

Nutritional needs: are life-stage and breed diets fact or fiction?

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Nicola Ackerman BSc(Hons), RVN, CertSAN, CertECC ,A1 V1, C-SQP, discusses the importance of tailoring diets to individual cats and dogs

Summary

ANIMALS have different nutrient requirements throughout life, whether for growth, lactation or maintenance. A good quality diet can deliver nutrients that help support the animal at a specific life stage and promote health and the prevention of disorders associated with that specific time. An example is decreasing phosphate levels in senior diets to aid in renal function.

Key words

Animal nutrition, life stage, diet, breed-specific, neutered

AVAST array of life-stage diets are available, and these can be subdivided to encompass neutered pet diets, breed-specific diets and those with different requirements (whether a mobility or hairball diet). So, do pets require these different life-stage diets, or is it all a marketing ploy by nutrition companies?

Selecting the right diet for the right pet can be challenging and is a balance between owner choice and pet choice. Different life stages of cats and dogs have specific requirements and, therefore, different nutrient requirements are needed to meet these demands. Cats and dogs require around

40 different essential nutrients. These need to be in the correct form and in the right amount (balanced), to deliver complete nutrition ([Figure 1](#)). Too much or too little will cause deficiencies or toxicities.

The way an animal picks up the food in its mouth, and the way it eats it, influence the palatability of a diet. Cats exhibit three different methods of dry food prehension. The most common method is labial prehension, where the cat grasps the kibble between the incisors, without the use of the tongue. The second method, supralingual prehension, involves the cat using the dorsal side of the tongue to lap up its kibbles. The third method, sublingual prehension, occurs when the cat applies the ventral side of the tongue to the kibble, turning the kibble backwards into the mouth ([Figure 2](#)). Sublingual prehension is commonly used by brachycephalic breeds, such as Persians, and almond-shaped kibbles aid in sublingual prehension, and are, therefore, used in breed-specific diets.

Prehension and kibble shape and size do not appear to be linked in the dog. The kibble shape and size does affect other feeding parameters – for example, the time taken to eat the diet and encouraging dogs to chew it rather than swallowing it whole.

Feeding puppies and kittens

Puppy growth diets are divided into those designed for puppies that will be greater than 25kg when fully grown and those less than 25kg when an adult ([Figure 3](#)). This division is due to growth rates and the age when maturity is reached. Large breeds should grow at a slower rate over a longer period of time. Diets designed for these breeds are modified with lower energy levels, thus preventing rapid growth rates¹. Historically, large-breed diets were supplemented with calcium, as it was felt extra calcium was required to support the skeletal system during rapid growth. Extra calcium is not required, and should be kept in the ratio of 1: 1 to 1.5: 1 with phosphorous. If the energy content of the diet is correct, rapid growth phases are prevented, and the predisposition of developmental orthopaedic disorders is reduced.

Overfeeding in all puppies and kittens should be avoided, as it can lead to obesity in later life. Slight underfeeding, which does not induce a reduction in full growth potential, will aid in increasing an animal's lifespan compared to overweight or obese individuals. Too low a weight gain may reflect insufficient calories being consumed or that a diet's protein quality (not quantity) is not adequate enough. The quality of a protein reflects the essential amino acids it contains and the overall digestibility of that protein.

Junior and adolescent diets

Some commercial dog foods offer a junior or adolescent choice of diet. The role of these diets can be beneficial in puppies that require an intermediate diet prior to moving on to an adult maintenance diet. For those brands that do not provide a large-breed puppy option, using this junior/adolescent diet is necessary to prevent rapid growth rates. When large-breed puppy diets

are being fed, changing to a junior or adolescent version is not required, as large-breed puppy diets have a reduced energy content compared to puppy diets for small and medium breeds.

Adult maintenance

The adult phase is defined from when maturity has been reached until physiological changes occur due to the ageing process. The age the adult phase starts depends chiefly on breed variations. Smaller breeds can reach full maturity from six months; larger and giant breeds from between one year to 18 months. Each animal should have its diet altered to meet its individual needs. The quantity of diet fed will depend on the quality of the diet, amount of exercise the animal receives, neutering status and metabolism. Those breeds predisposed to weight gain should have their weight, body condition score (BCS) and muscle condition score (MCS) monitored throughout this life phase. Changes in post-neutering metabolism should be noted to owners, and use of “light” diets or diets specifically aimed at neutered animals should be advocated. These diets are designed to prevent weight gain, not aid in weight loss.

Neutered adult diets

Many diets specifically designed for neutered cats have been introduced to the market. As previously discussed, an animal’s metabolism changes after neutering. In entire cats, energy expenditure in both female and male animals is 57 ± 2 kcal/kg. Once neutered, this value decreases to 50 ± 3 kcal/kg in males and 51 ± 2 kcal/kg in females².

Performance and working diets

Animals with a high energy expenditure will benefit from a diet with a higher energy density. The digestive system’s capacity and digestive and absorption abilities may be limiting factors. Care should be taken when an animal has periods of reduced activity as excessive calories will result in rapid weight gain. Energy-dense diets are also beneficial for animals with a high metabolism that find weight gain difficult. When changing any animal to a more energy-dense diet, a longer than normal transitional period may be required. This is due to the dog’s digestive mechanisms having to adjust to this diet. The extra energy in these diets is supplied in the form of increased fat content, while they have a relative decrease in fibre content. This increase in fat is due to the increased calories per unit of weight the fat contains. The reduction of fibre is required as this increases the digestibility of the diet, and reduces the effect fibre has on reducing absorption of other nutrients.

Senior diets

The onset of a senior or geriatric life phase varies according to breed size and species. Toy and small-breed dogs enter the senior stage of life at approximately eight years of age, medium breeds at between seven and eight, and large and giant breeds enter a senior life stage at five years. Cats

are deemed senior from eight years. Other factors, such as nutritional status, environment, genetic make-up and clinical health, will affect the ages and longevity of the dog and cat. Changes that occur with age include greying of the muzzle and slowing down in activity levels due to arthritic changes, but less obvious changes include alteration in the physiology of the digestive tract, immune system, kidneys and other organs. Generally, the capacity to absorb and use nutrients is not decreased in older animals, but the body does become less able to tolerate excesses and borderline deficiencies, and the ability to respond to dietary changes may also be decreased³.

Nutritional changes in feline and canine diets are aimed at supporting the physiological changes that occur within this life stage. Energy requirements for senior animals can be reduced due to a decrease in activity levels and expenditure, normally because of arthritic changes or owner perceptions of older pets. Some active senior animals may require an energy density higher than that provided by senior diets, and a compromise between senior and adult maintenance is required (Figure 4).

In cats, however, the maintenance energy requirements do not decrease as they get older². This could be because cats remain relatively inactive throughout their adult life. It is difficult to tell between an older and younger cat simply by looking at its activity levels, as cats spend a large portion of their day being inactive if in pain, and an extremely high number of cats have undiagnosed arthritic changes.

A reduction in renal function should be considered in all senior animals. A reduction in protein quantities within the diet could be beneficial if renal damage has occurred. The protein's quality should be increased as skeletal muscle mass reduces, which also reduces any protein or amino acid reserves if required. Some life-stage diets do not have a decrease in protein levels. Some views exist that restricted protein levels are not required until there is direct evidence of renal impairment. In fact, protein requirements sufficient to support protein turnover actually increase in older dogs and cats. Protein restriction in feline senior diets should be avoided. Cats are especially sensitive to decreases in protein levels within their diet. This is due to the inability to downgrade protein metabolism pathways. Reduced protein digestibility is also experienced in geriatric cats. In healthy adult cats, protein digestibility is typically 85 per cent to 90 per cent. In geriatric cats, digestibility can be reduced to less than 77 per cent⁴. Diets with a severely restricted protein level or proteins of a low quality (biological value) can predispose cats aged 12 years or older to negative nitrogen balance, and loss of lean body mass⁴.

The restriction of phosphorous in the diet plays a significant role in the prevention of renal impairment. A decrease in kidney function also leads to an increased loss of water-soluble vitamins, due to the kidneys' decreased ability to concentrate the urine. This can also lead to a reduction in hydration levels of the animal. Senior animals have a reduced sensitivity to thirst, and thus are at greater risk of dehydration⁵.

The use of antioxidants for senior animals has been advocated. Free radical production can

increase with age, as diseases associated with ageing – for example, cardiovascular disease or arthritis – will increase further production of free radicals.

Older cats and dogs should be evaluated for vitamin and mineral deficiencies. Due to oxidative damage, demand is greater for antioxidant vitamins. Geriatric animals, especially cats, have a reduced ability to digest fats. Due to the association with fat digestibility and that of other essential nutrients (fat-soluble vitamins), deficiencies can occur.

As an animal ages, olfaction is the first sense to decline. As an animal's sense of smell deteriorates, it may eat less. The aroma of the diet is particularly important in diets aimed at senior animals to encourage consumption.

Breed-specific diets

Many commercial diets are targeted for specific breed types or size. Small-breed diets tend to have a higher energy density compared to those aimed at medium and large breeds. This is due to the stomach's small capacity and an increase in metabolism. Care should be taken with any small-breed dogs that put on weight easily and, in some cases, small-breed diets might not be the diet of choice. Kibble size is also tailored according to the size and breed of dog it is designed for. In feline diets, kibble shape has also been shown to affect the way certain breeds consume their diet. Persian cats, for example, benefit from an almond-shaped kibble that aids in sublingual prehension.

Diets aimed at reducing the risk of certain breeds' disposition to certain disorders/disease have also been introduced.

Where these prove useful, it should be remembered that large variations between individuals of the same breed occur and, where one diet might suit one animal, it may not suit another of the same breed. Certain breeds have certain characteristics – long-haired cat breeds are more likely to need a diet with a hairball element, for example, while Labradors are more likely to require a diet that has some element of mobility aid and is lower in calories.

Each animal must be considered as an individual when discussing and recommending a specific diet. The animal's BCS, MCS and dietary history need to be evaluated to ensure an accurate recommendation.

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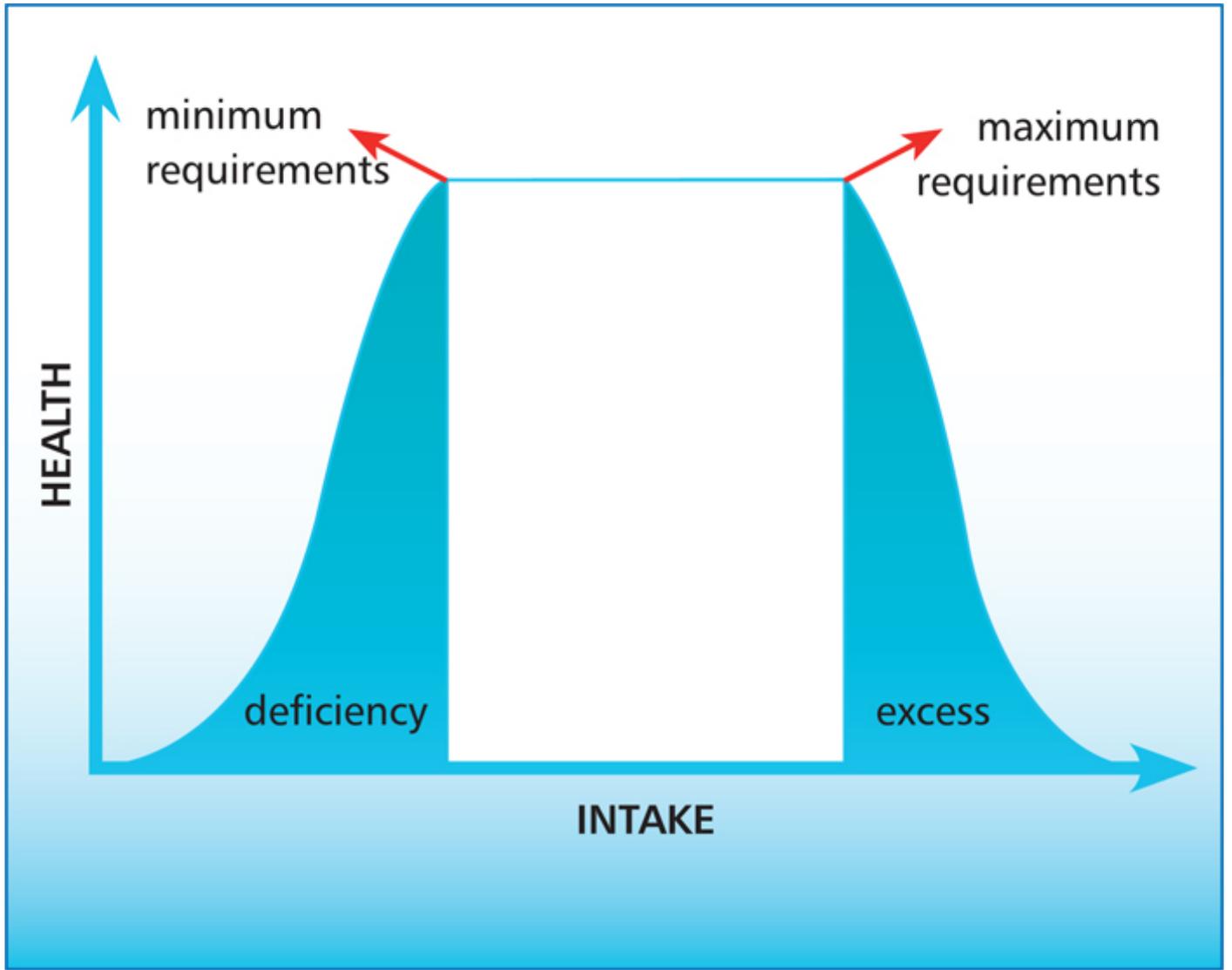
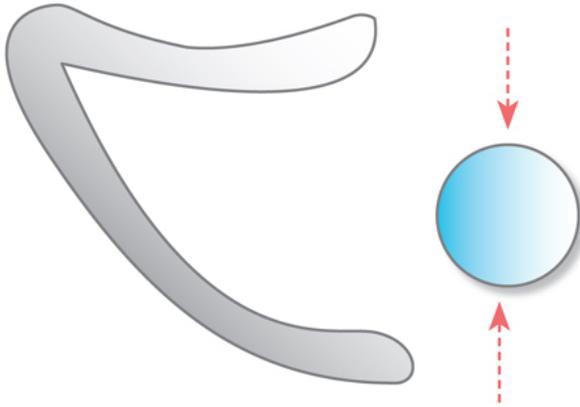
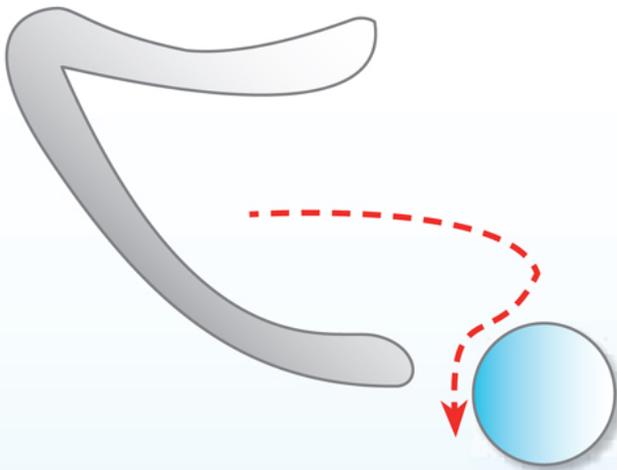


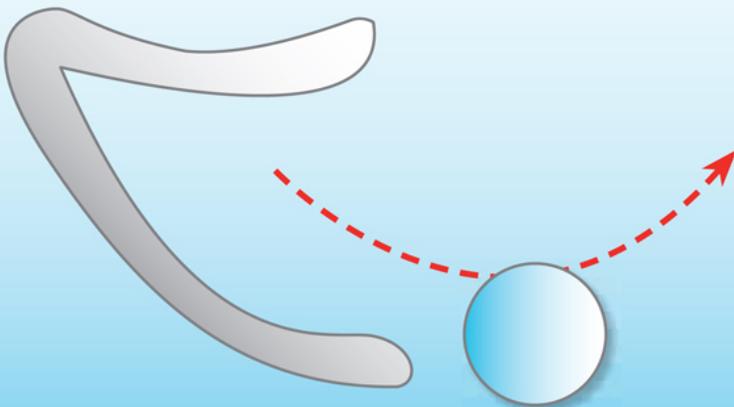
Figure 1. Diagram showing nutrient requirements.



LABIAL



SUPRALINGUAL



SUBLINGUAL

Figure 2: Prehension methods in cats.



Figure 3. Puppies' nutrient requirements differ greatly from those for other life stages.



Figure 4. Some older active dogs still require higher levels of calories than others.