Jacky Reid qualified from the School of Veterinary Medicine at Glasgow university and went on to specialise in veterinary anaesthesia. She is currently an honorary senior research fellow at the University of Glasgow and a director in NewMetrica; a research company that specialises in instruments to measure pain in non-verbal species.

Marian Scott graduated from the University of Glasgow with a PhD in statistics. She is professor of environmental statistics at the School of Mathematics and Statistics and cofounder of the Glasgow University Pain and Welfare Group.

Andrea Nolan qualified from Trinity College Dublin and undertook her doctoral studies in the field of animal pain. Her subsequent academic career focused on the pathophysiology, pharmacology and assessment of pain in animals.

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Pain assessment in companion animals: an update

Jacky Reid, Marian Scott, Andrea Nolan

An article 'Pain assessment in animals' was previously published in In Practice (Reid and others 2013). This short article aims to bring the reader up to date with what we consider to be significant advances in the field of pain assessment in companion animals.

IN recent years, one particularly interesting development in the field of pain assessment is the use of facial expression to detect and evaluate acute pain in animals. Indeed, the universality of the 'pain face' has been found to be relatively consistent across human development (from infancy to adulthood) and between people and animals (Chambers and Mogil 2015).

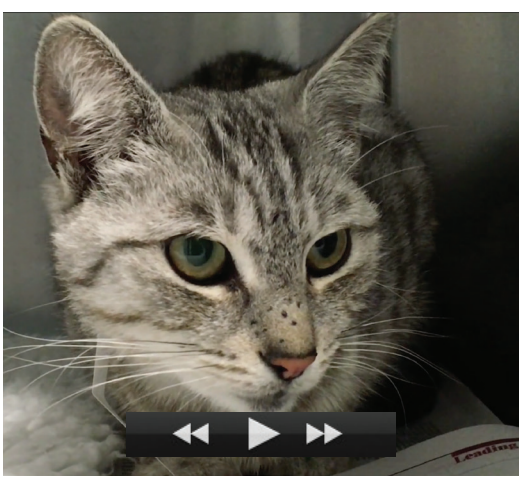
Facial expressions have been used for many years in human infant pain scales, one of the most used being the Wong-Baker scale (Wong and Baker 1988). Additionally, so called 'grimace scales' have been developed for rats (Sotocinal and others 2011), mice (Langford and others 2010), rabbits (Keating and others 2012), horses (Dalla Costa and others 2014) and cats (Holden and others 2014). The cat scale differs from these other scales in that it was developed using naturally occurring clinical pain compared with scales developed using an applied, short-lived painful stimulus (mouse, rat and rabbit), or immediate postoperative pain (horse). There are common features reported for all species: changes in ear position, muzzle and eyes (with the exception of the cat), but in all of these only two levels of pain can be distinguished; in contrast to the five levels detectable in babies using the Wong-Baker scale. This limits the use of these scales for evaluative purposes; however, adding the facial component to a cat behavioural scale (Fig 1, Box 1) has increased the sensitivity of the latter and accordingly enhances its clinical usefulness (Reid and others 2017b). This scale includes an intervention level to guide practitioners as to a cat's requirement for analgesia, thus is a useful adjunct to their clinical judgement in a variety of scenarios, including postoperative care (Videos 1, 2). To date, facial markers of pain in animals have been restricted to acute pain, but there may also be a chronic pain 'face' which would make an interesting line of enquiry.

The complexity of the chronic pain experience has a bearing on its measurement, such that many of the instruments now used to measure human chronic pain are concerned primarily with measuring; not the pain per se, but rather its effect on the patient's health-related quality of life (HRQL). In veterinary medicine, the measurement of chronic pain through its impact on HRQL continues to be an evolving area of research, as the incidence of chronic painful disease grows with increased longevity in companion animals. Awareness of the existence of chronic pain has improved its recognition, such that these days 'slowing down' is more often associated with chronic pain than old age. Osteoarthritis is the most common chronic

Videos

Two videos showing an eight-month-old domestic shorthair cat before and after undergoing a midline ovariohysterectomy are provided with the online version of this article at inpractice.bmj.com
The authors would like to thank Boehringer Ingelheim for use of their videos.

Videos: Pain assessment in animals: an update



Video 1: Cat before surgery with a Feline Composite Measure Pain Scale score of 2/20

Video 2: Cat after surgery with a Feline Composite Measure Pain Scale of 13/20

Glasgow Feline Composite Measure Pain Scale: CMPS - Feline

Choose the most appropriate expression from each section and total the scores to calculate the pain score for the cat. If more than one expression applies choose the higher score

LOOK AT THE CAT IN ITS CAGE:

Is it?

Question 1

Silent / purring / meowing	0
Crying/growling / groaning	1

Question 2

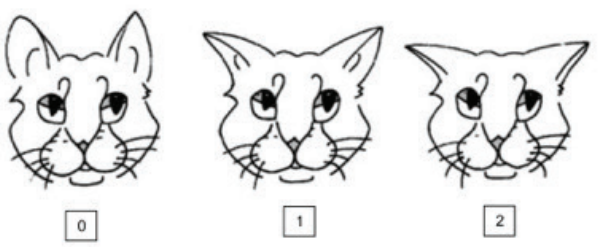
Relaxed	0
Licking lips	1
Restless/cowering at back of cage	2
Tense/crouched	3
Rigid/hunched	4

Question 3

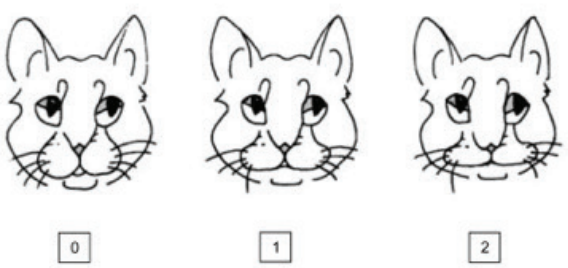
Ignoring any wound or painful area	0
Attention to wound	1

Question 4

a) Look at the following caricatures. Circle the drawing which best depicts the cat's ear position?



b) Look at the shape of the muzzle in the following caricatures. Circle the drawing which appears most like that of the cat?



APPROACH THE CAGE, CALL THE CAT BY NAME & STROKE ALONG ITS BACK FROM HEAD TO TAIL

Question 5

Does it?

Respond to stroking	0

Is it?

Unresponsive	1
Aggressive	2

IF IT HAS A WOUND OR PAINFUL AREA, APPLY GENTLE PRESSURE 5 CM AROUND THE SITE. IN THE ABSENCE OF ANY PAINFUL AREA APPLY SIMILAR PRESSURE AROUND THE HIND LEG ABOVE THE KNEE

Question 6

Does it?

Do nothing	0
Swish tail/flatten ears	1
Cry/hiss	2
Growl	3
Bite/lash out	4

Question 7

General impression

Is the cat?

Happy and content	0
Disinterested/quiet	1
Anxious/fearful	2
Dull	3
Depressed/grumpy	4

Pain Score ... /20

FIG 1: Feline Composite Measure Pain Scale for the measurement of acute pain in cats

painful disease in the dog. A number of scales have been published for its measurement (Brown and others 2007, Hercock and others 2009, Hielm-Björkman and others 2009, Walton and others 2013, Brown 2014) and management, the latter with a traffic light system to indicate the efficacy of therapeutic interventions (www.aim-oa.com). These tend to be primarily concerned with physical limitation rather than the effect on HRQL; a much broader concept including emotional and physical wellbeing, encompassing how the animal 'feels' about its circumstances.

Many other prevalent chronic diseases such as cancer, cardiovascular disease, neurological and dermatological conditions may also be associated with pain, but irrespective of whether pain is a feature, there is a need to be able to measure their impact on HRQL. This will enable practitioners to assess the therapeutic benefits of the plethora of drugs currently used and other treatment modalities, such as biologic and stem cell therapies that are under development. Additionally, with surgical interventions increasing in complexity and with the increasing trend towards hospice and palliative care for animals, never before has it been more important to be able to measure quality of life in an objective fashion backed by evidence-based medicine. HRQL assessment instruments typically take the form of structured questionnaires, which can be either generic or disease-specific. Disease-specific instruments may be more responsive to clinical change, but generic instruments measure the impact of anything that will affect quality of life, and can be valuable indicators of a range of impacts associated with disease and its treatment. They have been shown to provide an effective alternative when particular disease-specific instruments do not exist, and may be the only option when a patient is suffering from more than one condition (Wiseman–Orr and others 2004, 2006).

In human medicine, HRQL assessments are frequently used as patient-reported outcomes to measure the impact and effectiveness of therapeutic interventions. A patient-reported outcome represents the effect of the disease on health and functioning from the patient's perspective, and is a report of the status of a patient's health condition

Box 1: Guidance for use of the Glasgow Feline Composite Measure Pain Scale

The Glasgow Feline Composite Measure Pain Scale (CMPS-Feline), which can be applied quickly and reliably in a clinical setting, has been designed as a clinical decision making tool for use in cats in acute pain. It includes 28 descriptor options within seven behavioural categories. Within each category, the descriptors are ranked numerically according to their associated pain severity and the person carrying out the assessment chooses the descriptor within category which best fits the cat's behaviour/condition. It is important to carry out the assessment procedure as described on the questionnaire, following the protocol closely. The pain score is the sum of the rank scores. The maximum score for the seven categories is 20. The total CMPS-Feline score has been shown to be a useful indicator of analgesic requirement and the recommended analgesic intervention level is five out of 20. To familiarise yourself with the scale, assess the behaviour of the cat in videos 1 and 2.

that comes directly from the patient, without interpretation of the patient's response by a clinician or anyone else. Needless to say, it is impossible to have a patient-reported outcome for animals. However, in human non-verbal populations it is acceptable to use observer reports, but only where these include behaviours that can be observed (FDA 2009). For example, an owner cannot validly report a dog's pain intensity, but can report behaviours thought to be caused by pain. Similarly, for this reason, asking an owner to rate their dog's HRQL on a zero to 10 scale cannot be regarded as a valid measure, but a questionnaire instrument that draws such a conclusion from owner-reported observations of behaviour can be. Currently, there is only one instrument (VetMetrica HRQL for dogs) that adopts this approach (Reid and others 2013a, b, 2017a), and focuses on how the dog 'feels' about its circumstances, thus providing a more complete picture of an animals 'true experience'.

The strength of the emotional human-animal bond has huge implications for instrument development and the opportunity for respondent bias cannot be underestimated. Accordingly, careful construction of the questionnaire to minimise such bias, using established techniques for structured questionnaire design (Streiner and Norman 1995), becomes much more important than may be the case for the acute pain tools, as the proxy (veterinary surgeon or nurse) is less likely to have a strong emotional bond with the animal.

It stands to reason that how an animal feels about its situation will vary with its breed, age and individual circumstances. For example, the opportunity of a long romp on a windswept beach can be perceived in one way by an energetic young Labrador retriever, and perceived entirely differently by an elderly cavalier King Charles spaniel that has been raised as a 'lap dog'. This has implications for the practical interpretation of scores obtained using any instrument. As a result and wherever possible, age and breed population 'norms' should be available for comparison to aid interpretability of the scale. Defining these requires a large number of dogs. Currently, interpretability of the Vetmetrica HRQL for dogs makes use of age norms for comparative purposes, which will be extended to include breed norms as these data become available, and the minimum important difference (Fig 2). The minimum important difference is the difference in scores that gives an indication of a change that is likely to be clinically relevant. For example, it might help you make a decision to either persevere with a treatment because there is good evidence it is working, or indeed change it for an alternative. However, as with all things biological, nothing is black and white so the figure should be treated accordingly.

Health-related quality of life measures can be single-index scores that will provide information about a single (or composite) domain, from which it can be inferred whether the animal is better or worse, or they can be represented by a multi-dimensional profile with scores in different areas (domains) of quality of life. Since HRQL is a complex multi-domain concept, one could argue that this should be better represented by a multi-dimensional profile to help understand the process of change and offer more flexibility with analysis. Fig 2 represents this type of input as used in Vetmetrica HRQL for the dog.

A substantial use for instruments to measure HRQL exists within the veterinary practice, including raising the profile of preventive veterinary medicine within a health and wellness model, where their use in between routine visits can be used to alert the clinician to a change in health status; improving disease detection, including chronic disease which is often unrecognised and unreported; effectively monitoring subtle indicators of clinical change in response to treatment and identifying a humane endpoint for individual dogs.

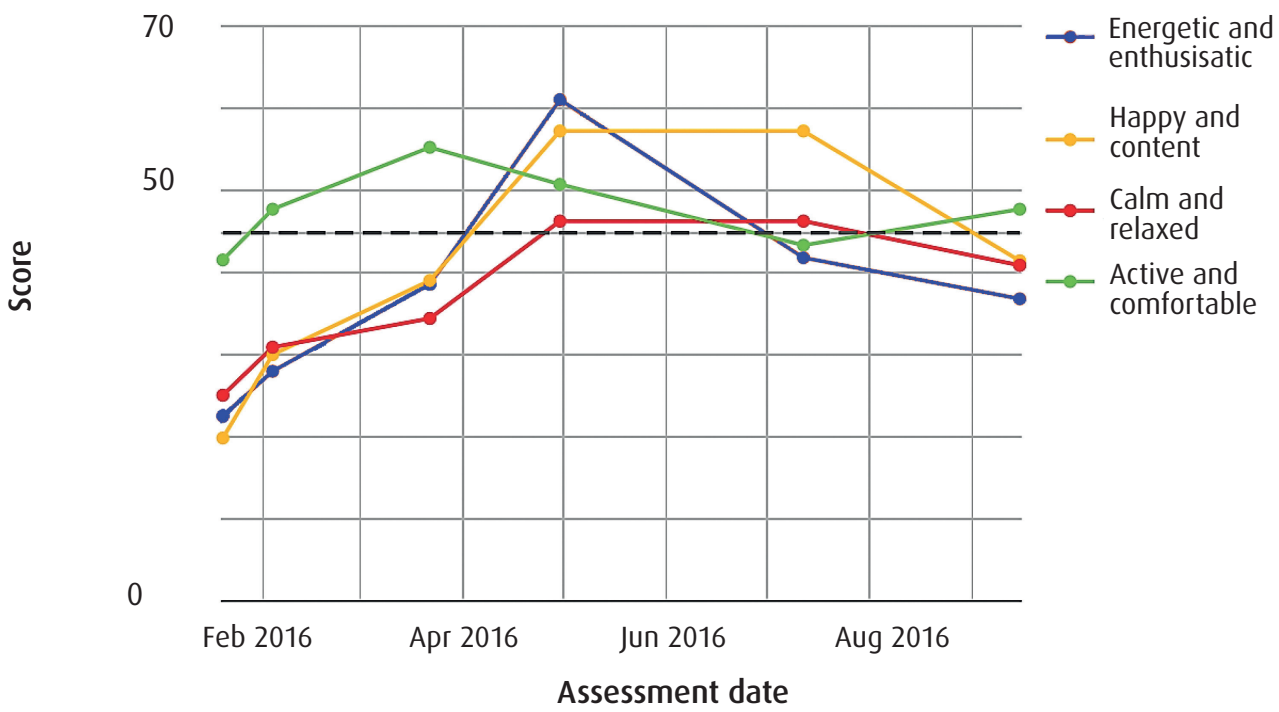


Fig 2: Example of VetMetrica HRQL output for a four-year-old mixed-breed dog diagnosed with osteoarthritis. The first data point is before treatment and thereafter the dog was treated with an NSAID. Each domain (energy, happiness, comfort, calmness) is represented by a different colour. 50 = average healthy dog. The threshold line indicates the value over which 70 per cent of healthy young dogs (under eight years old) will score. An increase in 10 points or over in energy, happiness and comfort, or an increase of 15 points in calmness, indicates a clinically important difference

Conclusion

Developing pain assessment tools is a lengthy, complex and time consuming process, but it is essential to build the evidence base that will allow us to advance our knowledge of the impact of all novel, and not so novel, therapies being developed to improve the welfare of animals suffering chronic disease, whether or not that is painful.

What does the future hold?

We anticipate some advances in the future for the measurement of acute pain, relating to more nuanced investigation of facial characteristics, but other than that, improvements are likely to be in relation to delivery. For example, electronic data capture and delivery via a software application.

However, we believe the real advances will be seen in the measurement of the impact of chronic disease, whether that be associated with pain or not. Development of HRQL tools is an iterative process by which existing tools are improved as more data become available, and new tools; both generic and disease specific, are developed for new populations and new contexts. We believe we are at the start of a fascinating journey as the availability of instruments for companion animals expands, to other companion animals (such as cats), and in development of more disease specific components.

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Notes