVA*.

In 2009, the Kennel Club's Dog Health Group conducted a review aimed at ensuring that all breed standards encourage the breeding of healthy dogs. Breed descriptions were checked to ensure that they couldn't be interpreted as encouraging dogs with features that might prevent them from breathing, walking or seeing freely. As a result, 78 of the breed standards were amended – this in itself says a great deal.

The changes are laudable but, sadly, do not control those breeders who do not refer to the breed standards and who continue to breed dogs with exaggerated features because there is buyer demand.

In addition, there are numerous websites, both veterinary and non-veterinary, explaining how to care for these unfortunate breeds. This recommended care is, of course, good for the pets concerned, but surely it is rather like 'closing the stable door...' and it is noticeable that members of the public are not being/will not be dissuaded from buying these breeds but are just shown how to deal with all their problems.

There is certainly a case for veterinary professionals consistently to step up to the plate and to be more assertive in their education of clients as to the problems associated with owning certain breeds. Whilst the extreme features characterising these dogs are seen as desirable – either for show or fashion purposes – it would seem that change will be an uphill struggle and veterinary professionals should use all channels open to them – especially the BVA's online reporting form* – to reverse these unacceptable trends. ■

*www.thekennelclub.org.uk/vets-researchers/caesarean-operations-and-procedures-which-alter-the-natural-conformation-of-a-dog

Rehabilitation of surgically corrected ORDSP

A 17-year-old thoroughbred mare was presented for resection of overriding dorsal spinous processes (ORDSPs) diagnosed on radiographic examination. Surgery involved the complete removal of the spinous processes of three vertebrae. Referral for veterinary physiotherapy was made two weeks following surgery. After a full assessment, a problem list was made and a remedial programme implemented.

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Faith Fisher-Atack is a category A member of the Association of Chartered Physiotherapists in Animal Therapy (ACPAT) and a chartered human physiotherapist. As an undergraduate, Faith studied physiotherapy at the University of Huddersfield following a gap year as a working rider for British show jumping team trainer, Alan Fazakerly.

After graduating in 2009 in human practice, Faith spent five years working for Leeds United Football Club as Academy Head of Sports Science and Medicine, while at the same time studying for a Postgraduate Diploma at the Royal Veterinary College, London. She graduated as a chartered veterinary physiotherapist in 2012 and chose to establish Equine Physio Services.

**Suggested Personal & Professional Development (PPD)*

PHYSIOTHERAPY

Overriding dorsal spinous processes – commonly referred to as 'kissing spines' – is noted to be the most common anatomical abnormality reported in the horse with back pain (Henson and Kidd, 2009; Jeffcott, 1980; Walmsley et al, 2002). Impinging or overriding dorsal spinous processes (ORDSPs) describes the loss of space between adjacent dorsal spinous processes (DSPs) within the equine spine.

The incidence of ORDSPs in thoroughbreds is common (Zimmerman et al, 2012). Reasons for this may be attributable in part – or combined with – premature training loads associated with racing, the shape of the summits of the dorsal processes (Henson, 2009), or the use of half-tree saddles used commonly in the racing industry (Head, 2009).

Case history

A thoroughbred mare was referred for physiotherapy following surgical removal of identified ORDSPs.

On presentation at the referral hospital, radiographic examination revealed one impinging DSP between thoracic vertebrae T14 and T15, with T13 and T14 and T15 and T16 being closely opposed and overriding. Based on radiographic examination, it was proposed that the dorsal processes of T13 and T15 were to be removed under standing sedation and local anaesthesia.

During surgery it became apparent that the T14 dorsal spinous process was not going to withstand being the remaining process in this region of the thoracic spine and so this was removed in its entirety, thereby creating a space between T12 and T16.

Postoperative advice regarding the rehabilitation and aftercare consisted of initial box rest and in-hand walking for 15 minutes daily for the first four weeks. The owner was asked to turn the mare out in a small paddock for a further four weeks after this period (40 by 40 square feet). At eight weeks, complete turnout in her normal paddock would be introduced, at which point lunging exercise could begin, assuming there was adequate healing of the incision site.

Ridden exercise was advised, to commence 12 weeks following surgery, once a repeat assessment by the referring veterinary surgeon had taken place. In addition, the owner was told to perform spinal stretches in to lateral flexion to the left and right for two weeks following suture removal to encourage flexibility in the back.

It was the intention of the physiotherapist to continue with the outlined plan set out by the veterinary surgeon. However, by employing evidence-based sets, repetitions, time frames, progressive exercises and goals, the physiotherapist aimed to enhance this plan and educate the owner, in the anticipation of greater compliance.

Assessment findings

Physiotherapy assessment took place five weeks after surgery and a full subjective history noted the previous details.

Subjective assessment comprised static and dynamic visual observation of posture, muscle (a)symmetry and gait, palpation, joint mobilisation, reflex assessment and specific pain provocation testing.

Postural observation

Postural observation showed the mare had adopted a sway-backed posture and a lordotic lumbar spine. There was moderate atrophy of the longissimus muscle over the surgical site bilaterally to T12-T16. Observation of the gait at walking pace showed hind limb stride length was reduced bilaterally; the mare did not show any ability to over track.

Palpation

Palpation of soft tissue was performed – both parallel and perpendicular to the orientation of the cervical, epaxial and superficial gluteal muscle fibres. Muscle spasm of the longissimus and bilateral superficial gluteals was identified.

Palpation of the thoracolumbar fascia identified a localised myofascial trigger point bilaterally at the level of the thoracolumbar junction. Guarded muscle spasm of right and left omotransversarius and splenius muscles was identified via palpation of the cervical spine.

Joint mobilisation

Mobilisation of the cervical vertebrae was performed using Maitland oscillations to the vertebral bodies in a transverse direction. Stiffness between C3/4 and C5/6 facet joints.

Figure 1. *Long-reining in the arena.*

Figure 2. *Outdoor long-reining on an incline/altered terrain.*

Costovertebral joints were assessed using Maitland oscillations performed at Grade I-II in a dorsal direction and identified resistance at ribs 13-16 bilaterally.

Pain provocation

The behaviour and responses of the mare were monitored for pain reaction, with adherence to consistent pressure. Pressure was applied over the tuber sacrale and tuber coxae to test for pain reaction (Hesse et al, 2010).

Problem list

The following 'problems' emerged:

- epaxial muscle atrophy between T12-T16
- bilateral muscle spasm of the omotransversarius, longissimus, thoracolumbar fascia and superficial gluteals
- facet joint stiffness C3/4 and C5/6, plus costovertebral stiffness at ribs 13-16
- lordotic/sway-back posture.

A list of goals was set to influence the treatment plan:

- restore muscle mass of the longissimus between T12-T16
- restore resting muscle length of omotransversarius, longissimus, thoracolumbar facia and superficial gluteals
- increase cervical facet joint mobility at C3/4 and C5/6
- increase costovertebral joint mobility at ribs 13-16
- strengthen abdominal musculature/facilitate abdominal control.

Treatment

The rehabilitation treatment programme is summarised in **Table 1**.

Neuromuscular electrical stimulation (NMES)

In human studies, the use of NMES results in increased circulation and subsequent oxygen supply that can enhance the rate of healing of soft tissues to which it is applied (McDonough et al, 2002). Unfortunately, there is little evidence to evaluate its use in equine practice. However, the application for this case study aimed to increase muscle development of the longissimus muscle at the surgical site and aid in facilitating neuromuscular control.

Baited cervical stretches

Dynamic cervical stretches of the neck have been proven to increase cross-sectional area of spinal stabilising muscles when performed over three months (Stubbs et al, 2011). The physiotherapist advised the owner on the number of sets, repetitions and direction of movement in accordance with current evidence (Stubbs et al, 2011).

Manual mobilisation

Excessive or repetitive forces can compromise tissue healing in the proliferation phase (Paulekas et al, 2009).

Table 1. The rehabilitation treatment programme

Weeks (post-surgery)	Home exercises	Physiotherapy (twice/week)
5 - 6	Long-rein exercises ■ 4 x 20 mins walking in roller with hock strap in controlled arena setting Baited cervical stretches (5 times per exercise and held for 30 secs approx) ■ left lateral flexion at level of girth ■ right lateral flexion at level of girth ■ left lateral flexion at level of fetlock ■ right lateral flexion at level of fetlock ■ bilateral cervical flexion – chin to manubrium	A 'NeuroTrac' neuromuscular electro-stimulator (NMES) machine applied (via two electrodes) to the motor points of the longissimus, trapezius and superficial gluteal muscles Motor points were identified using palpation Treatment time: 20 mins per side Cervical joint mobilisations C2, C3, C4, C5, C6 transverse glides, 3 x 10 oscillations, Grade II Myofacial trigger point release Sustained pressure for 20 secs was placed with thumb over identified myofacial trigger points of superficial gluteals and longissimus dorsi and omotransversarius bilaterally

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Weeks (post-surgery)	Home exercises	Physiotherapy (twice/week)
7 - 8	Long-reining ▪ 20 mins walking in roller with hock strap over alternating surfaces outside of previous arena setting ▪ 3 x per week Baited cervical stretches Passoa lunging ▪ performed on 20-metre circle ▪ 5-min walk right/5-min walk left ▪ 3-min trot right/3-min left ▪ 5-min walk right/5-min walk left ▪ 2 x per week	NMES Cervical joint mobilisations Myofacial trigger point release Costovertebral joint mobilisations Performed at ribs 13-16 in a dorsal direction 3 x 10 oscillations, Grade I
9 - 12	Long-reining ▪ session 1: 30 mins ascending and descending hill/alternating terrain ▪ session 2: 30 mins over straight-line poles, 1 metre apart in arena setting Baited cervical stretches Passoa lunging 1 ▪ performed on a 20-metre circle ▪ 5-min walk right/5-min walk left ▪ 5-min trot right/5-min left ▪ 5-min walk right/5-min walk left ▪ 2 x per week Owner included poles placed on the circle at 12, 3, 6 and 9 o'clock positions	NMES Cervical joint mobilisations Myofacial trigger point release Costovertebral joint mobilisations Reflex inhibition ▪ unilaterally to palpable areas of increased tone and muscle spasm at cervical spine ▪ contralateral to areas of increased tone and muscle spasm at thoracic and lumbar spine ▪ locations of spasm located via parallel and perpendicular palpation of cervical, epaxial and gluteal musculature
12 - 14	Long-reining ▪ session 1: 30 mins ascending and descending hill/alternating terrain ▪ session 2: 30 mins over straight-line poles placed 1.5 human strides apart in arena setting ▪ session 3: 20 mins over straight-line poles placed 1 metre apart and raised approximately 30cm on alternate sides in arena setting Baited cervical stretches Performed 5 times for each exercise and held for approximately 30 seconds Passoa Lunging 1	NMES Cervical joint mobilisations Myofacial trigger point release Costovertebral joint mobilisations Reflex inhibition
14 - 16	Baited cervical stretches Passoa lunging 1 Passoa lunging 2 ▪ performed on a 20-metre circle ▪ 5-min walk right/5-min walk left ▪ 5-min trot right/5-min left ▪ 5-min walk right/5-min walk left ▪ 2 x per week ▪ raised cavelletti poles placed at height of 20cm approximately and 1 metre apart. This sequence performed at trot for approximately 10 repetitions on each rein	NMES Cervical joint mobilisations Myofacial trigger point release Costovertebral joint mobilisations Reflex inhibition

Joint mobilisation using Maitland oscillations at progressive grades were used at the cervical spine from the beginning of the rehabilitation programme. Costovertebral joint mobilisations took place at week 7 at Grade I, increasing the grade of mobilisation over the following weeks.

A combination of acupressure and reflex inhibition therapy was applied to the longissimus dorsi (Wakeling et al, 2006), superficial gluteals and omotransversarius at the start of rehabilitation.

Long-reining (**Figures 1** & **2**)

Studies into the effect of lunging on longissimus activity have shown that movement on a circle produces two to three times more activity of the muscle on the inside of the turn than on the outside (Cottrial et al, 2008).

The physiotherapist felt that asymmetrical muscle activity during the early phases of the rehabilitation programme might encourage asymmetrical development of spinal stabilisers – during the proliferation of tissue healing, asymmetrical forces placed on healing tissue may risk further injury if repair is not adequate (Paulekas et al, 2009).

'Passoa' lunging

Studies assessing the effect of the 'Passoa' training aid have found that this provides a safe encouragement of core activation and postural correction without increasing loads to the fore- and hind limbs (Walker et al, 2013).

Subjective measures

Subjective measures included repeated palpation and observation of muscle symmetry, spinal posture, stride length and joint mobility. This was carried out twice weekly during physiotherapy visits.

Objective measures

This study was limited with regard to objective measurement, because equipment to measure stride length, spinal position and muscle resistance was unavailable at the time of treatment. However, following completion of the programme, the mare did return to her preoperative level of work. ■

PPD Questions

1. Name three risk factors associated with ORDSPs
2. Name three treatment modalities used in the rehabilitation plan
3. How many weeks after surgery does the physiotherapy assessment take place?

Answers

1. Premature training loads
Anatomy – the shape of the summits of the dorsal processes/short back
Tack – the use of half-tree saddles/poor fit
Dorsally flexed posture
Poor core stability
2. NMES; Cervical joint mobilisations; Myofacial trigger point release; Costovertebral joint mobilisations; Reflex inhibition
3. Five

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Nursing donkeys – what is different?

Donkeys have been serving mankind for 5,000 years (Ali et al, 2014). The phrase 'beasts of burden' describes their utility as pack animals and, in many parts of the world, they play a significant economic and societal role. It is estimated that there are about 90 million donkeys worldwide and they are especially widespread in Central and South America and parts of Europe (Ali et al, 2014).

In the UK, most donkeys – unlike horses – are kept as pets. The fact that donkeys are now popular as pets means we see them more frequently for treatment in equine practice. All veterinary professionals – especially RVNs – working with donkeys should know the main differences between them and horses, so that individualised species-specific nursing care can be applied.

Bonding behaviour

Donkeys generally form lifelong friendships and do not like to be alone. Bonded donkey 'friends' may become distressed if they are separated and this may lead to complications, such as inappetence and colic. Inappetence in donkeys can lead to a potentially fatal condition known as hyperlipaemia (The Donkey Sanctuary, 2015).

Bonding behaviour should always be considered when donkeys are admitted into the hospital for treatment. If possible, both the donkey and its companion should be admitted and kept in the same stable to avoid any unnecessary distress.

If one of the donkeys is euthanised, it is essential that the surviving donkey is allowed to remain with the body of their friend, until they have lost interest. If this advice is not followed, it can cause significant distress to the surviving donkey, which may develop hyperlipaemia as a result (The Donkey Sanctuary, 2015).The RVN should also discuss with the owner the possibility of finding another companion for the surviving donkey and assist with this where possible.

It is invariably beneficial for RVNs to spend time with a sick donkey because of the tendency of this species to form strong bonds (**Figure 1**). TLC in the form of grooming, petting and hand feeding can contribute enormously towards recovery (Dabinett, 2008).

Monitoring hospitalised donkeys

Any veterinary professional who is monitoring a donkey in a hospital environment must be sensitive to subtle behavioural changes that are often early indicators of illness. Donkeys are stoical by nature and often do not exhibit dramatic symptoms of illness (Dabinett, 2008). Any donkey described as dull – with its head held low, exhibiting general disinterest in its surroundings and with a reduced appetite – should be investigated (**Figure 2**).

RVNs caring for sick donkeys should be aware of their tendency to display 'sham eating'. This is where the donkey seems to be interested and eating but in reality is often only playing with the food (Sprayson, 2008).

Normal clinical parameter readings differ between horses and donkeys. It is important to be aware of these differences when monitoring sick donkeys in the hospital. **Table 1** gives a comparison of normal

***Figure 1**. It is beneficial for the RVN to spend time with a sick donkey.*

***Figure 2**. Any donkey described as dull – with its head held low, exhibiting general disinterest in its surroundings and with a reduced appetite – should be investigated.*

**Suggested Personal & Professional Development (PPD)*

DONKEYS

	HORSE average and (normal range)	DONKEY average and (normal range)
Temperature	38°C (37.5 - 38.5°C)	37.1°C (36.5 - 37.7°C)
Pulse	32 beats/min (25 - 40)	41 beats/min (31 - 53)
Respiration	10 breaths/min (8 - 12)	20 breaths/min (13 - 31)

Table 1. Comparison of normal clinical parameters for horses and donkeys (The Donkey Sanctuary, 2015)

clinical parameters for horses and donkeys.

Nutrition

The domestic donkey is descended from African wild asses that evolved to live in semi-arid environments with only poor quality, sparse vegetation. To increase their potential food sources, donkeys have evolved as browsers as well as grazers – with woody shrubs and trees being potential food sources when grasses and other low vegetation are not abundant (Lamoot et al, 2005).

Donkeys are highly efficient at digesting poor nutritional quality fibre and possess a superior digestive efficiency compared to horses when digesting forages such as straw (Wood et al, 2005). The donkey's natural adaptations to survive on poor quality feed – when compared to ponies – means, that when donkeys are treated as 'mini horses' or kept in the same way as their horse companions, they may become obese and subsequently develop significant health problems. This is a serious consideration for an RVN nursing sick donkeys in practice.

Feeding recommendations for donkeys and mules have, until recently, been extrapolated from horse nutrition. Using experience and limited research in donkeys, it was estimated that they required 75 per cent of the nutrients that would be given to a pony of the same size (Svendsen, 1997). Research funded by The Donkey Sanctuary established that these guidelines significantly overestimate the digestible energy requirements for maintenance (Carretero-Roque et al, 2005; Wood et al, 2005). This can present a significant challenge in practice where all feedstuffs available are designed for horses.

Straw should form the majority of the diet for most donkeys as it is high in fibre and low in sugar (**Figure 3**). Good quality barley straw is fine to feed to donkeys with good teeth. Oat straw better for old or underweight donkeys with good teeth as this has a slightly higher nutritional value than barley straw (The Donkey Sanctuary, 2015).

An RVN working in an equine hospital should source and obtain the appropriate feed for donkeys if they are admitted. If the donkeys have straw at home, it is important to keep their diet the same to avoid gastrointestinal upset. If straw cannot be sourced, the owners should be asked to bring in forage from home to avoid an abrupt dietary change.

A feed balancer should also be provided to give extra vitamins and minerals – access to an equine mineral lick will help to ensure the donkey is receiving adequate nutrition (**Figure 4**).

An anorexic donkey should be tempted with anything it will eat. These patients should be hand-fed with bread, carrots, apples and/or ginger biscuits! The RVN should consult the owner for information on their donkey's favourite treats (Dabinett, 2008).

Drug metabolism and pain relief

Although the prescribing and dosing of medication is the responsibility of the veterinary surgeon, an RVN should be aware of the differences in drug metabolism between donkeys and horses. Therapeutics are often administered to donkeys based on dosage and intervals recommended for horses, because very few drugs have donkey-specific label indications. Yet differences in drug

Figure 3. *Straw should form the majority of the diet for most donkeys as it is high in fibre and low in sugar.*

Figure 4. *Access to an equine mineral lick will help to ensure donkeys receive adequate nutrition.*

distribution, metabolism and elimination – between donkeys and horses – have been noted for many therapeutic agents (Grosenbugh et al, 2011).

These differences can be partially explained by the donkey's unique physiology. Since their ancestors evolved in a desert environment, modern donkeys exhibit qualities that allow them to tolerate dehydration better than the horse and recover more quickly from its effects (Grosenbugh et al. 2011).

Donkeys eliminate phenylbutazone much faster than horses and this is thought to be the consequence of differences in protein binding of the drug (Lizarraga et al, 2004). It has, therefore, been suggested that in order to achieve effective analgesia in donkeys, higher doses and shorter dosing-intervals of phenylbutazone are required (Cheng et al, 1996; Mealey et al, 1997). Carprofen may be a better choice of analgesic agent for donkeys as this is metabolised less rapidly and can be dosed at the same rate as for horses (Matthews, 2008).

With this in mind, veterinary professionals caring for sick donkeys in practice should be aware of the differences in drug metabolism between horses and donkeys. Because donkeys are stoic and do not exhibit signs of pain as readily as horses, analgesic drugs must be considered very carefully. Drug selection and doses should be prescribed and administered with this in mind.

Hyperlipaemia

Hyperlipaemia is a life-threatening disease to which donkeys are particularly prone – both as a primary or secondary condition. It is, therefore, essential that any RVN dealing with donkeys is aware of measures taken to prevent, identify and treat this disease. The metabolic pathways involved are complex and involve many factors.

Basically, hyperlipaemia occurs when animals mobilise triglyceride from body fat reserves in response to a negative energy balance (Grove, 2008). The end result is multi-organ failure as lipid is deposited in the liver and kidneys.

Contributory factors for hyperlipaemia (Grove, 2008) include:

- body condition – the disease is prevalent in fat and obese individuals owing to their higher body fat reserves and increased insulin resistance
- stress – donkeys are more susceptible to hyperlipaemia in times of stress, such as transportation and change of environment, including being admitted into an equine hospital
- age – older animals are more prone to the disease
- sex – mares are more likely to develop the disease than males
- late pregnancy and early lactation – the additional energy demand during these times increases the risks of developing hyperlipaemia
- Cushing's syndrome – cortisol antagonises the effect of insulin, which allows body fat to be readily mobilised
- laminitis – primary hyperlipaemia can be seen in laminitic animals owing to the association with insulin resistance
- concurrent disease – any disease that puts the animal in a negative energy balance can cause hyperlipaemia
- surgery – the starvation period prior to surgery, added to the possible period of inappetence that follows, increases the risk of the patient developing a secondary hyperlipaemia.

Early clinical signs of hyperlipaemia are often vague and easily missed, so any animal falling into one or more of the above risk categories should be monitored closely and, ideally, receive preventive management and therapy.

Clinical signs include (but are not limited to) the following (Grove, 2008):

- dullness/depression
- inappetence/anorexia
- gut stasis with diagnostic mucus-covered, dry faecal balls
- halitosis
- congested mucous membranes with delayed capillary refill time.

A comprehensive guide to the treatment of hyperlipaemia is beyond the scope of this article, however, the basic principles (Grove, 2008) include:

- treat any underlying disease
- administer fluid therapy – maintain circulating volume, correct electrolyte imbalances, restore acid/base balance
- administer symptomatic therapy – non-steroidal anti-inflammatory drugs (NSAIDS), analgesics, anti-ulcer medication, multivitamins, anabolics, antibiotics
- give nutritional support – maintain a positive energy balance.

Mortality rates of 60 to 90 per cent have been reported (Grove, 2008). Prognosis improves if the syndrome is detected in the early stages and prompt action is taken and highlights the importance of carefully monitoring donkeys for signs of the disease.

Prevention is certainly better than cure and this is an area where an RVN can really make a difference with careful observation and swift action. If any donkey shows inappetence, then a blood sample should be taken and analysed for hyperlipidaemia (Grove, 2008). Reducing stress is also an important factor to consider with patients coming into the hospital.

Donkey 'companions' should be welcomed and catered for. Plenty of TLC should be given and if a donkey needs to lose weight, an RVN should make sure that this is done safely and slowly. Strict monitoring procedures should be in place for donkeys that have been starved for a general anaesthetic; and then every effort should be made to encourage the patient to eat once it is safe to do so after surgery.

Conclusion

Donkeys are not just small horses with big ears! There are many physiological differences to consider in comparison to horses. Veterinary professionals, especially RVNs, dealing with sick donkeys must be able to recognise these differences and cater for them. Donkey-specific protocols should be put in place and adhered to in every equine practice.

Special areas of consideration – such as strong bonding, specific nutrition, different drug metabolism and different clinical parameters – should all be taken into account, along with the tendency for donkeys to develop hyperlipaemia.

By following protocols specific to donkeys, the RVN can ensure that these patients receive individualised, species specific nursing care, and therefore have an optimum chance of recovery. ■

Acknowledgement

The author would like to thank The Donkey Sanctuary, Devon, for supplying some of the images for this article.

PPD Questions

1. If a donkey has good teeth, what kind of straw should it be fed?
2. Straw is high in fibre but low in vitamins and minerals. What can be given to donkeys to ensure that they receive adequate levels of vitamins and minerals in their diet?
3. Which analgesic agent is considered best for use in donkeys?
4. Which medical condition are donkeys prone to developing after being exposed to excessive stress?
5. As donkeys display strong bonding behaviour, what can RVNs do to help aid recovery in sick patients?

Answers

1. Barley straw
2. A feed balancer and/or an equine mineral lick
3. Carprofen, as this is metabolised less rapidly and can be dosed at the same rate as for horses
4. Hyperlipaemia
5. Provide a great deal of TLC in the form of grooming, petting and hand feeding

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Transition cow management

We have known for a long time that transition cow management is hugely important for a successful and healthy lactation in dairy cows. Somehow, though, we don't seem to have progressed far enough in putting theory into practice.

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**Suggested Personal & Professional Development (PPD)*

CATTLE

The previous article in this series highlighted the prevalence of subclinical ketosis and other early lactation disorders. An estimated 30 to 50 per cent of dairy cow calvings result in a clinical disorder, such as mastitis, metritis, ketosis, displaced abomasum and lameness, in early lactation (LeBlanc, 2010).

Some veterinary surgeons and vet practices are beginning to find ways to incorporate transition cow performance monitoring in their regular schedules. Monitoring is definitely a step in the right direction. Next comes the management.

Transition is a moment of change. The cow undergoes many changes before and after calving – physiologically, physically (in her environment) and psychologically (meeting new cows; becoming a 'mum'). Therefore, the transition period is not just one moment, but a series of events spanning either side of calving.

First, she goes from milking to being a dry cow. Then she is often moved from a far-off dry cow pasture into a close-to-calving group. Then she calves. Then she moves to the early lactation group. Often there is a further physical move to a 'highs' group. Even without a physical move, the changes in energy requirement and work rate as she adjusts to high milk production are inevitable.

In all cases, she will have a reduction in feed intake around calving, a negative energy balance and a period of immune suppression. Different people define the transition period differently. Traditionally, three weeks before to three weeks after calving was considered the most important period. However, more recent work suggests we need to consider the *whole* dry period (Dann et al, 2006), so perhaps a better definition is from just before drying off to three weeks into lactation.

What are the golden rules?

There is much to think about to ensure a successful transition period. There are also many different ways in which farmers keep their dry cows and different types of farm system, each with its own particular needs and challenges. In general, the four broad areas to consider are:

- cow factors – body condition score, lameness, rumen fill score, parity, twins
- environment factors – lying comfort, temperature, stocking rates, space, ventilation
- management factors – how often and in what way cows are moved, strategies around calving, protocols around monitoring
- nutritional factors – diet composition, feeding management, milk fever control strategies, provision of water.

It would be nice to have a set of rules that applied to every farm! The fact that there isn't one means that veterinary surgeons and farmers must be smart. A deep understanding of the cow's requirements is necessary such that management can be nuanced to meet them.

However, there are some general principles which we can apply in many instances. Nordlund (2009) describes five key factors for successful transition cow management of cubicle-housed dairy herds. These are summarised in **Table 1**.

Working procedure and using a checklist

Because there are many areas to consider, using a systematic approach to transition cow management is important. For dairy vets, there is a considerable opportunity to add value to their work by incorporating routine checks and monitoring of clients' transition cow management. This needs some thought – regular involvement with the dry cows is harder to foster than with the milking herd.

This may be because the dry cows are kept away from the main holding, but often it is simply because problems rarely manifest themselves in dry cows themselves. This means farmers may be reluctant to pay for routine checks on them. This is in contrast to the troublesome early lactation cows, for which farmers regularly pay for routine veterinary visits, usually centred around getting them back in calf.

Routine fertility visits work best when the veterinary surgeon structures them correctly, and can demonstrate value in the work. In a similar way, dry cow checks need structure and value needs to be shown. Using a checklist so nothing is missed is very useful. Certainly, this is far more effective and professional than casting an eye over the dry pen on an irregular basis.

Table 1. The five key factors in transition cow management of cubicle-housed dairy herds (Adapted from Nordlund, 2009)

Factor	Main requirements/ considerations
Feed space in both pre-calvers and fresh cow pens	▪ 75cm per cow feed space; or ▪ 5 lock-up spaces per 4 cows
Minimising pen moves and social stress, particularly within 10 days pre-calving	▪ avoid moving if possible, e.g. stable dry cow groups ▪ reduce movements to once a week ▪ move in pairs, at least ▪ if moving to calving pens, do so at point of second stage labour (feet or foetal membranes showing)
Increasing cow comfort with amply sized stalls (cubicles)	▪ deep-bedded pack (straw yards) are preferable to cubicles just prior to calving ▪ 1m² /1,000 litres milk production bedded area, plus loafing/feeding area (approx a third as much again) ▪ cubicles must be at least 127cm wide and 275cm long (Holstein) ▪ lying area (curb to brisket locator) 180cm (Holstein) ▪ build pen size and cubicle house for 140% x the average requirement to avoid periods of over-stocking
Sand resting surfaces on which to lie	▪ for cubicles, deep sand is preferable to mattresses and sawdust: better hygiene, comfort and grip
An efficient and effective screening process to identify cows requiring special attention or nursing care	▪ good stock person – personnel is key ▪ placement of fresh feed during milking, and observation of cows' behaviour on return to pen: self-locks engaged; assessment of appetite and attitude ▪ checking temperature, ketones, vaginal exam etc. for those cows warranting it ▪ avoid prolonged lock-up for routine screening

What to check?

Although not exhaustive, the following list gives suggestions of things to check, and includes targets where relevant.

Feed delivery and feed space

At least 75cm of feeding space should be available per cow in the group. This means also checking that the feed is being delivered evenly along all of this space (**Figure 1**). Any likely obstructions to feeding – such as narrow passageways, dead-ends and uncomfortable feed barriers – should be assessed.

The feed must be delivered fresh at least once every day. This is particularly true in the summer months when feed heats up (secondary fermentation) and quickly becomes unpalatable. The feed should be delivered onto a clean table, or trough and then pushed up frequently to ensure accessibility.

The pre-calver diet is often not particularly exciting to eat (high quantity of straw, sour-tasting dry cow minerals) and pre-calvers often do not have a big appetite as a consequence of being heavily pregnant. Yet success comes from ensuring these cows continue to have high dry matter intakes as this means they are likely to eat more after calving too. This is an art!

Rumen fill, diet palatability and feed refusals

The aim is to keep these pre-calver cows eating. Only high quality forages should be used, so the silage clamp should be checked regularly. There should be minimal sorting – moisten the diet with water (3-4 litres per cow) if a high straw content is used.

Pre-chop the straw if the mixer wagon is leaving straw more than 6cm long. Check the eating behaviour of the cows because their demeanour and eagerness to eat can tell you a great deal (**Figure 2**).

Check sorting with a forage particle separator (**Figure 3**). There should be less than 15 per cent difference in proportions of the diet in each sieve at fresh feed-out and six to 10 hours later. Check that at least 85 per cent of resting cows are ruminating and less than 10 per cent of cows have a rumen fill score below 4 (**Figure 4**). Accept at least five per cent of refusals. This is the feed left over from the day before. It is unrealistic to expect these cows to eat every last morsel.

***Figure 1**. Transition cows should have at least 75cm feed space per cow (Holstein) and feed should be delivered fresh every day and evenly distributed along the whole feed space.*

***Figure 2**. Observation of the demeanour of pre-calvers can tell you a lot about their feed intake. This in-calf heifer has a low rumen fill (score 2) and picks at the diet unenthusiastically.*

Diet composition

The ingredients, mineral levels and energy density of the dry cow diet are very important. It is necessary to have a milk fever control strategy, which always involves composition of the pre-calving diet. In addition, it is important to pre-condition the rumen to the lactating cow diet by including some starch. Meanwhile, the diet must not encourage fat deposition (too high an energy density).

Working with a good nutritionist is often the best approach. As a rule of thumb, look for a total dry matter intake of around 13kg/day and a total energy intake of 115MJ/day (for Holsteins). It is important, though, that some of this energy is provided as starch (for rumen papillae development) which means the forage element of the diet must be controlled for energy density.

Water access

It is true that dry cows don't drink much water compared with their lactating herd mates. But a clean, fresh and accessible supply is essential to keep dry matter intakes up. As dry cows drink less, it is particularly common for their troughs to be very dirty and foul. Allow at least 10cm linear access to water per cow, or one rapid drinker for 10 cows, and always have more than one water source per pen.

Cow comfort and cubicle divisions

For dry cows and fresh calvers housed in cubicles, there should always be at least one cubicle space per cow. For Holsteins, the cubicle should be 1.3 metres wide and the lying length between the brisket locator and rear curb at least 1.8 metres long. The overall length of each cubicle should be at least 2.75 metres, with at least 75cm of unobstructed forwards lunge room.

Less than five per cent of cows should have evidence of rubs or hair loss and no cows should be mobility score 3 (very lame). The beds must be tended daily with dry and ample bedding – preferably deep sand or other comfortable material.

Straw beds (loose housed)

Straw yards need to be of a suitable design so that they have a clear bedded area separated from a feeding/loafing area, with a wide access between the two (**Figure 5**). Straw should be dry (stored under cover) and topped up at least every other day, so that cows remain clean and comfortable.

As a rule of thumb, at least 1m² lying space per 1,000 litres of milk production should be provided for each cow. The area should never be over-stocked, so it is good practice to calculate a maximum occupancy for a straw yard and display this clearly on a board beside the pen. This reminds farmers when they are tempted to put in additional cows (which will be inevitable!).

Temperature and ventilation

Transition cows will suffer an additional reduction in dry matter intake in times of heat stress. As they are already a group vulnerable to low intakes, particular care must be given to ensure their environment is well ventilated, preferably with additional mechanical ventilation or cooling when temperatures exceed 22°C.

Group management

Each time a cow group is destabilised by the addition of new members, the disturbance and re-establishment of a new hierarchy is likely to affect dry matter intakes, possibly across the whole group, but certainly for the new members. Typically, it takes up to seven days for intakes to recover. Stable groups are the ideal – but rarely possible during the transition period – as cows move from 'far-off drys' to 'close-to drys' (very often) and certainly from the dry group to the milking cow group after calving.

***Figure 3**. A forage particle separator (Penn State particle separator) can be used to assess diet sorting. A couple of handfuls of diet are placed on the top sieve and the box is shaken in a consistent manner. The proportion (by weight) of diet in each sieve box is calculated. Results from fresh feed can be compared with the diet several hours after feed delivery.*

***Figure 4**. Rumen fill is assessed by looking at the rumen fossa behind the last rib and under the transverse processes on the left-hand side of the cow. This cow has a score 4 (minimum target for pre-calvers): the fossa bulges under the transverse process and a clear triangular depression is not visible behind the last rib.*

***Figure 5**. Straw yards are best designed long and shallow with a wide access between the straw and the concrete standing area, with a curb to retain the straw in place.*

Reducing unnecessary movements by having a single dry group can be beneficial. An increasing number of high-yielding herds are operating a single dry cow group, often in conjunction with a shorter dry period (35–42 days, for example). There is unlikely

***Figure 6**. An example of a stress-free calving line. Pre-calving cows and fresh-calved cows are in close contact (over a gate) and changes between the two groups are reduced to a minimum – essentially the diet. In this example, the fresh cows are also very close to the milking parlour so they do not have to walk far to be milked.*

to be any detriment to udder health or subsequent yields by reducing the dry period unless it reduces below around 35 days (Grummer, 2008; Steeneveld et al, 2013).

When cows are moved, moving them in pairs (at least) is preferable to moving them singly. Restricting frequency of movements is sensible – to just once a week, for instance.

The concept of a 'stress-free calving line' includes reducing changes either side of calving to the minimum. Pre-calvers are housed in direct contact with (across a gate) a post-calving group, in similar housing (straw yard, for example). The only difference is their diet. When a cow calves she moves from one side of the gate to the other and whilst she is in a new group, the previous nose-to-nose contact is designed to reduce stress (**Figure 6**).

Health and performance monitoring

A system of recording disorders around calving is important to monitor transition cow success. It might be useful to classify cows as having a successful transition (no disorders recorded within first 60 days of lactation) and an unsuccessful transition (any one or more disorders recorded). Of individual disorders, the following key performance indicators are a suggestion:

- < 5% hypocalcaemia
- < 8% clinical mastitis in first 30 days
- < 2% LDA rate (based on 8,000-10,000 litre yields)
- < 8% retained foetal membranes.

Routine monitoring for ketosis and/or rectal temperatures may also be used, or targeted at individuals deemed to be most at risk.

A long time before the transition period, the diagnosis and recording of cows carrying twins is a valuable routine. These cows can be expected to have a shorter gestation (typically by seven to 10 days) and can be managed carefully, being particularly at risk of postpartum disorders.

Body condition score (BCS) management

The target should be to have cows calving at body condition score 2.5 to 3.5. In fact, they should also maintain a constant body condition score throughout the dry period. Realistically, there are likely to be some cows outside this target score – either too fat (perhaps stale milkers), or too thin (perhaps carrying twins or lame).

An achievable target is to have no more than 10 per cent of animals above BCS 3.5 and no more than 10 per cent below BCS 2.5. A plan for the outliers is needed as these are the high-risk cows. Monensin intra-ruminal boluses (Kexxtone, Elanco) are designed specifically to be administered to at-risk dry cows to reduce the incidence of ketosis in early lactation. In my opinion, they are a useful tool in the veterinary surgeon's armoury.

Integration post calving

Even in the best circumstances, giving birth puts a cow at risk of having a lower lying time (more difficulty rising and lying down) or being knocked over. Rather than introducing freshly calved cows into a busy, large milking cow group immediately, it may be beneficial to have a smaller 'special needs' group to accommodate these cows. As a smaller group, their milking times can be reduced to a minimum resulting in less forced standing.

The behaviour and feed intakes of 'special needs' cows can be monitored more closely too, and their environment made particularly comfortable and spacious. Although an additional group results in additional moves, the benefits of a smaller, fresh cow group – housed, for example, on a straw yard or in extra-large cubicles – can often outweigh this disadvantage.

The typical time a cow remains in the 'special needs' group may be around two weeks, but this can be tailored to the individual. Ensuring lying times of 12 to 14 hours per day for these cows, as well as encouraging a rapid rise in dry matter intakes to reduce weight loss, are both important measures to reduce lameness risk.

Summary

Applying a structured approach to transition cow management and monitoring helps identify where changes can be made. This is likely to increase the number of cows achieving a successful transition period. It is easier and more rewarding to focus on prevention of problems rather than wasting time, money and resources to fix them.

The veterinary surgeon's involvement in transition cow health should be ongoing and follow the regular 'measure-monitor-review-manage' cycle that other areas of health management require. ■

PPD Questions

You have a client with 250 cows, calving evenly spread through the year. The herd averages 9,000 litres per cow per year and has a cull rate of 25%, which is also the replacement rate. The calving interval is 400 days. The dry period is 8 weeks. The first 5 weeks are spent in a 'far-off 'group and cows move into a 'close-to' group 3 weeks before their expected calving date. In-calf heifers are integrated into the main herd 3 weeks before their expected calving date (i.e. into the pre-calving group).

1. Assuming the close-to group is housed on straw (loose housed), how much bedded area should be available for the pre-calving group on this farm?
   A. 97m²
   B. 130m²
   C. 115m²
   D. 160m²

2. If the pre-calvers are housed in cubicles, how many cubicles are required for this group?
   A. 15
   B. 13
   C. 18
   D. 20

3. How much feed space is required for the pre-calvers?
   A. 8.6m
   B. 9.6m
   C. 16 head locks
   D. 22 head locks

4. What rumen fill score is the target for pre-calvers?
   A. ≥ 3.5
   B. ≥ 4
   C. ≥ 4.5
   D. ≥ 5

5. Which of the following statements are false?
   A. When a cow is moved into a new group, her feed intake is likely to be affected (reduced) for up to 7 days whilst she establishes her space in the hierarchy
   B. A dry period of less than 8 weeks is likely to negatively affect the subsequent lactation yield and/or udder health
   C. All cows will experience a reduced dry matter intake around calving and this makes a period of negative energy balance almost inevitable in any fresh-calved dairy cow
   D. The diet of dry cows in the far off dry period is unlikely to have a great impact as long as the diet is correct in the period 3 weeks prior to calving

Answers

1. D. The number of expected calvings per year is 250/400 x 365 = 222. This is 4.26 per week, so 12.8 every 3 weeks. The cows each need 9m² of bedded area (1m² per 1000 litres). 9 x 12.8 = 115m². However, this is for average and we must make available 140% x the average to account for fluctuations in numbers throughout the year. 115 x 1.4 = 161. The pre-calvers must *never* be over-stocked for lying space.

2. C The number of expected calvings per year is 250/400 x 365 = 222. This is 4.26 per week and 12.8 for every 3 weeks. Multiply by 1.4 to account for fluctuating numbers throughout the year. The pre-calvers must *never* be over-stocked for lying space.

3. D The average number of cows in the group will be 12.8 (see Questions 1 & 2). The feed space needs to be 5 headlocks per 4 cows, or 75cm per cow. This is 16 headlocks, or 9.6m, on average. But, we must multiply by 1.4 to account for fluctuating numbers throughout the year (22 head locks or 13.4m). The pre-calvers must *never* be over-stocked for feed space.

4. B 4 or above.

5. B&D The dry period must be lower than around 35-40 days before significant deleterious effects are likely. Energy intakes during the far-off dry period can hugely influence risk of ketosis, for example.

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Rod Welford
BVM&S MRCVS

Rod Welford qualified from the University of Edinburgh veterinary school in 1990.

Hailing from a mixed dairy farm in Yorkshire, the large animal side of general practice has always been his prime interest and he has worked for 25 years in the Millcroft Veterinary Group in Cockermouth. The practice covers farms that have sheep grazing the highest Fells in England.

A love of fell running across – and paragliding above – the Lakeland Fells has given Rod a privileged perspective of the landscape and he has witnessed the scenery change and alongside it the balance of disease.

**Suggested Personal & Professional Development (PPD)*

TICK-BORNE DISEASE

Tick-borne disease in sheep – a changing landscape

Many of the diseases we witness are governed by landscape and climate. This is true for 'tick-borne disease' (TBD) that relies on the tick as a vector between hosts. The tick's habitat is a deep vegetative mat, such as is found on bracken, moor and heath. *Ixodes ricinus* is the major sheep tick in the North. *Haemophylis* and *Dermacentor* can affect areas of southern England and Wales.

Ticks live in the deep moist vegetation, taking a blood meal from various hosts (bird, rabbit or sheep) each year (**Figure 1**). In total they feed for only 10-14 days over their three-year life cycle and are active above 7°C, when they 'quest' by seeking a host before returning to their vegetative mat.

Spring and autumn peaks are recorded, but it is not uncommon to witness tick activity almost all year round; which is not surprising when you consider the many secluded south-facing slopes.

The north west quadrant of the Lake District National Park, where much of the high fell is common land, is grazed by the hefted Herdwick or Swaledale (**Figure 2**). Sheep are gathered from the fell for key interventions, such as tupping, lambing, clipping and weaning.

At these times a head count – historically conducted in local dialect, 'yan, tyan, tethera, methera, pimp...' – will indicate those sheep missing, or as they are colloquially termed, "lost to the fell". The variations can be profound, with areas recognised as 'dirty fells' and others as 'clean fells'. Farmers recognise specific parts of the fell as 'dirty' because they are often associated with higher losses from tick-borne disease (**Figure 3**).

'Dirty fells' can witness annual losses of 15 per cent of lambs at foot and 10 per cent of gimmer yearlings returning to the fell. When naïve sheep are put to dirty pasture these losses can exceed 50 per cent. Fell farmers report increasing losses in these locations, together with a greater incidence of 'cravocked' lambs – those lame, light and failing to thrive.

Common tick-borne diseases

Louping ill

The infectious agent that causes louping ill is a flavivirus that induces signs of encephalitis. Its name comes from the characteristic 'lolloping' gait that is exhibited when affected sheep are moved. Most, however, are found dead or in a state of terminal neurological extremis that generally indicates imminent death.

Tick pyaemia

This is a blood-borne staphylococcal infection introduced by the feeding tick. Tick pyaemia is a common sequel to tick feeding because the staphylococci are carried on a sheep's skin. With a high

***Figure 1**. A typical tick life cycle. The ticks found on sheep are the pregnant feeding adults, at the end of a three-year life cycle spent almost entirely within the vegetation. This final feeding stage (lasting 7-10 days) sees the tick engorge on a blood meal, becoming the size of a pea before dropping off to lay eggs. During this feeding, tick-borne disease can be passed to and from the tick.*

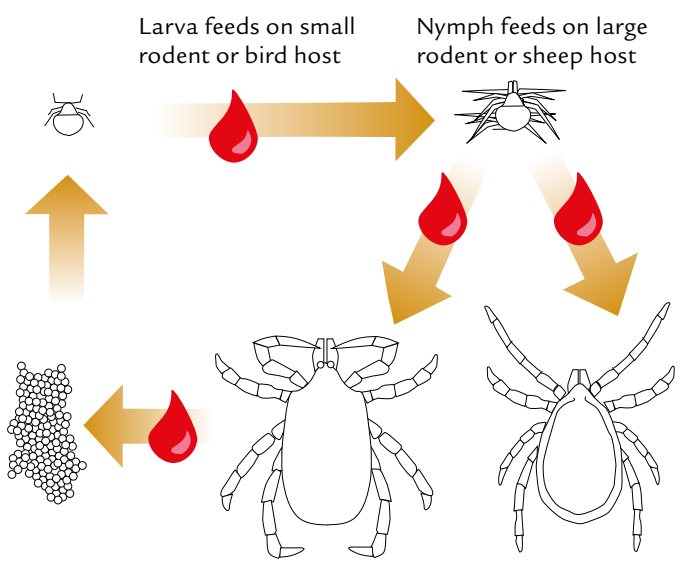

***Figure 2**. The north west quadrant of the Lake District National Park, where much of the high fell is common land, is grazed by the hefted Herdwick or Swaledale.*

***Figure 3**. A Swaledale ewe lamb turned to the fell in summer is found dead having succumbed to tick-borne disease. A post-mortem confirmed an overwhelming tick pyaemia with concurrent signs of tick-borne fever.*

challenge, or in weakened sheep with concurrent tick-borne fever, for instance, it can induce losses or leave 'light' chronically lame lambs or 'cripples'.

Tick-borne fever

Tick-borne fever (TBF) is caused by *Anaplasma phagocytophilia*. This invades the white blood cells and 'drags down' the body's immune system, leaving it vulnerable to attack from other infections, such as the other two key tick-borne diseases listed above.

TBF alone is often a transient infection of sheep but the associated pyrexia can leave rams temporarily infertile, or cause abortion when pregnant ewes are exposed. Concurrent infection with louping-ill virus will precipitate losses.

It is interesting to note that a common practice on fell farms is to house newly purchased tups prior to use, 'lest they will fail to leave lambs'. Considering the pyrexia invariably associated with a fresh tup encountering TBF, there is more than a little credence to this folk law.

If your clients are finding ticks on sheep and witnessing losses or the clinical signs above, then it is important to distinguish which tick-borne diseases you are facing. Sheep presented in a terminal nervous state often look much alike and they are best sacrificed for post-mortem investigation. Immunohistochemistry is the definitive confirmation of louping ill virus, associated with non-suppurative encephalomyelitis. Suggestive neurological signs of the condition can be supported by acute phase IgM or retrospectively diagnosed from seroconversion via IgG. Bloods taken from a cohort of older sheep that graze the same area can indicate the wider picture.

TBF can be confirmed on haematology by the presence of Geimsa-stained inclusions

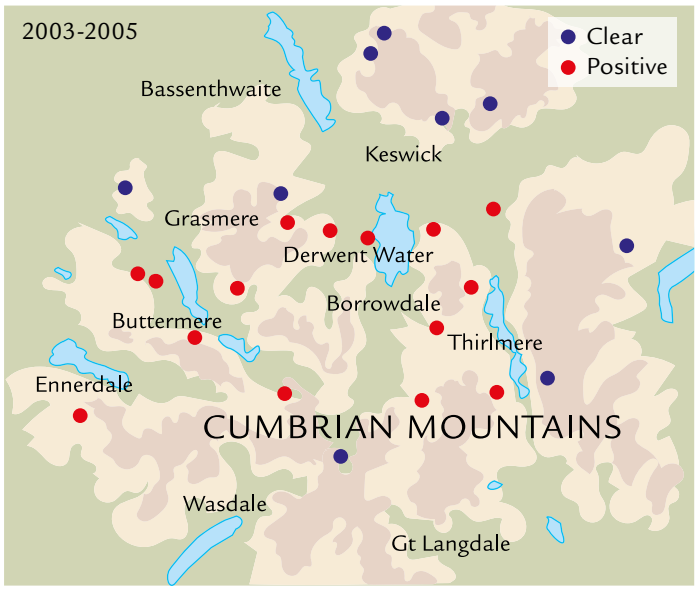

***Figure 4**. Fells and commons showing evidence of louping ill in 2003-2005.*

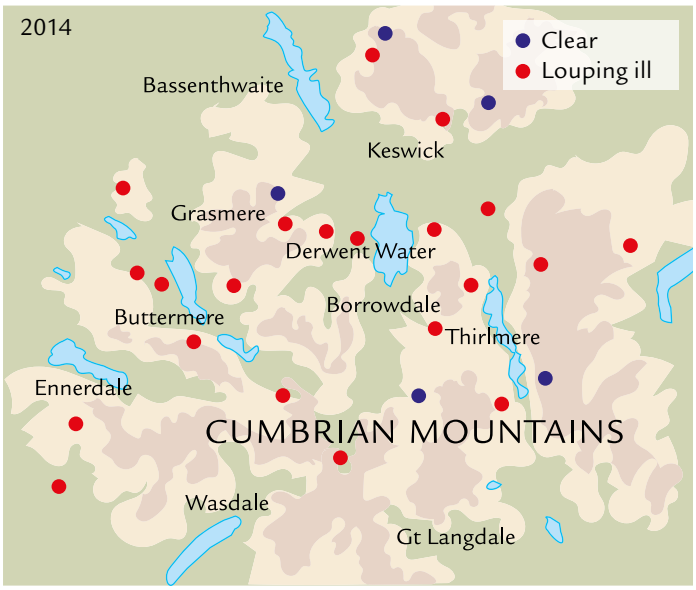

***Figure 6**. Fells and commons showing evidence of louping ill in 2014.*

within neutrophils. A polymerase chain reaction (PCR) test for TBF is available and undergoing validation.

Tick pyaemia is confirmed by culture of *Staphylococcus aureus*.

Local survey results

From the early 2000s, farmers in North West Cumbria were reporting a rising concern over tick-related disease. Millcroft Veterinary Group decided to investigate the tick diseases in order to map out the dirty fells. During the clipping gathers of 2003-2005, we sampled six ewes from 24 farms that cover the north-west quadrant of the Lake District National Park. The results are shown in **Figure 4**.

The louping ill sero-negative fells were consistent with those locations seeing less tick-borne disease and termed 'clean fells'. In the summer of 2014, Chris Sharman, a local veterinary student, re-ran this study to assess the changing picture that was being fed back from some farms. This work was supported by Amanda Carson of the AHPA and the Herdwick Sheep Breeders Association (**Figure 5**).

***Figure 5**. A Herdwick ewe and lamb.*

The results show that the geographic range of louping ill has extended into previously clean areas (**Figure 6**). In 2003-2005, 41 per cent of holdings tested were clean. This had been reduced to 19 per cent clean by 2014.

We also tested for *Anaplasma phagocytophilia* 'tick-borne fever', both to help validate an evolving PCR test and to map its distribution. The results confirmed that tick-borne fever is fairly ubiquitous on the north west lakeland fells.

Significance of findings

The incidence of tick-borne disease is reported to have risen over recent years. Why should this be considering ticks and the diseases they carry are not new to the fells? What has changed is the way the fells are managed?

Environmental schemes have encouraged farmers to reduce stocking rates on the fell. The result is a noticeable increase in vegetation – such as bracken, that is ideal tick habitat – alongside its distribution on the fells (**Figure 7**).

More sheep are wintered off the fell and hence have less opportunity to harden themselves to the tick-borne diseases by accruing gradual exposure and immunity. The result is two-fold – an increased challenge and a decreased immunity.

The expression of tick-borne disease is a balance of immune status versus tick-borne challenge. The implementation of some environmental schemes has seen the balance shift in favour of the disease. Sheep that are destined to live in areas of tick habitat need to acquire an immunity and become 'hardened to the fell'. The key is to recognise the naïve animals and buffer the challenge, allowing a gradual exposure rather than overwhelming challenge.

Summary

The following points are particularly important:

- obtain a diagnosis as it is important to know which tick-borne disease is part of the clinical picture.
  The aim is to reduce challenge whilst encouraging immunity –

some areas are louping ill virus-free, so vaccine is not appropriate here
- the general rule is to manage the introduction of younger, naïve sheep in order to encourage a gradual exposure and natural immunity – avoid putting naïve sheep on the dirtiest fells
- beware introducing outside sheep to tick areas as they may have no immunity to the endemic tick-borne diseases
- buffer the tick numbers by timely application of synthetic pyrethroid pour-ons. Tick prevention requires a line applied between the fleece (as opposed to the fan application indicated for blow-fly)
- where louping ill is of concern, a vaccine is available to help protect naïve sheep if used in advance of the challenge.

Finally, this article covers only the common tick-borne diseases in sheep. Those mentioned can affect species other than sheep and a wide range of less pathogenic TBDs can be found in sheep. ■

***Figure 7**. Bracken on the fell provides the ideal environment for the tick.*

PPD Questions

1. How old is the pea-sized sheep tick we commonly remove from dogs?
2. Name the three major tick-borne diseases of sheep
3. Where do ticks live?
4. Where would you find *Anaplasma phagocytophilia* in the host?
5. How can farmers manage tick exposure to reduce losses?

Answers
1. This is the adult, three-year-old, female engorged with blood on its final host before dropping off to lay eggs
2. Louping ill, tick pyaemia, tick-borne fever
3. Anywhere there is a deep vegetative mat that provides a moist habitat between 'questing' to find a host for their annual feed
4. In inclusion bodies within white blood cells whereby it expresses its immunosuppressive effect
5. Understand the basis of tick-borne disease; manage the exposure of naive stock to tick-burdened land, with the aim of gradual exposure to tick diseases and buffering the tick challenge with synthetic pyrethroid (SP -pour-ons)

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The benefits of an integrated computer system

In its day the traditional practice management system (PMS) was revolutionary for the practice manager, saving time and making systems much more efficient. Client record keeping and invoicing became much easier to manage and the addition of a stock control system potentially saved practices many thousands of pounds.

Traditional practice management system (PMS)

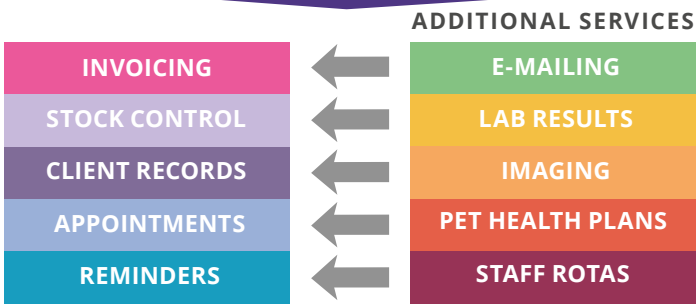
With the advent of the digital age numerous new facilities and services can now be provided electronically and the role of technology in modern practice is even more significant.

Adding new facilities to an existing PMS is best done as a fully integrated solution and practices that are able to do this will see huge benefits and greater efficiencies.

The ability to create and view staff rotas, record and integrate lab results, add digital images to the client record or have a seamless integration of a pet health scheme are all rewarding but can be more time-consuming, if this involves using different suppliers for the different services.

The dependence on multiple support services is never a good option and certainly does not help the busy practice manager.

Adding bolt-on services to the traditional PMS



Preferable to 'bolting on' these extra facilities is to work with as fully integrated a system as possible. With many IT facilities and services all interconnected and 'joined up' they can work together seamlessly to provide an efficient and effective management tool for both vets and practice managers; which in turn significantly improves the service a client can receive from the practice.

Ask any practice manager or owner what they would like to see from a PMS and you will be given a long wish list of facilities and services rather like the list below.

What do you need from your IT provider?

- Accurate and up-to-date client and animal records providing instant access to all aspects of an animal's health and history.
- An invoicing system that enables stock items and services to be added to the client's invoice while also providing access to reports, end-of-day and month procedures and loyalty point schemes.
- An appointments system providing proactive planning to level out appointment peaks and troughs while the status of arrived clients as well as emergency patients and others who have arrived without an appointment can be easily accessed.
- SMS text messaging allowing text messages to be sent from a client's record to remind them about appointments and treatments and the ability for messages to also be sent to vets on the road.
- An easy-to-use system for creating and viewing staff rotas.
- Appointment hospital and daybook modules which have the attendance check facility within them enabling checks to be automated and sent in batches to more than one client at a time; thereby helping to avoid missed appointments and no shows and a choice of contact method so this can be carried out automatically via SMS and email or manually by telephone.
- Targeted electronic client communications allowing the sending of personalised and automated text message and email reminders and the ability for information to be merged with data held in client and patient records into a text message or email reminder for multiple recipients, similar to mail merge.
- The generation of reminders for any product or service from an initial purchase or recommendation that can be generated for any specified intervals utilising information about a client's preferred method of communication and allowing the user to select which form of communication is most appropriate.
- An organised daybook which enables large animal and equine practices to organise offsite visits more efficiently, for example, by arranging rounds to minimise mileage.
- A stock control system where there is immediate access to information about the practice's stock items and where batch numbers can be tracked as well as allowing expiry dates and low stock levels to be flagged. Electronic ordering and stock reports should also be included.

>>>

What else would it be great to have?

- Consultation notes which can also include graphical and chronological representations of dental, skin and eye conditions.
- The ability to electronically store all patient files together with the animal's 'card or folder' so that it can be easily accessed and easily emailed. These files would include such items as histology images, X-rays, MRI studies, DICOM images, movies, JPEGs, PDFs and Word documents.
- A computer system that can integrate with diagnostic equipment so that results can be fed into the system electronically and stored in the animal's record and also be viewed as a graph.
- To be able to work with third party laboratories who provide in-house laboratory equipment so that the in-house lab results are passed directly from the machines to the PMS lab results waiting list so that vets can see what results have come in; and attach the results to the client record and, if laboratory work is done externally, have the laboratories send the results onto the lab results waiting list.

Anything else?

- To have a practice email solution which as well as meeting data security standards would work with the existing practice network, offering a professional and standardised structure for the practice email. So rather than all members of the practice having to share one email address or sending out emails from an array of personal email accounts, the practice team could send emails that all link to the practice's own domain name. Even better if this is synchronised with mobile phones, laptops or home computers so that we can send, receive and compose emails from our laptop, mobile, home or practice computer and they are synchronised to be accessible from all the practice devices.
- To have a PMS that facilitates an efficient Practice Health Plan allowing clients to have a range of services and products throughout their period of cover paying for them over a period of time managed by the PMS. To have a system that tracks which items the client has been issued with and deducts them from the pre-defined allowance and integrates seamlessly with the PMS so that if a client uses any of their allocated scheme products they are automatically charged or not charged depending upon their status within the scheme. Even better if the system can inform the practice of all monthly payments due.
- A picture archiving and communications system (PACS), is a fully integrated multi-user and multi-screen imaging solution for managing records to enable the storage and distribution of DICOM (Digital Imaging Communications in Medicine) studies across a network. Images which can be integrated automatically into client records and everything housed centrally but be able to be accessed remotely if required.
- To create, send and track insurance claims so that the practice simply needs to select the items that make up an individual claim from an animal's financial history and enter them into the system. To have a system that tracks claims by the owner, animal and insurance company category, condition and status right through to final payment. For submission of claims forms to be quick and easy and for the possibility of double claims to be eradicated. To have printed forms accepted by all major insurers and an electronic facility so claims can be sent to insurance companies.
- To have a system that is secure and protected from the wide range of internet abuses (viruses, phishing attacks, email scam etc) that we hear about on a daily basis.
- To work with a company that is innovative and continually developing new products and services to help my practice develop clinically and financially.

It's a lot to ask of a single PMS

It does seem a lot to ask of a PMS and to expect all of this in one fully integrated system which is versatile and flexible enough to be configured to cater for all types and sizes of practice. What we need to realise is that technology has moved on and rather than simply 'shopping for a PMS' a practice now needs a digital partner who can advise on and provide for the practice's current and future IT needs.

Long-established veterinary-owned computer company **AT Veterinary Systems** provides integration to a wide range of services as well as having one of the largest 'stables' of IT products and services available for practices. In addition to its leading practice management system, **Spectrum DDS**, it also produces **IRIS PACS**, **Rota Manager**, **Vision Email** and **SMS system**, **Vision sentinel security**, **Lab Manager PIMS**, **Spectrum ECM** and a range of web-based services.

With an active pipeline of new and innovative products having **AT Veterinary Systems** as an 'IT partner' not only allows a practice to achieve a fully integrated system but one that keeps on evolving to meet the growing needs of veterinary practices.

To find out more about the full range of products and services available from

AT Veterinary Systems telephone: **01359 243 400**

or email: **enquiries@vetsystems.com**

AT VETERINARY SYSTEMS

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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)*

AMPHIBIANS

Some notes on commonly kept amphibians – newts and salamanders (caudates) and caecilians

This the third in a series of articles covering the management and veterinary care of amphibians. Most general comments were covered in two previous articles featuring, respectively, treatment options [*VPT* May/June, 3(3): 52-55] and anurans [*VPT* July/August 3(4): 49-52]. However, a few specific notes are necessary when considering newts, salamanders and caecilians.

Unlike anurans, several species of caudates – including common pet species – may show neoteny (develop sexual maturity whilst remaining in the juvenile, gilled stage). Many also have distinct variation in 'phases' (aquatic versus terrestrial habitats) throughout the year.

It is notable that many of the common pet caudates – in contrast to anurans – tend to be temperate species, and more consideration is likely to have to be given to cooling rather than heating. Active cooling may be needed (even in the UK!) and, if not provided, this may cause stress with resulting increased susceptibility to disease.

With regards to behavioural observation, terrestrial/terrestrial phase caudates are very largely crepuscular/nocturnal, and generally secretive. In captivity, they may adapt and learn to feed at a specific time, or even become more active during the day; but certainly for new captives significant diurnal activity may indicate an environmental and/or health problem.

Although bloodworms (red mosquito larvae) are often used as a staple diet for aquatic/aquatic phase caudates by hobbyists, nutritionally this is not advisable. This unwise practice is not specific to caudates, but far more common with them than anurans.

Unmodified cultured bloodworms are a very poor staple diet because their calcium:phosphorus ratio, notably, is very poor. They may well be commercially available with added (gut-loaded/soaked) vitamins which will improve things; but, in general, they should be discouraged as a staple food.

Bear in mind that the bright colours associated with some caudates (whether all over or ventral only) is generally warning colouration; whilst not as toxic as the arrow poison frogs, the skin secretions can irritate mucous membranes.

Finally, unlike the case with anurans, length measurements are generally for the body *plus* the tail.

CAUDATES

Axolotl

Species

Axolotls (*Ambystoma mexicanum)* originate specifically from a small number of lakes in central Mexico. They are a very endangered species in the wild, being restricted to a small area of one lake.

Description

Axolotls are a large, moderately heavily built species with large bushy external gills and a laterally compressed tail. Their natural colour is dark/olive brown but there are many colour variants – especially albino – that are common in individuals kept in captivity.

Adult size

Adults can be up to 30cm in length (including the tail) and weigh up to 200g or over.

Sexing

Sexually mature males have larger cloacal regions and are generally less heavily-built than females; although, as is often the case with such features, it is not always clear-cut.

Longevity

A life spanning over 25 years has been recorded in captive individuals.

Natural history

Axolotls show neoteny, in that they live their whole lives and breed in the aquatic, gilled state. In some cases, metamorphosis to adult forms may be induced (and can occur spontaneously, with possible owner concern!).

They have long been used in experimental biology, and are noted for their regenerative abilities, such that damaged or amputated limbs will be re-grown.

Class of enclosure

These caudates are aquatic (unless metamorphosed).

Specific husbandry notes

Water temperature is very important for axolotls and their natural habitat is cool. So the recommended water temperature is in the relatively narrow range of 16°-20°C because temperatures over about 22°-23°C will stress them.

Substrate ingestion is a relatively common problem, so there should either be no substrate, or particles must be too big to swallow. Axolotls are quite messy animals too, so good filtration

***Figure 1**. A tiger salamander in a (somewhat small) semi-aquatic set-up.*

***Figure 2.** A fire salamander.*

and frequent water changes are necessary, otherwise nitrogenous waste and/or potential pathogens are likely to build up.

Although they are reasonably tolerant, axolotls prefer soft water of pH 7-7.5; but it is important to avoid strong water flows from filters and other sources.

The use of UV lighting is controversial – possibly unnecessary, but it may be beneficial. If provided, it should be at a low level of intensity and easily avoided by the animal.

Specific health notes

Cage mate-inflicted wounds are not uncommon when axolotls are kept in groups. They can be fairly indiscriminate feeders; and, as mentioned earlier, substrate ingestion is common if ingestable-sized substrate is used.

'Fridging' (at 8°-10°C) is often recommended – in hobbyist literature or on websites – for all sorts of illness. Anecdotally, it appears to have benefits in some cases; but caution is needed. It may encourage regurgitation if substrate has been swallowed.

Similar species

There are several *Ambystoma* species in the same area in the wild, which can interbreed and produce fertile offspring. There is a suggestion that most of today's captive axolotls are not 'pure' and how much cross-breeding occurs in the wild is unknown.

There is a much rarer (in captivity) species called Anderson's Salamander (*Ambystoma andersoni*) which may be encountered; husbandry is similar to that for *Ambystoma mexicanum* and distinguishing it from other axolotls is often difficult.

Firebelly newts

Species

The Japanese fire-bellied newt (*Cynops pyrrhogaster*) and the Chinese fire-bellied newt (*Cynops orientalis*) may be misidentified in pet shops. There are some subtle differences but, without experience, it is difficult to distinguish between the two.

Description

Typical newt shape, dorsum generally dark brown but ventrum bright orange, possibly with some black/brown markings. Skin is noticeably granular and there are visible parotid glands.

Adult size

Large adults may reach 10cm or so in length, with bodyweights of only a few grammes.

Longevity

These newts can live as long as 20-plus years.

Sexing

Out of breeding season, it is not possible to sex individuals visually. During the breeding season, male Japanese newts develop a fine filament on the end of their tails.

Natural history

These newts are found in a variety of habitats in south-east Asia and they are mostly fairly aquatic.

Class of enclosure

These newts are semi-aquatic (primarily aquatic), so a small hauling-out area is typically all that is used.

Specific husbandry notes

These creatures come from still waters, so currents in the tank should be limited as far as possible. The temperature should be kept below approximately 23°-24°C – higher may cause stress.

Specific health notes

Unfortunately, these newts are generally very 'cheap' to obtain and are consequently often considered to be 'disposable'. Wounds and infections are very common in many individuals originating from pet shops.

Similar species

Other not too dissimilar species groups are also available and include paddletail newts, (*Pachytriton* species) and crocodile newts (*Tylototriton* species). The crocodile newts are generally more terrestrial; whereas the paddletail newts are almost wholly aquatic – and if they are spending significant time on land, it may suggest a problem with the environment.

Terrestrial ambystomids (mole salamanders)

Species

Various species of ambystomid salamanders are found throughout much of North America. The Eastern tiger salamander (*Ambystoma tigrinum* and *A. mavortium*) (**Figure 1**) are perhaps most common; others include the spotted salamander (*Ambystoma maculatum*) and the marbled salamander (*Ambystoma opacum*).

Description

These are relatively heavy-bodied salamanders, often fairly strikingly patterned with lighter markings on a dark background.

Adult size

Adult tiger salamanders can reach 30cm or more in total length (including the tail). Their bodyweight may be 200g or more; although 150-180g is more usual.

Longevity

The life span of these salamanders may be 15 years or more.

Sexing
Males have a somewhat enlarged cloacal area; although without several with which to compare this, it may not be easy to determine.

Natural history
These newts are widely distributed in North America – from Mexico to Canada. They are nocturnal, secretive and spend most of their time in burrows. Neoteny may occur.

Class of enclosure
Enclosures for these species need to reflect the fact that they are largely terrestrial.

Specific husbandry notes
Cool ambient temperatures are required by these species, so more than about 24°C should be avoided. Burrowing substrate and/or plenty of hiding places should be provided.

Specific health notes
There are no specific health notes for these species.

Similar species
The European fire salamander (*Salamandra salamandra*) (**Figure 2**) is a bright yellow/black species that is similar, widely distributed in Europe and probably more common in captivity in the UK. There are many recognised subspecies.

Eurasian newts
Species
There are various *Triturus* and *Lissotriton* (formerly *Triturus*) species. Example would be marbled newts (*Triturus marmoratus*) (**Figure 3**) and Alpine newts (*Lissotriton alpestris*).

Description
Eurasian newts are a classical 'newt' shape, of varying colour according to species. They have generally fairly dull colouration on the dorsum – except marbled newts and some Alpine newts – but bright colouration ventrally.

Adult size
As might be expected, the sizes of these animals varies with species – up to 25cm (including the tail) for larger species (notably *Pleurodeles waltl*), but most are 6-12cm.

Longevity
A life span of over 20 years has been recorded for several of these species.

Sexing
Males develop elaborate crests and brighter colouration during the breeding season, and sexing may or may not be possible out of this period. Some species/individuals retain remnants of their crests.

Natural history
As a whole, this group is widely distributed throughout suitable habitats in Eurasia, although individual species ranges vary – even within a species, the range can vary widely. Their habitat is generally made up of leaf litter (when terrestrial).

The duration of the aquatic phase depends somewhat on the species involved – and even geographically within a species. Many return to water for a brief breeding season in spring, and are entirely terrestrial for the rest of the year; whilst others remain in suitable bodies of water over the entire spring/summer/autumn.

Males generally develop bright colours and/or crests during the breeding period in the spring.

Class of enclosure
The balance of aquatic versus terrestrial components required by these animals depends somewhat on the species involved; although many are tolerant of a moderate bias in either direction and can be kept successfully predominantly aquatic or mainly terrestrial.

Some populations, particularly of alpine newts, are neotenic.

Specific husbandry notes
Higher temperatures should be avoided, which may mean active cooling on hot summer days in the UK. Appropriate seasonal variation in temperatures and photoperiod are advisable.

Specific health notes
There are no specific health notes needed.

Similar species
The more 'exotic' species, such as the *Neurergus* species from the Middle East, are now in the captive 'hobby', even though they are endangered and on the CITES Appendix I. They have essentially similar requirements for routine care.

Sirens and amphuimas
Species
There are various species of sirens and amphuimas.

Description
These are elongated, heavy-bodied aquatic amphibians with reduced or absent toes and/or limbs.

Adult size
Some of these species grow to over one metre in length.

Longevity
Life spans of over 25 years have been recorded.

Natural history
All species are North American and aquatic: although amphiumas are lung/skin breathers, whereas sirens have external gills.

Sirens have reduced front legs and no hind legs;

Figure 3. *Juvenile marbled newts.*

Figure 4. *The head of an amphiuma.*

amphiumas have all four limbs but they are almost vestigial in form. (**Figure 4**).

Class of enclosure
These creatures are aquatic in their environmental requirements.

Specific husbandry notes
Eyesight is reduced in amphiumas, so their hunting is carried out by means of smell and touch. They are reportedly prone to biting; but that may reflect the fact that they interpret a touch as possible prey and strike quickly.

Specific health notes
As is the norm for all aquatic species, water quality is very important.

CAECILIANS
Rubber eel
Description
The rubber eel (*Typhlonectes natans*) has an essentially eel-like body – though without fins and with reduced eyes (covered by transparent skin). Colouration is dark grey dorsally and lighter ventrally.

Adult size
Rubber eels can reach over 700mm in total length and weigh up to 250g.

Longevity
Life spans of over 13 years have been recorded.

Natural history
Rubber eels are found in northern South America – mainly Colombia and Venezuela – and are little known in the wild. They are not territorial as such, but males may interact aggressively with each other.

They feed on a variety of foods – in the wild, often detritus from fishing – so in captivity, a variety of invertebrates and amphibian pellets should be offered.

Sexing
In theory, adults may be sexed by the shape of their cloacal disc – which is large and round in males and more elongated in females. The reliability of this procedure depends to a large extent on experience.

Class of enclosure
Rubber eels need a semi-aquatic (primarily aquatic) environment.

Specific husbandry notes
The water temperature should be 24°-28°C (some data suggest slightly higher), and reasonably 'soft' (recommended <5.5 °dH). These eels produce relatively high bioloads, so good filtration and frequent water changes are recommended.

They are also very good at escaping and relatively strong, so lids must be secure and heaters should be guarded, as they may wrap themselves round them.

Specific health notes
Wild-caught individuals commonly have heavy nematode burdens and these may cause skin lumps. Dermatitis generally is described as common, although this may be more because it is easier to diagnose.

Similar species
Other aquatic caecilian species are generally treated similarly, though more from lack of data than established knowledge. *Typhlonectes compressicauda* is a similar species found in a large area of northern South America.

Terrestrial caecilians
Species
African caecilians – commonly *Geotrypetes seraphini* or *Herpele squalastoma* – are perhaps the commonest; although specific identification may be questionable in some cases.

Description
These caecilians are generally earthworm-like, blue-grey in colour with a segmented appearance.

Adult size
This is not well known in many cases, but 12-35cm is common.

Longevity
Life spans of five to 20 years are quoted.

Natural history
Terrestrial caecilians are generally fossorial (burrowing), although some may be considered semi-fossorial. Most species in the pet trade appear to be from Africa.

These are very secretive animals, whose diet consists mainly of invertebrates.

Class of enclosure
A terrestrial environment is required.

Specific husbandry notes
A burrowing medium is strongly recommended for these animals in the long term, although they can be kept successfully in folds of damp tissue paper for a short period or for quarantine. The temperature gradient should be approximately 28°C at the hot end to 20°C at the cool end.

Specific health notes
Little is known about conditions affecting these species. Mycobacterial infection has been recorded, as have fungal and bacterial infections. Hygiene,therefore, may be an issue in burrowing media. ■

PPD Questions

1. What is neoteny?
2. Most caudates should be kept below what sort of temperature?
3. What sort of water flow should be aimed for in firebelly newt tanks?
4. Apart from the routine parameters of nitrogenous waste (ammonia, nitrite and nitrate) and pH, what common water parameter should be checked for when keeping *Typhlonectes* aquatic caecilians?

Answers
1. Attaining sexual maturity whilst retaining some physical juvenile features
2. 22°-24 °C
3. As little as possible on the animals
4. Hardness

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Deborah Croyle

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

**Suggested Personal & Professional Development (PPD)*

CREATIVITY

Give me an idea...

You've reached where you are today by being analytical – assessing clinical signs, researching treatments and calculating dosages. But maybe there's room for more creativity in your work – in marketing and advertising, when addressing 'people' issues and, particularly, when problem solving.

The two skills are complementary – analytical thinking is essential to being creative. The difference is that analytical thinking works in logical steps towards one correct answer, whereas creative thinking may be incorrect or incomplete and move in jumps – or even sideways – towards more than one answer.

Let us dispel a myth. You do not have to be 'right-brained', a musician, painter or writer to think creatively. Some people find it easier than others, but anyone can do it with practice, because being creative is a state of mind that can be developed. It is not something you are either born with or without. The biggest hurdle is allowing yourself to be creative – don't just think "It's easier to follow the rules" or "I can't be seen to make a mistake" or "My team would laugh at me".

Your role

As a manager, owner, or partner you are in a position to develop and nurture creativity within your team. To do this, look at the individuals, the team, your leadership style, the culture and the physical environment.

Who are the creative thinkers in your team? Do they think forwards or backwards? How can you use their abilities? Value and use their individuality.

What is their role in the team – formal and informal? Do they feel they have 'permission' to make suggestions and challenge the current situation or do they feel constrained?

> **"Promote creativity, support imagination and experimentation and tolerate failure"**

Do you share and delegate the running of the business or do you feel you have to make all the decisions and have all the ideas? Other people may approach things differently to you but that doesn't mean their ideas are better or worse – just different!

How well do you communicate? Are your conversations and meetings a genuine two-way exchange or just a way of passing information and instructions downwards?

Do you encourage creativity? Do you talk about business issues or keep them bottled up? A democratic leadership style will help, as will a facilitative approach, trust, and a low level of control.

Remember that happy people are more creative than unhappy people! Many people are only creative briefly – it may be better to park an idea and return to it another time.

Look at the physical environment in your business. Do notices and posters encourage lateral thinking or are they all about clinical matters? Is the décor stimulating or depressing?

Your mind-set

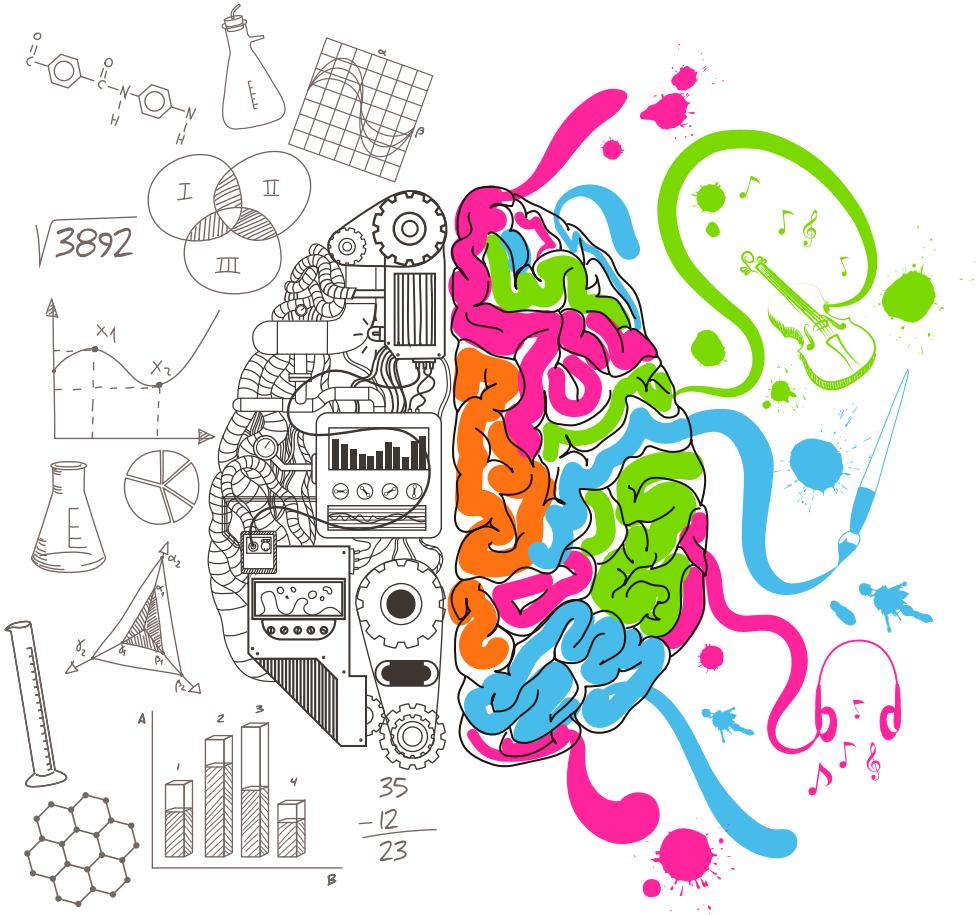
Challenge your normal mind-set and assumptions, suspend judgement and be prepared to work without all the information. Try adapting what already exists – if it doesn't work, leave it and try again in different, unconventional ways. Be dissatisfied with the current state of affairs and determined to find a solution.

Use your vision and imagination to help see the big picture and allow your mind to wander creatively. Above all believe in your own ability!

Build your capability

There are many ways to build capability; so the list below is just a start. These tips work by making you look at things in a different way – the essence of creativity!

- do cryptic crosswords and other word puzzles – these encourage you to find alternative meanings for words
- do 'dingbats' and other visual puzzles – these encourage you to look at words and shapes in a different way



The analytical and creative brain. Image: © freepik.com

- work forwards – find abnormal uses for normal objects
- work backwards – start with the ideal end in mind
- fusion cookery – make a 'use-up' meal of whatever is in the fridge; and only that
- look at roads as they were before a bypass was put in. Use old maps, look at the lines of hedges where they leave the road, look for straight roads built on old railway lines
- look at buildings as they were before an extension was built. View old buildings that have been extended or converted and try to visualise how they used to be
- take unusual photographs through different frames – such as tree branches, gateways or holes in a wall – this has a direct link to framing your issue differently
- use all the resources available to you – talk to different people about their own interests and abilities and consider how these might mirror your own
- park your thoughts and allow your subconscious to work on them overnight or when commuting.

Creative problem solving

If your habit is to think analytically, it may help to consider creative thinking as a five-step process (**Figure 1**).

Define the right issue accurately

Make sure that you are addressing the root cause of the issue, and not a symptom. It is pointless just to tackle the symptoms – because if you have ever tackled the same problem repeatedly you've probably not addressed the root cause.

Is it a people problem, or the process they're using? Is it the materials and tools in use, or the way they're being used? When stating the problem, phrase it positively starting "How to..." to encourage a solution, rather than "We are losing too many clients". Phrase it as "How to improve client retention".

There are several methods available to help. These include:

- a 'Fishbone' or 'Ishikawa' diagram – to help you find the root cause of a problem
- asking the 'Five Whys' – another way of seeking a root cause
- seeking SMART objective/s – to define what you want your outcome to be.

More information on these and other tools is listed below and is also available online and elsewhere.

Investigate the issue fully

When investigating the issue, use one or more of the following methods:

- SWOT analysis – to consider the strengths, weaknesses, opportunities and threats in your situation
- PESTLE analysis – to consider the political, economic, social, technological, legal and environmental aspects of the issue and use these to inform your SWOT analysis
- Porter's Five Forces – to consider substitutes, supplier power, competition, buyer power and barriers to starting when launching a new service
- Trend analysis – to visualise how the numbers have changed over time by using a graph
- Force Field Analysis – to determine what helps resolve the issue and what hinders it.

Gather as much data as you think you need, and analyse them to elucidate useful information. Check their validity – the date, context and so on – because assumptions based on incorrect data will never be correct by themselves. For example, you might attribute increased turnover to your advertising; but what if it coincided with school holidays or was just after Christmas? However, beware of the 'need more info' trap.

***Figure 1**. The five steps of creative thinking.*

- make sure you've defined the right issue
- investigate the issue fully
- generate as many solutions as possible
- evaluate your solutions using relevant criteria
- select the best solution – or a combination.

"Remember too that conformity stifles creativity"

At times you will need to go with what you have to hand.

You may also care to consider and approach stakeholders who have an interest in finding an answer to your issue, or who can help you. These include clients, suppliers, shareholders, the RCVS and, most importantly, your team. You don't have to do this all yourself – many people find that bouncing existing ideas off other people is the best way to generate new ones.

Generate solutions

When generating possible solutions, there are some useful approaches:

- 'Brainstorming' – use your team and clients to help
- 'Six Thinking Hats' – in a meeting, take Edward de Bono's approach to considering an issue
- 'Mind mapping' – Tony Buzan's way of recording your personal brainstorming session
- 'Double reversal' – seek ideas to solve the opposite issue, then reverse your solutions!

Evaluate solutions

When deciding on the best solution – or combination – there are several more techniques that can be employed.

Risk analysis offers an opportunity to estimate (out of 10) the chance of your solution going wrong. Do the same for the severity of its going wrong, then multiply your numbers together to create a percentage to compare with other solutions.

Risk management engages a series of statements to tease out how your solution can best be described (**Figure 2**).

Compare possible solutions on the basis of their ease versus their impact. It is best to aim for high ease/high impact solutions. In the same context, a cost benefit analysis is useful too. In this case aim for low cost/high benefit answers; and remember that the 'payback' may take time.

Select solutions

If the optimum solution is not apparent after your evaluation, you could also use a 'Criteria Grid' whereby you list each solution in a grid against criteria from your SMART objective/s and see which meets the most 'must haves' and 'nice to haves'. Alternatively, you could employ the 'Forced Pairs' technique to compare each option with every other option in order to identify your preference.

Your team and culture

Culture may be defined as 'The way we do things here'. You will have a huge impact on this, not only through your leadership and communication, but in other ways as well.

Promote creativity, support imagination and experimentation and tolerate failure. If people fail, it is highly powerful for you to ask what they learned rather than simply criticising them. Support persistence and the trying of many iterations of the solution.

Encourage training and learning – even if it is not directly job related – so long as the individual can make a case for the benefits it will bring. This will motivate team members as well as facilitating their creativity.

Remember too that conformity stifles creativity. If you have a rigid dress code or ban personalised workspace decoration, if you insist that everyone uses corporate screensavers and you impose strict rules on document formatting, this all sends out the unspoken message that conformity is valued more highly than creativity. Allow time for people to be creative. Let them use free time to consider ideas to drive the practice forward.

What now?

To set the ball rolling, why not set yourself a target? Could you, for example, create:

- five untried ways to promote your practice within the local community
- a new layout for your premises that removes existing bottlenecks
- three novel ways to raise money for your favourite animal charity.

Go for it ... and good luck! ■

***Figure 2**. Teasing out the risk.*

- I can afford to take this risk
- I can't afford to take this risk
- I can afford not to take this risk
- I can't afford not to take this risk.

"Encourage training and learning – even if it is not directly job related – so long as the individual can make a case for the benefits it will bring"

PPD Questions

1. Why should you not decide on an option or action too early?
2. When would you use Porter's Five Forces?
3. How can looking at old buildings help you?
4. Why should you use other people and delegate to them?
5. What other skill is complementary to creative thinking?

Answers

1. It will prevent you from devising further solutions, one of which may turn out to be better

2. When considering launching a new product or service, or entering a new market

3. Try to imagine how the building once looked – see it differently

4. They may have ideas and approaches that are different to – or better than – your own

5. Analytical thinking – will help you define the issue and generate solutions

Anne-Marie Svendsen-Aylott
CandMedVet, MRCVS

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.

**Suggested Personal & Professional Development (PPD)*

MOTIVATION

Staying motivated

Have you ever been in a situation where you noticed that you were procrastinating or just simply losing your motivation to keep going? There are key techniques based on scientific research that can help you charge up that motivation again.

There are two steps that are helpful for you to take before you focus on your motivation.

Choose to change the lens through which you view your reality

Recognise that there are different ways to interpret what goes on around you and choose to interpret them in a way that is helpful and 'realistically positive' (**Figure 1**).

Realistically positive means focusing on a reality where you concentrate on what is right before considering what is wrong – while still allowing yourself to analyse the past to learn from it and do helpful contingency planning for the future.

Create a map for success rather than one for failure

Focus on the positive 'why' of why you choose to do what you do.

If it is about money – what will that money buy you? A better life for your children? Wonderful experiences? Ask yourself how you know that you are constantly moving forward in your life based on how you feel on the inside rather than focusing on things on the outside. Proactively get rid of the 'negative hijackers' – thoughts, actions or people – that are pulling you towards worry rather than focusing you on mental and emotional success.

Once you have taught your brain to focus on a realistically positive reality and identified what your map of personal success looks like, you can turn your attention to any lingering procrastination or lack of motivation.

***Figure 1**. Choose to change the lens through which you view your reality. (Image: www.planetofsuccess.com/blog)*

There are some clear steps that you can set to help you move forward:

- set journey goals
- increase your likelihood of success
- prioritise mental energy
- use priming
- celebrate the small steps.

Setting journey goals

The closer the brain perceives something to be, the more motivated we become. This is one of the reasons so many people need deadlines to actually get started on a project. Something that is too far in the future is just not imminent or pressing enough.

Coaching helps you to differentiate between your *final* goal and your *journey* goals. Your journey goals are the mileposts along the way that let you know that you are on the right track (**Figure 2**). There are several specific recommendations that can help you make your journey goals more effective.

Always set a goal within the month you are in, because goals in the next month are less effective. Think about setting weekly goals and remind yourself when you are 70 per cent of the way there – that will fuel more energy for you.

Focus on positive habits that will create the end result that you are seeking and consider creating a 'day charge' to track that you are working on them.

"Always set a goal within the month you are in, because goals in the next month are less effective"

Figure 2. *To change a goal from a dream into something real, it is important to create journey goals to work as mileposts along the way. (Image: Hartwig Kopp Delaney)*

Think about the things you have already done to move yourself towards your goal, put them on a list and tick the box for done! This creates a perceived head start that increases motivation.

Make sure that the journey goal is a *learning* goal rather than a *performance* goal. Performance goals are focused on the end result – 'sell three surgeries'; while learning goals are focused on what you are doing along the way – 'figure out how to speak better with my clients so I can sell three surgeries'.

Learning goals provide you with skills and experiences that directly drive satisfaction and happiness in the long term. Performance goals are transient and fleeting and tend to be replaced with another performance goal that simply raises the bar without celebrating what you have already learned.

Increase your likelihood of success

The more you think that you can reach your goal, the more likely it is that you will. A key way to help focus your thinking is to change the parameters to make it more likely that you will reach it. In short, set goals that you are at least 70 per cent sure that you can reach.

Remind yourself of previous goals that you have reached where initially it seemed even more difficult; and make a list of your current resources and what you have utilised when you were successful in other situations.

> "Remind yourself of previous goals that you have reached where initially it seemed even more difficult"

Think about how you phrase your goal and use the words or the measurements that makes it more comfortable for you and more like something at which you can succeed. For example, if you think it is too hard to encourage your entire team to 'like you', focus on getting a smile from each individual once every day.

Prioritise mental energy

Thinking takes energy and mental costs increase as you go from physical, to visual, to cognitive processing (Weinschenk S, 2011). This is why it can be more tiring to do creative or strategic work than pure physical labour. The more energy we think we will have to spend on doing something, the more likely we are to procrastinate.

Here are some ways to help you conserve that important mental energy:

- reduce the number of active decisions you have to make – prioritise establishing routines, processes and systems for regular tasks, so you can do them without having to think everything through
- stick to a routine in other areas of your life – when you get up, what you have for breakfast, how you prepare to leave for work, the flow of your consultations, when you read your e-mails and so on
- put the most important work early in the day where you will be the freshest. Avoid having multiple important meetings one after the other – make sure there is a gap or, even better, that they are on different days
- chunk down any task into 15-minute increments and identify what it is you have

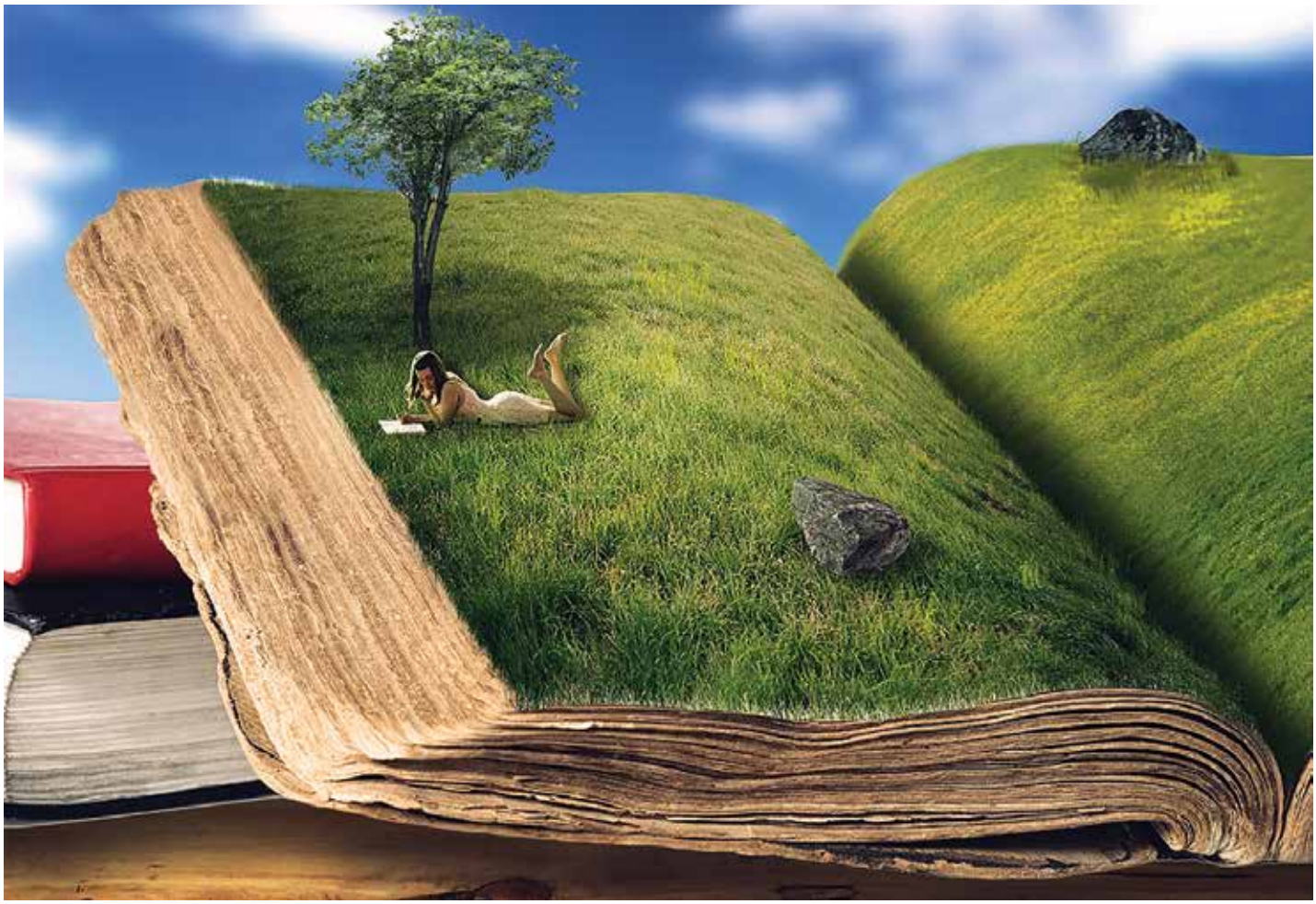


***Figure 3**. Creating visual cues that remind you of why you are working towards a goal can be helpful. It is even better if you can include pictures that work to symbolise this week's goal and help you stay focused. (Image: Mattio Merlo)*

to clear before you can do what you really want to do – for example, open the file with the information that you need in order to write an important e-mail or talk to a specific person who will be able to help you find that information

- focus on where you want to go instead of where you do not want to end up. What we focus on is what we achieve – try to ride a bicycle and focus on something to one side and notice what happens to the path of the bicycle!

Use priming

Another thing that is useful is to have visual cues to remind you about what is important in your life and to remind you why you are setting the goals that you are. It is important that the cues are realistic and that the goals that you are focusing on are achievable within the near future.

If you like pets, you might put up pictures of cute kittens, puppies or older pets; and a picture of your smiling family on your last vacation might remind you why it is important to focus on the job in hand.

Think about what goal you want to accomplish this week. Go on the internet or look in your folders to find a picture that symbolises the goal; then set it up to be your screensaver or your background for that week (**Figure 3**). Keep it realistic and remember to think about what you have already done to move towards the goal.

> "Set goals that you are at least 70 per cent sure that you can reach"

Celebrate the small steps

Positive feedback makes us feel good. And positive feedback that celebrates the time and effort you have put into reaching your goal helps you get there faster. It helps you focus on the fact that you are moving forward rather than worrying about the journey that is still to go. On a weekly – or even daily – basis, make a quick list of how you have progressed towards your goal. What have you thought about? What have you discussed with people? What have you realised that you do not yet know and how is the plan for going forward coming together?

It is especially important to work with your team and give them regular positive feedback on the progress that they are making. Sometimes people are at their most despondent when they have just realised that the job will be much bigger than they realised. Help them see the positive in that they can now plan better and help them chunk it down into those 15-minute steps that will help them reach a journey goal at the end of the week.

Time to get going

Here are some key questions to get you started:

- what is that wonderful goal you would like to reach?
- what is the reason that it is so important to you?

"On a weekly – or even daily – basis, make a quick list of how you have progressed towards your goal"

- now that you know that there are skills that you can learn which will help you get to where you want to go, what does the goal look like?
- what are the individual journey goals along the way, the mileposts that will let you know that you are on the right track?
- what is it that you need to learn, focus on, put some effort into or get on with this week that will help you achieve a journey goal at the end of the week?
- what are some of the visual cues that could symbolise that goal? And where will you put them to help you focus?
- what is it that you need to/want to learn before you can get started?
- what will you learn along the way? And how will you know that you are learning?
- what are the individual 15-minute chunks of tasks that you will need to do in order to accomplish your goal?
- when will you start?

Conclusion

As with everything else in life, we can be in control of our own motivation.

When we choose to put the time, effort and discipline into learning how we can use specific techniques to keep us going, everything is possible. It is normal for our motivation to wax and wane.

Sometimes it is easier to keep going – and sometimes life seems to get in the way. And that is what we shall talk about in my next article. ■

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PPD Questions

1. What are the first two steps before you start to think about your motivation?
2. What is the reason that setting a journey goal is a good way to increase motivation?
3. How sure should you be that you can reach your journey goal?
4. How do routines help your motivation?
5. What is a benefit of celebrating the small steps?

Answers

1. Choose to change the lens through which you view reality and create a map for success
2. The closer the brain perceives something to be, the more motivated we become
3. 70 per cent
4. They reduce the energy you spend and so may help you reduce procrastination
5. It makes you feel good and it helps you reach your goal faster

What should we look out for in our accounts?

This is a favourite question that we are often asked! So what is the answer? There is no 'one size fits all'.

Mark Harwood
BSc ACA CTA

Mark has been with Hazlewoods since 2003 and works solely with veterinary practices and their owners. He enjoys advising on a wide range of business and accounting matters, helping veterinary practices make the most of their opportunities to be successful.

In his spare time, Mark is a keen runner, cyclist, tennis player and is also a fan of motorsport.

It is important first to ensure that you have a good understanding of what is included in your accounts and how this information can be a guide as to your practice performance and financial position. We start by exploring this in more detail and then move on to look at some areas in your accounts that can be helpful to monitor.

Year-end accounts v. management accounts

Year-end accounts is a term commonly used to describe the annual accounts of the practice. They do not have to cover one year, although this tends to be the case; they are a legal requirement for all companies and LLPs. That said, whatever the financial structure, accounts in some form are needed as they are a starting point for calculating tax liabilities.

Management accounts refer to those accounts prepared in addition to the year-end accounts; they are prepared entirely at the discretion of the practice owners.

Whilst when year-end accounts are prepared they have to follow certain accounting standards, there is no such requirement for management accounts; although we would recommend that they are prepared on a consistent basis for ease of comparison.

What is in a set of year-end accounts?

To a great degree it depends on the practice's financial structure – company, LLP, partnership, sole trader, for instance – although typically a set of accounts will include a profit and loss account, a balance sheet and some supporting notes that put some meat on the bones. They are also likely to include an accountant's report; although this tends to follow relatively standard wording.

If your practice trades as a company or LLP, then there will also need to be a Directors' Report (company) or Members' Report (LLP). This provides supporting information and commentary on the accounts.

Year-end accounts sometimes also include a cash flow (it depends on certain thresholds being exceeded) analysing where the cash from profits has gone – whether there have been drawings, capital expenditure or loan repayments, for example.

What is in a set of management accounts?

As to the content of management accounts, there is complete flexibility and they might include more or less information than year-end accounts. Ultimately, what goes into them should be determined by what information you (perhaps guided by your accountant) would like to gain from them.

Profit and loss account

A profit and loss account (P&L) includes information:

- from one point in time to another – it captures transactions over time
- excluding VAT (assuming the practice is VAT-registered)
- relating to income (most commonly turnover – including sales excluding

**Suggested Personal & Professional Development (PPD)*

ACCOUNTS

	£'000
Sales	1,408
Cost of sales	(367)
Gross profit	1,041
Employment costs	(420)
Establishment costs	(47)
Admin costs	(163)
Interest payable	(13)
Profit before tax	398
Tax (if applicable to show)	(85)
Profit after tax	313

Table 1. A typical P&L account

	Practice A £'000	Practice B £'000
Sales	1,408	1,408
Costs that are the same	(927)	(927)
Rent	(25)	-
Interest	(13)	(4)
Depreciation	(45)	(14)
Corporation tax	(75)	-
Deferred tax	(10)	-
Net profit	**313**	**463**

Table 2. A comparison of two practice P&L accounts

VAT) and most, but not all, expenditure
- on an invoice basis, *not* cash – reflects work done and expenses incurred (not monies received and paid)
- that may give different profit figures depending on the financial structure of the practice – company, partnership for instance.

An example of a P&L account is set out in **Table 1**.

There are normally supporting notes in the accounts that break down each category into more detail. So let us pick up on some of the key points.

A common misunderstanding is to assume that the P&L includes *all* outgoings. It does not. The following items (not an exhaustive list) do not go through a P&L:
- capital expenditure – on equipment, motor vehicles, structural property items (although general repairs and maintenance does). Instead these items are recorded on the practice's balance sheet (**Table 3**). That said, depreciation on capital items incurred does reduce profit
- owner remuneration – some owner remuneration, such as directors' salaries (for a company) and rent does go through the P&L; but owner drawings do not (these are instead shown as a reduction in the owners' capital accounts on the balance sheet). Neither do dividends paid to company shareholders (they are shown as a reduction in the historic retained profits recorded on the balance sheet)
- how remuneration is taken will be greatly influenced by the financial structure of the practice. Therefore, it is important to understand this when comparing two sets of accounts as it is quite possible that 'like for like' is not being compared
- capital repayments on loans and hire purchase – are reflected as a reduction in liabilities on the balance sheet. They do not reduce profit. However, interest incurred on such items does reduce profit
- payment by the practice for owners' personal expenses (including tax). This does not impact on profit.

Profit does *not* mean cash. A common mistake is to look at the profit figure at the bottom of a practice's P&L account and wonder why that does not equal the money in the bank. Areas such as the following (similarly not an exhaustive list) help to explain why this is the case:
- some outgoings do not impact on the P&L as noted above
- the P&L includes certain non-cash items, such as depreciation on capital items and, potentially, also amortisation of goodwill and other intangibles
- with a company structure, corporation tax will be shown as a reduction to profit in the year. However, this tax is normally not payable until up to nine months and one day after the year end. For sole traders, partnerships and LLPs, the owners are taxed personally, so the practice's profit is not affected.

We can illustrate this using an example of two practices (**Table 2**).

Looking purely from a financial perspective, which practice is most profitable? It might seem obvious given practice B has a higher net profit. However, in reality it is not possible to tell without further information.

Practice A has a rent charge whilst practice B does not. This could be a consequence of a different property ownership setup which ultimately does not impact on the underlying profitability. Practice A is a company with corporation tax and deferred tax charges, whilst practice B is a partnership; the different practice structures give rise to different profit figures. To coin a phrase, trying to compare one directly with the other is not comparing 'apples' with 'apples'.

Balance sheet

A balance sheet provides information that:
- is a snapshot in time – at the end of one particular day, for instance. This is a very different concept to a P&L account that includes information between two points in time
- summarises assets (what a practice owns) and liabilities (what it owes). Example assets include property, equipment, motor vehicles, goodwill, stock, debtors, bank/cash and prepayments. Example liabilities include creditors (amounts owed to suppliers), loans, hire purchase and relevant tax. Depending on how the practice is structured, some items (property, goodwill and owners' motor vehicles) may or may not be recognised on the balance sheet
- is generally based on what is known as 'historic cost' data – the values shown in the balance sheet do not necessarily represent the current position. Common examples are that of property and goodwill, which might be shown as earlier historic values
- financial structure affects the balance sheet too. For example, in most cases companies are not able to revalue 'goodwill' on the balance sheet to its current value, whilst partnerships may do as they wish.

	£'000	£'000
Fixed assets		1,342
Current assets	120	
Current liabilities due < 1 year	(283)	
Net current liabilities		(163)
Long-term liabilities due > 1 year		(373)
Net assets		**806**
Share capital		1
Profit & loss account reserve		805
Net assets		**806**

Table 3. A typical balance sheet

	£'000
Turnover (sales)	**x**
Cost of sales	
Drugs and consumables	(x)
Laboratory fees	(x)
Clinical/carcass waste disposal	(x)
Referral fees	(x)
Gross profit	**x**

Table 4. Considerations of gross profit margins

An example of a balance sheet is set out in **Table 3**.

A common mistake is to take a balance sheet and assume that it gives the current value of a practice. For the reasons considered on the previous page, this is not normally the case.

Therefore in the event of ownership change, it is important that advice is taken so that it is understood what the 'real' balance sheet position looks like, which is not necessarily the one presented in the most recent set of accounts. Even when this is considered, it is important to realise that because a balance sheet is a snapshot in time, it could look very different the next day.

For example, if the partners in the practice took £100K of cash out of the above balance sheet as drawings, this would reduce current assets by £100K and reduce net assets down to £706K. The practice value has reduced in this case with value having been transferred to the owners personally.

What to look at?

Space dictates that we are unable to consider all aspects; however, there is some food for thought in the following points.

The quality and quantity of financial information varies considerably between practices. Whatever you choose to monitor, ensuring that you understand what the information that is presented is telling you, is crucial in order to be able to make timely decisions. At Hazlewoods, for instance, we provide a benchmarking service to our clients, looking at key performance indicators (KPIs), helping them set targets for the future and having discussions about how to achieve those targets.

Looking at accounts in conjunction with information from your veterinary practice management system can be invaluable. This is one of the benefits of having regular management accounts, in that information from the system can be incorporated into the management accounts to support the accounting data. Ultimately this means deciding what KPIs will be most helpful for you.

Some basic ideas include:

- looking at turnover per vet and comparing this to individual vet packages (gross salary plus benefits) allowing for turnover booked to other staff. Whilst it is accepted this can be distorted by different staff roles and experience, it can be still be useful to monitor such information over time to gain a feel for matters
- this can be taken a step further by monitoring turnover by type of income by vet and for the practice as a whole on a monthly basis. This can help to highlight vets who are particularly strong or comfortable in certain clinical areas and where others may perhaps benefit from additional support and mentoring.
- monitoring the gross profit margin (gross profit as a percentage of sales) over time (**Table 4**).

It is important to understand what goes into your gross profit. Sometimes staffing costs may be included. As with all areas, if you are comparing to benchmarking data, it is important to ensure that you are comparing like with like:

- considering the gross profit margin in conjunction with the mix of turnover, including the fee-to-drug ratio and the individual vet turnover information. Reviewing this in the context of the practice's pricing structure, including any changes that have been made, can help to identify the reasons for variances in the margin
- some practice management systems are now able to run 'exception' reports to identify where charges are expected for particular appointments/procedures but have not been made. This can help to identify undercharging and enable you to take proactive steps to improve the position
- monitoring the staffing costs composition over time, as well as overall staffing costs as a percentage of turnover. When doing so, it is important to make an allowance for owners' contribution and factor in an equivalent market rate remuneration for them (including employer's National Insurance). Any directors' remuneration and directors' pension costs should be excluded and replaced with this equivalent market rate salary
- monitoring overheads over time. We generally consider that an annual review of overheads is sufficient at most practices, to ensure that the best value service is being obtained. When reviewing overheads, pay particular attention to any exceptional / one-off costs that need to be excluded to show the underlying trends
- looking at the overall profitability. This may sound simple – why not just look at the net profit in the accounts? For the reasons we have explored above, however, this can give a distorted picture. An adjusted profit calculation called EBITDA can be helpful here.

EBITDA stands for Earnings (profit) Before Interest Tax Depreciation & Amortisation. It provides an indication of the underlying financial performance of a practice, irrespective of its structure (sole trader, partnership, LLP, company), debt levels, policies on writing off the values of assets (depreciation/amortisation) and exposure to tax (**Table 5**).

Where necessary, EBITDA is further adjusted to exclude private costs/income & exceptional items, such as one-off repairs, legal and professional fees. It gives an indication of the amount of cash a practice generates before capital expenditure and drawings/dividends. This assumes no material difference between the timing of invoices and cash being received/paid out.

EBITDA is commonly used in practice valuations and by banks looking to lend.

It is often worthwhile to prepare a budget, including a cash flow projection. This will help you to identify the timing of the practice's commitments into the future, to ensure that cash flow is well managed. It will also enable you to compare actual performance against this budget and act accordingly so that the practice's finances stay on track.

Often budgets focus purely on the P&L and balance sheet, However, without the cash flow side, it can be difficult to plan for future practice commitments, for example the timing of when to put in place new initiatives and to budget for staffing (whether personnel or pay changes) and the timing of owners' remuneration. If this seems a little daunting, there is computer software available that can help make the whole projections preparation process easier. Your accountant may be able to help you here; and how much information you choose to share with staff is a topic worthy of debate in its own right.

	£'000	£'000
Sales		1,408
Cost of sales		(367)
Gross profit, 74%		**1,041**
Staffing costs (including directors' remuneration)		(365)
Administrative costs (including depreciation/amortisation)		(263)
Interest		(15)
Profit before tax		**398**
Corporation tax		(75)
Deferred tax		(10)
Profit after tax		**313**
Interest		15
Corporation tax		75
Deferred tax		10
Depreciation		25
Amortisation		30
Rent in P&L	25	
Rent at market rate level	(55)	
		(30)
Directors' remuneration		16
Imputed owners' salaries plus employer's NI, say		(203)
Exceptional costs (practice reception redecoration)		9
EBITDA		260
EBITDA as % of sales		18.5%

Table 5. A typical EBITDA

Final word

We started out by asking, 'What should we look out for in our accounts?'

It is worth first ensuring that you are comfortable with what your accounts are telling you and how your particular financial structure impacts on this. This is particularly important if you are comparing your accounts to benchmarks – whether historic internal benchmarks or to external benchmarking information.

There is no 'one size fits all'. Working closely with your accountant to decide what financial information will be helpful to you will enable you to make timely and proactive decisions to the benefit of your practice. ■

The author welcomes questions from readers and can be contacted on 01242 680000 or mark.harwood@hazlewoods.co.uk

Soupçons of common sense

The veterinary media are full of problems.

Column inch after column inch, blog after blog are devoted to the problems in veterinary practice, together with the personal stress experienced by veterinary professionals as they cope with meeting the rapidly evolving expectations of their clients and the extra personal tensions of work/life-balancing a career that is also a vocation.

Survey after survey – from both the RCVS and the BVA – have reinforced these issues; and further surveys and committees have been established to reconfirm the problems and recommend solutions. But despite this, little actual progress appears to be made as to their resolution.

The pressure continues on those at the front line of practice life who largely seek simple, incremental, common sense approaches to their problems rather than grand sweeping gestures from those in authority.

At the back end of last year, The London Vet Show provided a cauldron in which these issues simmered and stewed to a copious extent and, from which soup, small measures of helpful, hopeful sustenance could be ladled.

Dedicated nurse clinics are an answer

Kristie Faulkner from Onswitch challenged her audience to review whether they were keeping pace with all the changes that have occurred in vet practice, especially efficient use of the nursing team.

She advocated much wider application of dedicated nurse clinics to educate clients and take action on subjects such as parasite control, pre-purchase advice for puppies and kittens, life stage nutrition and parasite control – things that were often not discussed by the reception staff or during routine 'vet consults'.

Often the problem is poor communication within the practice and the inadequate allocation of responsibility – and sufficient time – to deal more professionally with clients to make it easier for them to access and absorb the advice they really need. When this is not offered in a veterinary practice, owners will turn to alternative sources – especially the internet – which offer poor

advice and ineffective products. These are missed educational and commercial opportunities for the veterinary practice.

Research from Onswitch suggests that referral to nurse clinics that specifically deal with preventive measures will increase client loyalty and enhance the practice as a business. It also helps with the socialisation and habituation of young puppies, increases the number of pets being neutered and breaks down the barriers between the practice and pet owners.

Some practices are now extending the concept of 'nurse consults' to pick up appointments which do not necessarily require a full veterinary consultation, or at least to save 'vet time' by using the nurse to carry out preliminary history taking. This is often better received by clients than practices imagine and, in many cases, provides a platform for owners to discuss issues that they are reluctant to raise with the vet.

And, most importantly, as well as making better use of time and increasing the level of service offered to clients, the motivation and professional status of veterinary nurses is enhanced; which, in turn, endorses their feelings of well-being and self-worth.

Developing an assertive approach will help

"Know your mind-set, communicate confidently and move on," said veterinary coach and mentor, Carolyne Crowe, as she took delegates through what assertiveness is and what it isn't. "If what you are doing over and over isn't working, maybe it is time to do something different," she began.

It is important to think about what is driving us forward and to overcome the things that are stopping us from achieving our goals. To help do this, it may be useful to draw an 8-segmented 'wheel' that covers key segments of your personal life, your relationships or aspects of your work, for instance. Each segment can be scored on a scale of 1 to 10 and by joining the dots it is possible to create you own personal wheel of 'where you are now'.

Assertiveness means being honest with yourself and others. It is about knowing your mind-set, communicating it confidently and facilitating the process of moving on. There is also a need to select the appropriate time and situation in which to be assertive. In order to do this, we have to make ourselves aware of the motivation and communication styles of the people with whom we work.

Carolyne stressed the importance of not being driven by our emotions when we are communicating in the work environment. The correct use of assertiveness will often prevent us from straying into this emotional territory.

It is important to be able to recognise people who are either 'over-assertive' or 'submissive' so that you can better employ your own balanced assertiveness and communicate in a constructive way to achieve an 'I'm OK, you're OK' outcome.

Concluding her presentation, Carolyne reminded delegates that "assertiveness is a choice" and that when the heat is on in practice and there is a temptation to take on too much, there is nothing wrong with being "responsibly selfish". ■

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Industry Profile

Your name: Renay Rickard
Position: President elect 2016-2017
Company: Veterinary Practice Management Association (VPMA)

What first attracted you to working in veterinary practice?

Cliché though it may be, I came from the 'Herriot' generation and was an avid reader of his books. It sparked an interest in veterinary medicine and, from the age of about 11, I knew it was the industry about which I wanted to find out more.

How did your career evolve?

After gaining a spectacularly unremarkable handful of 'O' level results, I decided that working in a veterinary practice for a year – whilst taking some re-sits – would be a good idea. I had little 'hands on' experience, so before committing to an academic pathway I thought maybe I should find out for sure if it was the career for me.

So, in July 1985, I walked into my local vets and said "Gissa job!" Which they did – as a YTS trainee. I knew immediately it was the right place for me and subsequently embarked on my veterinary nursing training, qualifying in 1989. I worked my way up through the ranks to head nurse and made the step into practice management in 2004.

During this time I also worked for Duchy College in Cornwall as an internal verifier on the VN course, and later became a course moderator.

What particular challenges did you face on your pathway to becoming a practice manager?

The main challenge I have faced has been as a working single mum; but fortunately I worked for a supportive practice and also, as my career evolved, I was no longer part of a set rota or out-of-hours team, so the flexibility was there for me to work full time.

Another challenge was that practice management as a career was not really recognised as a role in the early days, so defining what it was that I actually did all day – and gaining the respect for that – was at times tough. An example of this was being asked one day – during a heated debate with an assistant vet – whether I was actually qualified to do my job. This immediately galvanised me into gaining a management diploma and sitting the CVPM examinations.

> "We have to work at running a business that clients want to use and for which employees want to work"

As a career move these were the best things I could have done; because not only did I gain recognition from others, it also gave me the self belief that actually I *was* doing a good job! Another challenge that I am sure I share with other practice managers.

What are the most significant changes to veterinary practice that you have witnessed since you first began your career?

There have been many changes in the past 30 years, but I think that the main one that has affected me is the fact that veterinary practice has realised it is actually a business which needs to be managed. During the '80s – and particularly the '90s – we just opened our doors and people walked in with no real expectations apart from that we would do our best to make their animals better.

Things are very different now because with the changes in the regulations on advertising and promoting our services – along with the more competitive marketplace – we can no longer be that complacent. We have to work at running a business that clients want to use and for which employees want to work. The expectations of clients and employees are also much higher – and rightly so. But I think the art of good management these days is to keep these expectations realistic and not to the detriment of animal care or the businesses we are running.

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

The main issue I think at the moment is around employment. There appears to be – in some areas – a shortage of both vets and nurses that needs to be addressed. Although the numbers of suitably trained people are out there, for various reasons, we seem to be struggling to keep them in the profession.

Another critical issue – particularly for mixed rural practices such as the one for which I work – is how the changes in the way TB testing is administered and funded will affect them, especially smaller practices. I think the next six to 12 months will be critical in this area.

During your years of association with the VPMA, what are the most significant changes you have seen in the organisation?

I think the profile of the VPMA has become raised, as the role of the practice manager – or maybe the management of veterinary practice – has become critical in the running of a successful business. It is also providing more support for, and engagement with, its members at both regional level, and by working with SPVS in providing a robust CPD programme and an excellent management congress.

The directors (Council) of the VPMA also reflect our diverse membership across independent practice, corporate practice and other sectors of the veterinary industry.

What are the association's priorities now?

The association's main priority is to maintain the support for our members as individuals. The role of the practice manager can at times be a lonely place; so we aim to provide opportunities to

meet and to 'network' – be it through regional meetings, CPD or Congress.

We are also working hard on ensuring our member benefits reflect this. For example, we introduced the services of Health Assured in 2015 to provide advice and support to our members.

What will be the main aims of your presidential year?

During my presidential year, I aim to promote the idea of practice management as career progression, particularly amongst the VN profession which is, obviously, close to my heart. I am excited to have been asked to speak about this subject at the Head Nurse Congress this year.

Also, as a management association, we will be aiming to help our members to be more resilient and proactive because there are challenging times ahead. This support will be provided through either the CPD programme and Congress or by providing information at regional level.

How do you relax when away from the hustle and bustle of work?

Although I believe in balance, I am regularly accused of working too hard. But I love my job and recently heard an interview with Karren Brady during which she said, "It's only work if there is nothing else you would rather be doing". I completely agree with this and have stopped giving myself a hard time over the hours I spend working. It's what I want to do!

That said, I am lucky enough to live in one of the most beautiful parts of the country – Cornwall – so in my spare time I can be found walking (occasionally running) on the coast paths, the clay trails or enjoying the moors and beaches. I am passionate about live music and enjoy attending concerts and festivals when I can.

I am also a sports lover (spectator) and enjoy going to watch rugby and football – particularly my beloved Arsenal. So if anyone out there can get tickets for The Emirates, I would be eternally grateful!

Do you think that good practice managers are born with the innate skills required or can they be learnt?

Working as part of a team, there are decisions to be made as to whether you wish to manage or 'be' managed. It is not for everybody, whether you have the skills or not. I think leaders are born with certain skills or personality traits that make teams confident in following them.

Managers on the other hand are often leaders who have learnt certain skills, whether it be in an academic sense or life skills you learn as you mature and gain confidence. So really it is a combination of things.

What are the key skills required?

There are so many diverse kinds of managers – even in veterinary practice. I think a key skill is being able to face things head on and tackle them with a positive outlook – even in the face of severe challenges. Your team needs to know that if you say you will 'sort it' ... you will.

Learning to stand back and be objective is a skill I have had to learn. Listening to your team's opinions and ideas will lead to progression and confidence too. This leads to successful delegation and development of teams.

> "Your team needs to know that if you say you will 'sort it' ... you will"

Being able to communicate effectively is also essential – with a range of people, including team members, clients and industry.

What would be your assessment of the current relationship between vets and veterinary practice managers?

I think we have come a long way in the last 30 years. Vets in the past were reluctant to loosen the reins on the running of their businesses. They were responsible for financing the business and also as the employer – which is a huge responsibility legally apart from anything else. I think with the changes in types of ownership of veterinary practice, along with the acceptance that a veterinary degree does not automatically make you a good business person, there is now a level of trust that has developed between veterinary surgeons and their practice managers.

I think that a good manager will always run the business as if it were their own, even if they are not ultimately responsible.

How can those relationships be improved?

I think that often, for practice managers, there is not a clear role defined, or an understanding of their employer's expectations. While we are busy reviewing and developing our teams, the practice manager is frequently overlooked in this process. This can be quite stressful.

Within the VPMA, we are aware that our members often feel isolated because they are not part of 'the group' – and their work is by nature, solitary. As a practice manager, you are invariably dealing with problems, be it of a personal nature from staff or business issues with clients. A manager can often feel like a 'sponge' for everyone's problems, but with no way or nowhere to off load some of the associated pressure.

An approachable boss, who allows time for briefing sessions that are not squeezed in between visits and consults, goes a long way to improving relationships.

What next for veterinary practice managers?

These are exciting times overall in practice management. As I have said earlier, we are now alert to the fact that we are running a business and that nothing much will happen unless someone is managing it effectively. More people are taking an interest in the running of the business and looking to develop their skills in this area.

The VPMA plans to be an integral part of this evolution and a good, effective manager is going to be a major asset to any well-run business. ■

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