

# Feature

## ONE HEALTH

# Canine and feline obesity: a One Health perspective

Recent years have seen a drastic increase in the rates of overweight and obesity among people living in some developed nations. There has also been increased concern over obesity in companion animals. In the latest article in *Veterinary Record's* series on One Health, Peter Sandøe and colleagues argue that the relationship between obesity in people and in companion animals is closer and more complex than previously thought, and that obesity should be treated as a One Health problem

OVER the past decade, there has been a growing awareness of the need for collaboration between the fields of human and veterinary medicine. Initially, efforts in this new area of One Health focused on preventing the spread of disease from farm animals and wild animals into human populations. More recently, there has been a growing awareness of the role of companion animals in One Health.

Thus, in 2010, the World Small Animal Veterinary Association (WSAVA) established a One Health committee with the remit of 'positioning small companion animals in the global One Health framework' (Day 2010). This committee has so far focused on the spread of zoonotic diseases from dogs, cats and other pet animals to humans. However, it also envisions two other future fields of work: comparative medicine and the human-animal bond.

In both fields, however, the focus is rather human-centred. According to the chair of the committee, Michael Day, the motivation for comparative medicine is that

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**Veterinary  
Record**  
Towards  
One Health

**A cat weighing more than 16 kg relinquished to an animal shelter in the USA. Obesity is increasingly being recognised in companion animals, and the link between obesity in pets and their owners demands a two-way approach**

'The study of spontaneously arising canine and feline diseases holds great potential for understanding the human counterparts.' The importance of studying the human-animal bond is justified by reference to the

'We cannot hope to understand feline and canine obesity without also knowing something about human obesity, the social status of owners, and the relationships that humans actually have with their dogs and cats'

'benefit to human health and wellbeing from association with pet animals' (Day 2010). One of the key issues here, Professor Day argues, is obesity: 'probably the most important health issue of man and pets in Western countries is the shared epidemic of obesity that is often directly related to aspects of this shared lifestyle' (Day 2010).

Professor Day's last point here is significant: obesity in humans, dogs and cats is a major problem, and clearly a One Health

concern. However, the human-centred One Health approach, in which the study of animal health is seen merely as a means to improving human health, is questionable. In this review of canine and feline obesity, we argue that, through collaboration between researchers in human and veterinary medicine, optimal health for both humans and animals can be achieved, and that this should be seen as central to the One Health concept (AVMA 2008). We will consider One Health as a two-way affair. We will not only look at how studying the effects of overweight and obesity in dogs and cats can contribute to understanding human health; we will also consider how insights from the study of human obesity can, in turn, benefit dogs and cats. In addition, we will look at how human obesity is connected with weight problems in dogs and cats.

### Defining overweight and obese

In dogs and cats, as in people, a distinction is drawn between being overweight and being obese. Being overweight can be defined as having a body composition where the levels of body fat exceed those considered optimal

for good health. Obesity can be defined as being overweight to the extent that serious effects on the individual's health become likely.

Values ranging from 15 to 30 per cent are given in the literature for 'optimal' per cent body fat in dogs and cats (Toll and others 2010, Bjørnvad and others 2011). However, optimal per cent body fat seems to depend on several factors, including the age, breed, gender and physical fitness of the animal. Furthermore, values will vary depending upon the measurement technique used.

Techniques for measuring body fat such as bioimpedance and dual energy X-ray absorptiometry (DEXA) scanning have evolved from purely research tools to tools used in human clinical practice. These techniques are not yet widely available in veterinary clinical practice, however, and so veterinary practitioners still have to rely on less advanced methods.

In humans, the Body Mass Index (BMI) is, despite its limitations, widely used as a practical method of assessment. However, it is based solely on information about the person's weight and height, and so is not

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easily transferable, particularly to dogs, as there are diverse breeds with very different body conformations.

Several alternative morphometric methods have been proposed for assessing the relative weight of dogs and cats. The Body Condition Scores (BCSs), developed for both dogs and cats, are the most widely used. The BCSs use a number of categories, ranging from 'emaciated' to 'severely obese', based on subjective assessment of specific features. These features include the shape of the animal viewed from above, and how easily palpable the ribs are (Laflamme 1997, McGreevy and others 2005, Toll and others 2010). Studies have shown that such measures correlate well with more advanced measurements of the amount of body fat, and, in general, there is good agreement between measurements across different users (German and others 2006).

A recent Danish study (Bjørnvad and others 2011) of indoor-confined, adult neutered cats found that the BCS tended to underestimate the level of body fat as measured using a DEXA scanner. The authors proposed that, due to a lack of exercise, these cats were 'skinny fat'. As observed in humans, physical inactivity may result in a decrease in lean body mass, causing a relatively higher percentage



Photo: Matthew Beck/AP/Press Association Images

**An overweight pug. A range of factors have been found to influence canine obesity, breed being one of them. Dogs of certain breeds seem to be more prone to weight gain than others**

of body fat, despite what appears to be a healthy bodyweight. 'Skinny fat' or 'sarcopenic obesity' could, as in the case of humans, predispose to type 2 diabetes and other serious health problems in cats (Heber and others 1996).

### Scale of the problem

A number of studies have been undertaken in North America, Europe and Australia – mainly on dogs – to determine what proportion of animals are overweight or obese. The reported prevalence was between 22 per cent and 44 per cent (Mason 1970, Edney and Smith 1986, Hand and others 1989, Crane 1991, Kronfeld and others 1991, Sloth 1992, Robertson 2003, Lund and others 2005, 2006, McGreevy and others 2005).

Differences in the prevalence of animals being overweight or obese reported in the literature may reflect differences in sampling, in who has been asked (owners or vets), or genuine local variations. After all, dramatic regional variations are found in the levels of human obesity: in adults in the USA levels are over 30 per cent, compared to between 8 per cent and 25 per cent in European countries, and less than 5 per cent in some Asian countries, such as Japan (WHO 2012). However, it is not known whether similar regional differences are found in dogs.

None of the aforementioned studies report on whether there is a general trend for increasing obesity among companion animals. To the best of our knowledge, this has been considered in only a single study that investigated the prevalence of obesity in populations of urban cats in New Zealand, using the same demographic area, design and questionnaire, 15 years apart. The authors hypothesised that an increased use of commercial, energy-dense 'premium' dry food could lead to a higher prevalence of obesity (Cave and others 2012). To the surprise of the authors, however, despite the change in general feeding practice, there was no increase in the levels of obesity.

Whether this finding reflects obesity development in other pet populations

remains to be seen. However, it may be speculated that the obesity epidemic observed in the human population, which is partly attributed to the increasing consumption of fast food, is not reflected in the cat population, since cats, like dogs, are fed commercial food which has centrally regulated nutritional content. It could also be speculated that since the feeding of dogs and cats is similar across developed countries, the prevalence of obesity could be more globally homogeneous for companion animals than for humans.

When it comes to monitoring the extent of weight problems in dogs and cats, the veterinary world clearly lags far behind the world of human medicine. Most animal studies are based on questionnaires, and next to nothing is known about the geographic distribution of weight problems, or their development over time. There is no universally accepted scale for defining

*'If an owner weighs too much it is more likely that their dog will also be overweight or obese'*

overweight or obesity in cats and dogs, and data from small animal veterinary clinics are, with a few exceptions, not shared. On all counts more could and should be done.

### Why should we care?

One reason for being concerned about human weight is that obesity is the main driver of the increased incidence of type 2 diabetes, and also poses a substantially increased risk of cardiovascular disease, several cancers, asthmatic disease, sleep apnoea, osteoarthritis, infertility, and a reduced life expectancy of five to 10 years, depending on severity (Bauer and others 2014). These health problems are not only of a physical nature – severe psychological and social problems, including depression, stigmatisation and suicide, may arise from being obese (Pedersen and others 2012).

In the case of dogs and cats, being overweight is obviously not linked to

problems such as low self-esteem and stigmatisation. However, a substantial body of veterinary literature documents that obesity in dogs and cats increases the risk of health problems. These problems include 'orthopaedic disease, diabetes mellitus, abnormalities in circulating lipid profiles, cardiorespiratory disease, urinary disorders, reproductive disorders, neoplasia (mammary tumours and transitional cell carcinoma), dermatological diseases, and anaesthetic complications' (German 2006). These conditions not only shorten the expected lifespan of the affected animals, but also reduce their health-related quality of life, so obesity in cats and dogs has

*'There may be a real dilemma here between two of the five freedoms used to define animal welfare: it may not always be possible to secure freedom from both hunger and disease'*

considerable potential to cause suffering. One questionnaire-based study (German and others 2012b) tried to assess the health-related quality of life of dogs following weight loss. A clear correlation was found between a reduction in weight and fat mass and an increase in vitality. It was also found that dogs showed fewer signs of being emotionally disturbed and of being in pain following a successful weight loss programme.

Even being moderately overweight seems to have a negative effect on animal health; for example, rodents fed ad libitum have a shorter lifespan than those on a



**A dog eating from a maze bowl. One feeding strategy could be to allow pets to work for their food, thereby engaging in more feeding-related behaviours without them getting too much food**

restricted diet (Hubert and others 2000).

In a series of papers, Kealy and others (2002) and Lawler and others (2005, 2008) reported the results of a longitudinal study of two randomly selected groups of Labrador retriever dogs, with 24 dogs in each group treated identically apart from their feeding regime. One group was initially fed ad libitum, then fed at a level at which they stayed overweight but did not become obese (mean BCS 6.5 on a scale ranging from 1 emaciated, to 9 severely obese). The other group was fed 25 per cent less than the first group throughout the study. Dogs in the latter group remained leaner and lived longer (median lifespan of 13 years compared to 11.2 years for the moderately overweight group). In addition, where the dogs in the leaner group developed the same diseases (primarily osteoarthritis) as those in the overweight group, the onset of disease came later and the signs of the diseases were less severe.

Thus, overweight and obese companion animals lose out both in terms of health-related quality of life and life expectancy. On the other hand, work with rodents and pigs also indicates that a restrictive diet of the sort that secures maximum longevity and minimum morbidity causes welfare problems in the form of increased hunger, and derived effects such as increased aggression, elevated levels of stress and the development of stereotypies (D'Eath and others 2009, Kasanen and others 2010). Assuming the same conclusions apply to dogs and cats, there may be a real dilemma here between two of the five freedoms used to define animal welfare (FAWC 2009): it may not always be possible to secure freedom from both hunger and disease.

D'Eath and others (2009) have argued that this is a significant dilemma in respect to keeping laboratory, companion and some farm animals. Kasanen and others (2010) state that 'One could argue that the best solution is simply to proceed with feeding ad libitum, allowing the rats to be fat and friendly rather than lean and mean. A similar line of thought seems to apply to fattening pigs.' This solution may be appropriate for farm and laboratory animals, which are killed at a relatively young age before they develop conditions such as osteoarthritis or heart disease; however, this does not apply to cats and dogs that normally live until they either die spontaneously or are euthanased because of disease at an old age. In 2013, the average life span of dogs in USA was reported to be 11 years and of cats 12 years (Banfield 2013).

Of course, there may be ways to make the dilemma between preventing hunger and protecting health less stark. Animals may be able to eat more without detrimental effects to their health if they also exercise more, or are fed low-calorie bulk diets that nonetheless provide a feeling of satiety. They could also

be made to work for their food, thereby engaging in more feeding-related behaviours without getting too much food. However, this does not resolve the issue of which feeding strategy provides optimal welfare.

In fact, determining the optimal feeding strategy may depend on how welfare is defined. If welfare is defined in terms of fitness and function, then a very restricted feeding regime may be optimal. In contrast, if welfare is defined as getting the maximum amount of pleasure and the minimum amount of frustration or pain – either in total over a full life or per year lived – then a more liberal feeding regime may be preferable, as the avoidance of disease should be balanced against the potential frustration and stress relating to hunger. However, many dogs and cats end up becoming so fat that the negative health effects of obesity probably ultimately outweigh any satisfaction gained from eating.

### Risk factors

For dogs and cats, as for humans, obesity is a multifactorial problem, and some of the factors are similar between the species. A number of potentially related risk factors may be relevant including genetics, sex status, exercise, and owner characteristics and behaviours.

Studies suggest that some dog and cat breeds have a higher propensity to becoming overweight and obese than others (Mason 1970, Edney and Smith 1986, Lund and others 2005, 2006, O'Neill and others 2014). For example, among dogs, Labrador and golden retrievers are notoriously at risk. Further studies on the genetic basis of

*'Dogs showed fewer signs of being emotionally disturbed and of being in pain following a successful weight loss programme'*

obesity in dogs and cats would be useful, and these could be of relevance for humans where genetics also seem to play a role in the development of obesity (Stunkard and others 1986, Elks and others 2012, Switonski and Mankowska 2013).

As in humans, it is hypothesised that a lack of exercise not only predisposes to higher levels of obesity in dogs and cats, but also exacerbates health problems linked to being overweight (German 2006). In cats, indoor confinement increased the risk of developing diabetes mellitus (Slingerland and others 2007). This could relate to the cats being more obese due to inactivity (Allan and others 2000), perhaps in combination with sarcopenic obesity. In dogs, weight loss improved certain markers of cardiopulmonary function, and the dogs performed progressively better in a six-minute walk test during the weight loss programme (Manens and others 2014). However, studies on the possible beneficial

effects of physical activity are generally lacking for dogs and cats.

As well as causing disease, obesity may be the result of disease. For example hypothyroidism decreases metabolism and activity levels, resulting in obesity, and hyperadrenocorticism causes weight gain due to a cortisol-driven increase in appetite. Obesity predisposes to osteoarthritis, and it is likely that osteoarthritis promotes the development of obesity by restricting the animal's willingness or ability to move (Marshall and others 2009).

In the case of dogs and cats, neutering is also a risk factor for obesity. Even though it is possible through careful feeding to keep neutered cats and dogs at their ideal weight (provided that they do not scavenge), in practice, neutered dogs and cats are much more likely to be overweight or obese than intact ones (Nguyen and others 2004, Lund and others 2006).

Finally, a number of particular characteristics of the owners of cats and dogs may increase the risk of their companion animals becoming obese.

First, studies have found a relationship between obesity in dogs and their owners (but not in cats): if an owner weighs too much it is more likely that their dog will also be overweight or obese (Mason 1970, Kienzle and others 1998, Colliard and others 2006, Nijland and others 2010).

The same phenomenon is found in the relationship between humans. One study found that a person's risk of becoming obese increased by 57 per cent if he or she had an obese friend (Christakis and Fowler 2007). Among pairs of siblings, the risk of one sibling becoming obese increased by 40 per cent if the other was already obese. Similarly, if one spouse was obese, the risk of the other becoming obese was increased by 37 per cent compared to having a spouse of normal weight (Christakis and Fowler 2007).

Secondly, studies seem to indicate a link with the owner's income: the poorer the owner, the more likely it is that both the owner and the companion weigh too much (Kienzle and others 1998, Courcier and others 2010).

These two findings reflect the well-documented but complex relationship between obesity and low social status in humans (Paeratakul and others 2002, Robert and Reither 2004, Bove and Olson 2006, McLaren 2007), and it is not surprising that habits and constraints in people's own lives influence how they view and treat the animals in their care.

So far we have considered social, demographic and physiological factors that seem to increase the risk of an owner having an overweight companion animal. Now we will take a closer look at the possible psychological mechanisms that may be involved, connected to the human-animal bond.

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**An owner walks her dog during a blizzard. Studies have found a positive correlation between owning a dog and getting more exercise from walking, which may prevent lifestyle-related diseases in people**

### Human-animal bond

A possible link between obesity and the human-animal bond was noted by Shearer (2010), who suggested that owners of overweight cats and dogs use food as an acceptable form of communication and interaction with their pets. Similarly, Kienzle and others (1998) found that obese dogs were more often present when the

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- Kienzle and others (1998)

owner prepared or ate their own meals, and were fed tidbits then, leading the authors to suggest that 'owners of obese dogs tend to interpret their dog's every need as a request for food'.

Kienzle and others (1998) reported that obese dogs slept more often on their owners' beds, and that their owners spoke more often and on a greater variety of subjects to their dogs, and were less afraid of contracting diseases from their dogs, than were owners of dogs of normal weight. Owners of obese dogs also saw the animals as less important in relation to traditional dog roles such as sources of exercise, work and protection. The authors interpreted these differences as indicators of what they called 'overhumanising': 'The obese dogs were indulged as "fellow-humans" and they were no longer treated as typical companion animals.'

This study also confirmed the finding that owners of obese dogs tend to be obese themselves, and that they took little interest in their own health compared to owners of normal-weight dogs. Therefore, Kienzle and others conclude, part of the explanation of the behaviour of owners of obese dogs is

a transfer of the owners' eating habits and attitude to health to their dogs.

A follow-up study of cats by the same German group found a number of similarities between the human factors involved in dogs and cats becoming overweight, in particular, the tendency to humanise the animals and communicate through food. Thirty per cent of owners of overweight cats, compared with 12 per cent of owners of normal weight cats, stated that they had not felt very happy before acquiring a cat, and the cat was intended to console and encourage them. The authors seem to assume that the cats fulfilled this role of consolation and encouragement, and proposed that 'the results are suggestive of (1) a closer relationship between overweight cats and their owners than between normal cats and their owners, (2) more humanisation of overweight cats than of normal cats, (3) a potential role of overweight cats as a substitute for human companions' (Kienzle and Bergler 2006).

Another interesting finding in the case of overweight cats had to do with gender: more of the overweight cats (97 per cent) were owned by females than were normal weight cats (87 per cent). According to Kienzle and Bergler (2006), this may be linked to the results of other studies showing that women tend to have closer relationships with their cats than men do (Bergler 1989).

While the owners of the obese dogs studied by Kienzle and others (1998) tended to be more obese, to care less about their own health and were generally less financially well off than owners of normal dogs, these differences were not found in the case of cat owners. The authors suggest that people who are not overweight or obese themselves easily find other ways of engaging with dogs than through food, for example by taking them for walks; however, people are less aware of alternative ways of interacting with cats, making feeding the main contact point between many cats and their owners. That owners of overweight cats tend to communicate with their cats via feeding is further supported by the finding that they were more likely to serve the cat

homemade food and to make food available ad libitum, and less prone to play with their cats (Kienzle and Bergler 2006). It should be added that all of the cats in the study were indoor cats; and this, of course, limits opportunities for exercise.

It has also been suggested that 'cat owners were less aware of their pet's weight problem than dog owners' (Kienzle and Bergler 2006). There may be different reasons for this: cats sleep a lot, hide signs of illness more than

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dogs, and appear less often in public with their owners than dogs, and are therefore less likely to attract comments from other people.

Just as one would like to think that very few parents intentionally allow their children to become obese, it seems unlikely that many dog and cat owners intentionally compromise the welfare and health of their companions by overfeeding them. Rather, it seems that owners of fat companions may overfeed their animals due to a number of factors, over some of which they have limited control, much in the same way as they are drawn into overfeeding themselves and their children.

So, in the same way that parents of overweight children consistently underestimate their children's weight (Etelson and others 2003), a number of studies show



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**An overweight golden retriever being exercised in a pool. This animal weighs more than twice what would be considered a healthy weight for the breed**

that owners of overweight or obese dogs underestimate the body condition of their animals (Rohlf and others 2010, White and others 2011) and cats (Allan and others 2000, Kienzle and Bergler 2006). Furthermore, practising vets may fail to identify overweight animals. In one study, 28.7 per cent of the feline patients were scored as being overweight by means of a BCS while only 1.4 per cent of these feline patients were given the diagnosis 'overweight' by the practising vet, indicating that the veterinarian did not address the weight as part of the cats' problems (Lund and others 2005).

The number of studies on the social and psychological mechanisms underlying the way people feed their companion animals remains small, and further factors will probably be identified as new research is undertaken. However, what is abundantly clear from these studies is that we cannot hope to understand feline and canine obesity without also knowing something about human obesity, the social status of owners, and the relationships that humans actually have with their dogs and cats. This, we suggest, strongly supports our two-way approach to One Health.

### What can and should be done?

It is clearly difficult for some cat and dog owners to prevent their companions from becoming overweight, especially if they are highly attached to their animal, have strong empathetic responses to it, and regard food as a primary means of communication with it.

One difficulty is that, for various reasons, the fact that their cat or dog is overweight or obese does not matter to the same degree to all owners. Some people lack the financial or personal resources to deal with their own health, or that of their family, and so the health of their companion animals may not be high on their agenda.

But the issue of weight control itself is also controversial: some people and groups resist the idea that it is inevitably problematic for someone to be overweight or obese. For example, in the USA, various movements have developed in favour of so-called 'fat acceptance' (Kirkland 2008), arguing that size is no more justifiable a reason for discrimination or prejudice than height, sex or skin colour. They resist the medicalisation of being large, arguing that fat people are normal people in large bodies, who are capable of living good lives and making a contribution workwise and otherwise. In light of this, similar attitudes could develop in relation to companion animal obesity. The feline cartoon character Garfield may be a good example of an obese inactive cat that, despite his attitude, is seen as sympathetic; indeed, in virtue of being an obese cat, he may be viewed as having more personality than normal cats.

However, given the health implications and potential suffering that being obese

presents for cats and dogs, and also that many owners will be concerned about these risks to their companions, strategies for weight control are clearly needed. A number of strategies can be adopted. First, a balanced feeding regime is required from the beginning of the animal's life; the animal should be regularly weighed and feeding adjusted accordingly. Where possible, leaving an animal intact, rather than neutering it, would reduce the likelihood of it becoming overweight. If the animal is neutered, then its food intake should be reduced. Regular exercise and other activities will also help to prevent the animal becoming overweight. It is particularly important in the case of cats to find ways of engaging with them that are not linked to feeding, for example through various forms of training and playing, especially if they are not allowed outdoors.

When it comes to people exercising their dogs, the benefits are clearly mutual. Studies have documented a positive correlation between having a dog and getting exercise from walking, which in turn is likely to have

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an effect on the prevention of a number of human lifestyle-related diseases (Coleman and others 2008, Cutt and others 2008, Hoerster and others 2011, Lentino and others 2012). Similar effects, in terms of reducing lifestyle-related diseases have also been documented for children (Owen and others 2010).

As many people do not recognise that their companion animals are overweight or obese, or seem unable to manage their animal's weight, vets have an important role to play in highlighting the problem when the animals are brought to the clinic for vaccination or regular health checks. A number of approaches have been developed to help owners and vets address the issue of pets being overweight and obese, both through collaboration with pet food companies and through development of practice-friendly guidelines from central veterinary organisations (Freeman and others 2011, Brooks and others 2014).

First, tools such as the BCS have been developed to enable owners to check whether their companion is a healthy size.

Secondly, low calorie, high fibre and moderate to high protein diets have been developed, comparable to 'light' products for human consumption. Most large commercial pet food companies now produce a range of specific restricted calorie foods for dogs and cats, some of which are prescription-only,

that is, the animal must have been examined by a vet and the product recommended. If used appropriately, these products are helpful as part of a weight loss or management plan and, in some cases, will address the dilemma between satisfying hunger and avoiding being overweight. Feeding devices are also available that allow the animal to spend more time engaged in feeding related behaviours, without getting more food.

Thirdly, weight-loss and maintenance programmes have been developed which provide guidance for owners of overweight dogs or cats (Toll and others 2010). There are also various books (for example, Harvey and Taylor 2012) and internet-based programmes, typically sponsored or run by pet food manufacturers (for example, www.PetFit.com). These programmes involve feeding calorie-restricted diets and regular weighing of the animal, often combined with exercise and enrichment regimes. However,

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persevering with such a programme can be challenging, as it takes many months for noticeable weight loss to occur, and owners must remain extremely motivated. A key element of such a programme is, therefore, regular engagement with staff at a veterinary or special weight control clinic. As in the case of human obesity, the difficulty is not primarily to obtain an initial weight loss: the real challenge is to maintain the reduced bodyweight by sustained long-term changes in lifestyle (German and others 2012a).

It is well established that if some family members are enrolled in a weight loss programme, the remaining family members will also tend to lose weight, due to a spillover of more healthy habits, and a family awareness of weight issues. It seems likely that a similar phenomenon could influence the weight of companion animals in the household.

A striking feature of all these proposed solutions is that they appeal to individual actions, and do not consider the political, social and related human issues that seem to underlie the problem. It may be necessary for people to be able to recognise and tackle their own unhealthy lifestyles before they can recognise and address the problems related to the overfeeding of their animal companions. Tackling these social issues will require far wider-ranging solutions.

Finally, given these social issues, it is important to avoid moralising, that is, condemning people for doing what they (to some degree, at least) cannot help doing. There have been cases, in Sweden and the

UK (Kulick 2009), where obese pets have been forcibly removed from their owners by the authorities. While this may be necessary if the animal's welfare is severely threatened, it cannot be a general solution to the widespread problem of canine and feline obesity.

Condemning owners of fat companions without either helping them or addressing the underlying social problems may simply worsen the stigmatisation and low self-esteem that obese people already face in many societies (Puhl and Brownell 2006). Instead, solutions must be identified to solve the underlying problem, and enable owners of cats and dogs to develop a healthy lifestyle for themselves and their companions – the kind of project that could lie at the heart of a two-way approach to One Health.

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doi: 10.1136/vr.g7521