

Life stage feeding

CHAPTER

5



LEVEL 1



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Learning outcomes

By the end of this chapter, you will be able to:

- describe why it is essential to feed pets food suited to their age
- explain to the owners why their healthy pet will benefit from a food suited to their life stage.



1

Why feed according to life stage?

Let your client know

The concept of life stage nutrition recognises that feeding either below or above an optimal nutrient range can negatively affect performance or health.

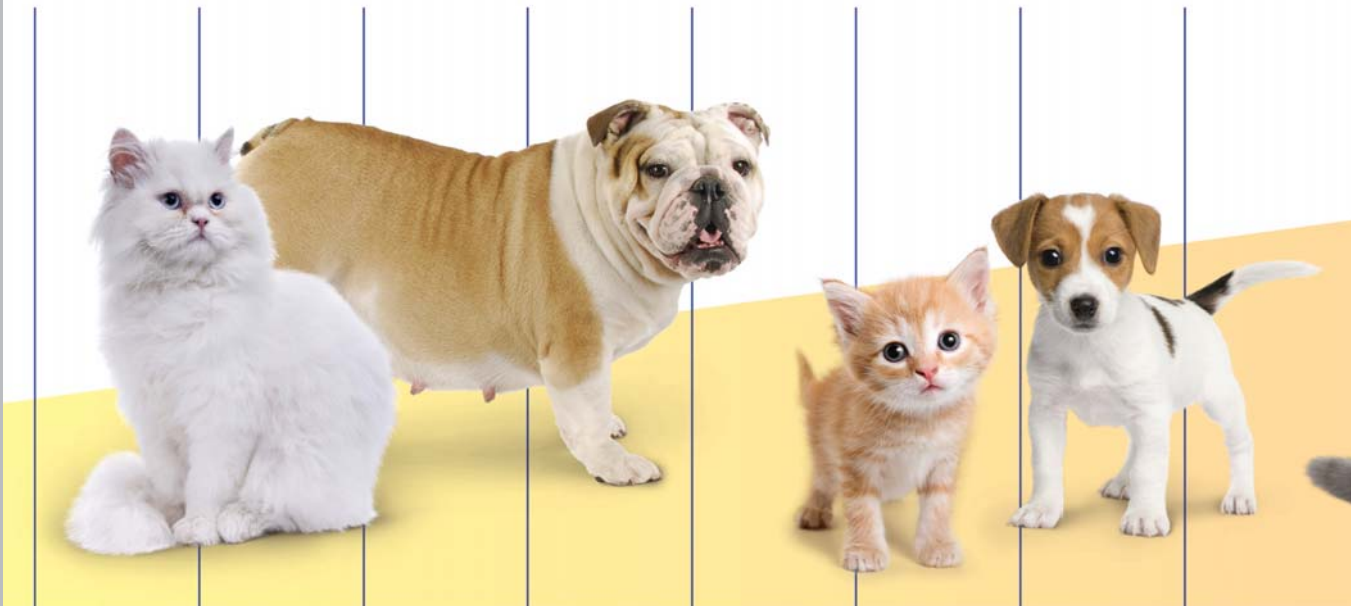
Throughout their lives, the nutritional needs of animals change. Some changes are obvious, such as the need of kittens and puppies for extra 'building blocks' to grow successfully. Others may be less obvious to the client, such as the need of an older dog or cat for a diet that avoids excessive amounts of certain nutrients, such as phosphorus. It is important to recognise that by feeding pets according to the life stage they are at will help them maintain good health throughout their lives.

In addition to providing advice about animals' basic nutritional requirements, the healthcare team should assess and minimise nutrition related health risks at each life stage. For maximum benefit, the risk assessment and the plan for prevention should begin well before the onset of disease.

Definition

Life stage nutrition: the practice of feeding animals foods that are designed to meet their optimal

nutritional needs at a specific age or physiologic state (e.g. adult, reproduction or growth).



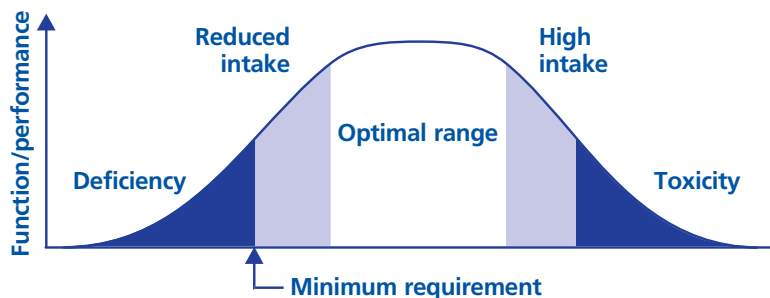
Reproducing dogs

Reproducing cats

Puppies

Kittens

Nutrient intake



Total biologic dose-response curve. This response curve spans intakes ranging from deficiency to adequacy to toxicity. The intakes at which these phases reside and the width of the range between deficiency and toxicity vary widely among nutrients.

Let your client know

When you feed a commercially prepared food, it usually meets minimum requirements for all nutrients for dogs and cats.

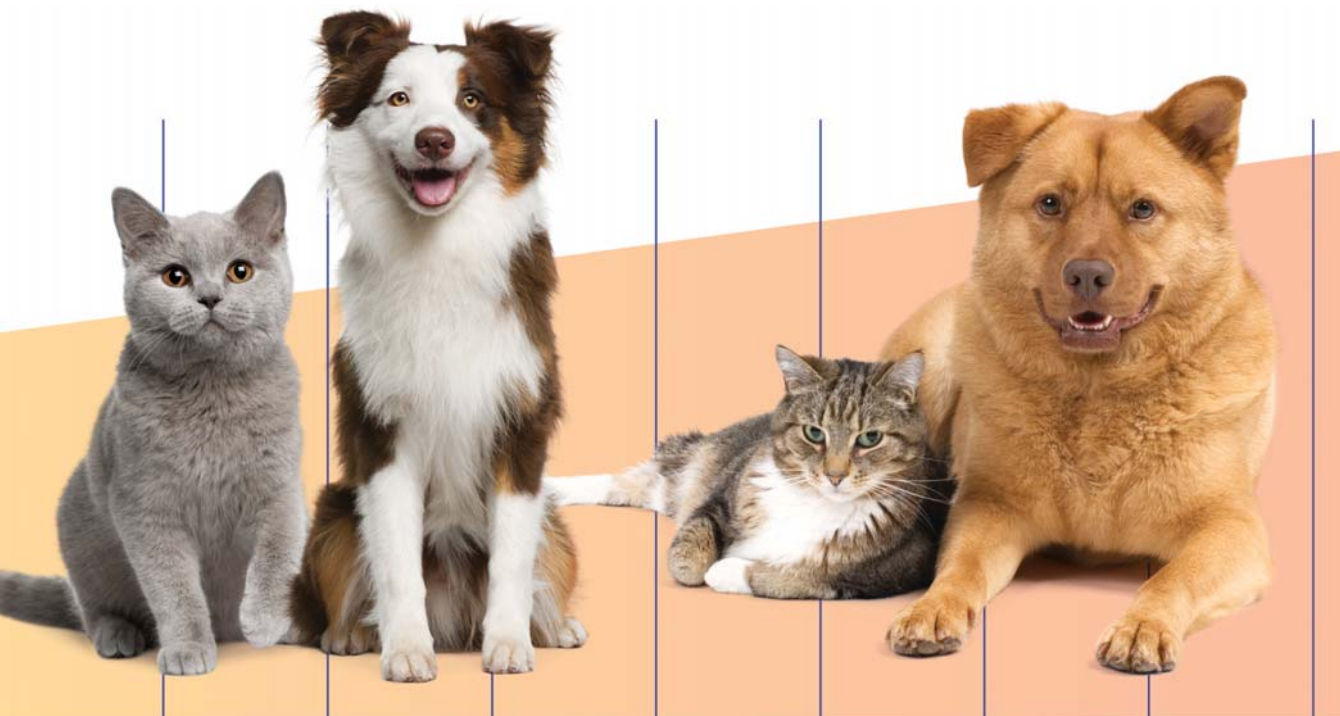
Clinical note

Specific food factors such as digestibility and texture can also affect health and disease risk. Together, nutrients of concern and specific food factors are called key nutritional factors.

In affluent societies, malnutrition is often caused by nutrient excess rather than deficiencies. Some of these nutrients may increase the risk of disease and are therefore called nutrients of concern.

In this chapter, we will look at:

- collecting the history and information of the dog or cat
- key nutritional factors in life stage feeding
- life stages of the dog and cat.



Adult dogs – young to middle-aged

Senior dogs

Adult cats – young to middle-aged

Senior cats

2









Nutritional history and information collection

In order to be able to give the owner appropriate advice on what to feed their dog or cat, it is important to get the following information about the pet:









Target Body Condition Score:

The Body Condition Score is a measure that helps indicate if a pet is at or over its ideal weight.









Very Thin

1	RIBS:	Easily felt with no fat cover		
	TAIL BASE:	Bones are raised with no tissue between the skin and bone		
	SIDE VIEW:	Severe abdominal tuck		
	OVERHEAD VIEW:	Accentuated hour-glass shape		









Underweight

2	RIBS:	Easily felt with no fat cover		
	TAIL BASE:	Bones are raised with minimal tissue between the skin and bone		
	SIDE VIEW:	Abdominal tuck		
	OVERHEAD VIEW:	Marked hour-glass shape		









Ideal Weight

3	RIBS:	Easily felt with slight fat cover		
	TAIL BASE:	Smooth contour but bones can be felt under a thin layer of fat		
	SIDE VIEW:	Abdominal tuck		
	OVERHEAD VIEW:	Well-proportioned lumbar waist		

Overweight

4	RIBS:	Difficult to feel with moderate fat cover		
	TAIL BASE:	Some thickening but bones can be felt under a moderate layer of fat		
	SIDE VIEW:	No abdominal tuck or waist		
	OVERHEAD VIEW:	Back is slightly broadened		

Obese

5	RIBS:	Difficult to feel with thick fat cover		
	TAIL BASE:	Thickened and difficult to feel under a prominent layer of fat		
	SIDE VIEW:	Fat hangs from the abdomen and there is no waist		
	OVERHEAD VIEW:	Back is slightly broadened		

Target Body Condition Score = 3

Signalment

- e.g., breed, age and weight

History

- environment and use, e.g., indoor or outdoor cat

Medical

- e.g., signs from the organ systems such as bad breath or loose stools
- e.g., prior disease

Nutritional

- e.g., what is fed and how much including treats

General impressions

- should include a Body Condition Score.

Definition

Signalment: a detailed description of the pet.

Remember to not just ask, but also record the following in the journal:

- dietary history
- body weight
- oral health
- overall appearance of skin and coat
- any other information that comes to light regarding the environment, history and current status.

Clinical note

Newfoundland dogs have energy requirements that are about 15% **less** than average while Great Danes and dalmatians may have energy requirements that are up to 16% **more** than the average.

Let your client know

Cats typically eat 10–20 small meals throughout the day and night. This is important to remember, as the practice of some pet owners to only feed their cats once or twice per day may predispose the cats to

begging behaviour. It is recommended to persuade at owners to feed their cats many very small meals throughout the day, as this is better suited to cats' nature and physiology.

2.1 Breed

Different breeds may be at different risks for certain conditions or diseases. Certain breeds appear to be predisposed to obesity. The DER (Daily Energy Requirement) may vary considerably between breeds and this makes it even more important to emphasise to the owner that feeding recommendations on pet food are only a **starting point**.





2.2 Neuter status

When dogs and cats are neutered, they will usually need fewer calories per day. Neutered dogs need an average of 25% fewer calories compared with an intact dog, while neutered cats need 24–33% fewer calories compared with intact cats. For most neutered pets it will be easier to maintain their optimal weight with a diet that has fewer calories and more fibre, like Science Plan™ Adult Light.

2.3 Activity level

Activity significantly influences the energy requirements of individual dogs. For example, standing requires 40% more energy than lying down. When comparing active, outdoor cats with sedentary, indoor cats, the difference in caloric requirements can be twofold. Since obesity is such a serious condition, feeding recommendations should initially be conservative to prevent the pet becoming overweight.



Clinical note

19% of owners never play with their dogs.
22% of owners take their dog out for exercise less than three hours per week.

2.4 Active and sporting dogs

Some dogs are used for hunting or racing and have different requirements compared to the couch potato at home. Working dogs are unable to perform optimally on a diet used for the maintenance of adult dogs. They require a diet that will support their levels of exercise, especially if endurance is a part of this. Sprinters may do very well on a regular diet for adult dogs while endurance athletes such as sled dogs require a diet with a much higher level of fat to meet their unique needs.



Let your client know

Multi-cat households can increase the social and psychological stress, particularly if there is overcrowding. Cats that are under stress may develop either diminished appetite and even anorexia, or they may have an increased appetite, which could lead to obesity.

Multiple feeding stations at different levels, multi-level resting areas, visual barriers and quiet hiding spots can help alleviate the stress of a multi-cat household.

2.5 Stress and the environment

Stress stimulates alertness but may depress the food intake. Stress occurs in many different situations from boarding to showing the pet. Dogs may develop diarrhoea or refuse to eat when they are being boarded due to stress. Paradoxically, dogs and cats actually have a **higher** energy requirement when they are stressed, but they eat less and this may cause them to lose weight. Obtaining accurate dietary histories and achieving good dietary compliance for cats from multi-cat households can be challenging. Nervous or stressed dogs will benefit from a concentrated diet that allows them to meet their energy requirements even if they only eat a little, such as the Science Plan™ Canine Performance™.



Clinical note

Physiologically induced weight loss is most common in sentry dogs, in which a combination of stress, weather extremes and activity may result in loss of up to 10% of body weight during a six-hour tour of duty.

When kept outside in cold weather, dogs may need 10–90% more energy than during optimal weather conditions. During hot weather, dogs will pant and may therefore require much higher amounts of water despite the fact that only a little extra energy is expended.

Clinical note

Cats pant and wet their coats with saliva to maximise evaporative water loss and cooling. Cats that are dehydrated have a 50% reduction in their ability to use this evaporative water loss for regulating their temperature.



Let your client know

Water is critically important to prevent heat stress in hot environments.

2.6 Age

Depending on the age of the cat or dog, the pet will have varying requirements for specific nutrients such as calcium, phosphorus and protein. Puppies, kittens and reproducing dogs and cats need extra nutrients for growth and may develop problems if these are not present in the correct amounts. On the other hand, large-breed puppies may develop problems if too much of certain nutrients, such as calcium, are provided.

Between five and seven years of age, the physiology undergoes changes that are generally described as age-related. This leads to an increase in the prevalence of dental disease, obesity, cardiac and kidney disease, which means that it is important to make sure that the diet does not exacerbate this tendency.

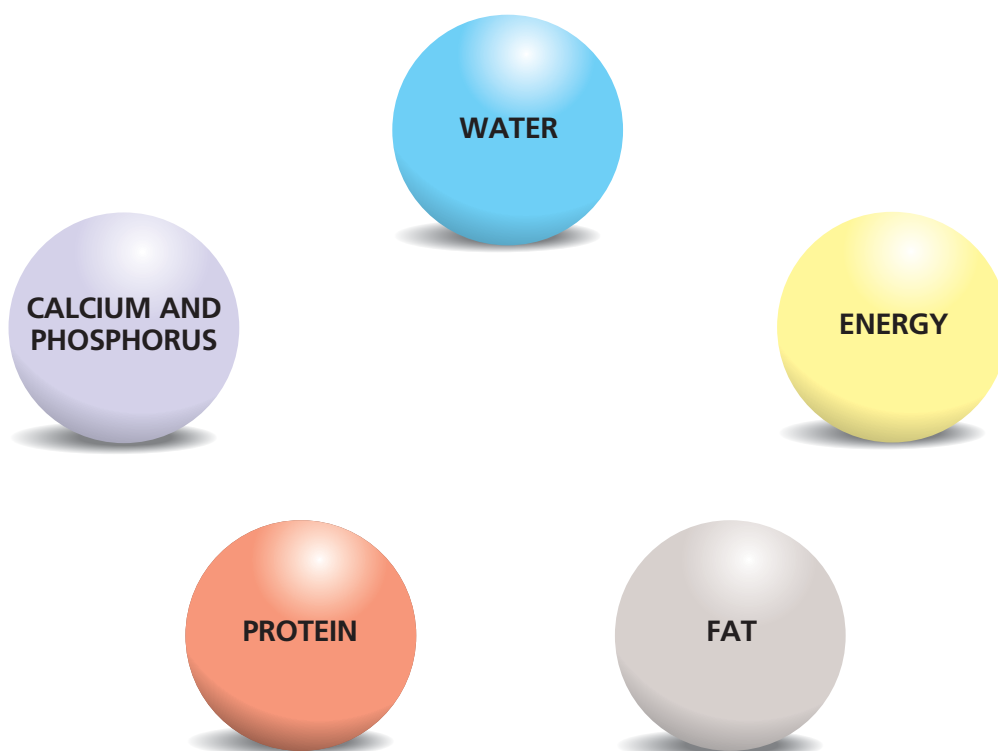


3

Key nutritional factors

The goals of nutritional management are to maximise both the length and the quality of life and, ideally, to do this before any health issues occur. To be able to maintain the good health of both dogs and cats, a pet food needs to have all nutrients in both the right balance and the right quantity. However, there are certain nutritional factors that are especially important to control. At Hill's these are called key nutritional factors.

THE MOST IMPORTANT KEY NUTRITIONAL FACTORS ARE:



Some of the life stages may also have additional key nutritional factors, which will be described separately under the appropriate life stage.

3.1 Water

The total water intake (drinking as well as the water that is obtained from food) is influenced by many factors (e.g., ambient temperature and activity level) but will increase almost linearly with increasing salt levels in food. Requirements may be met by allowing free access to a source of fresh water. Cats are especially good at concentrating their urine if they drink less water.

Let your client know

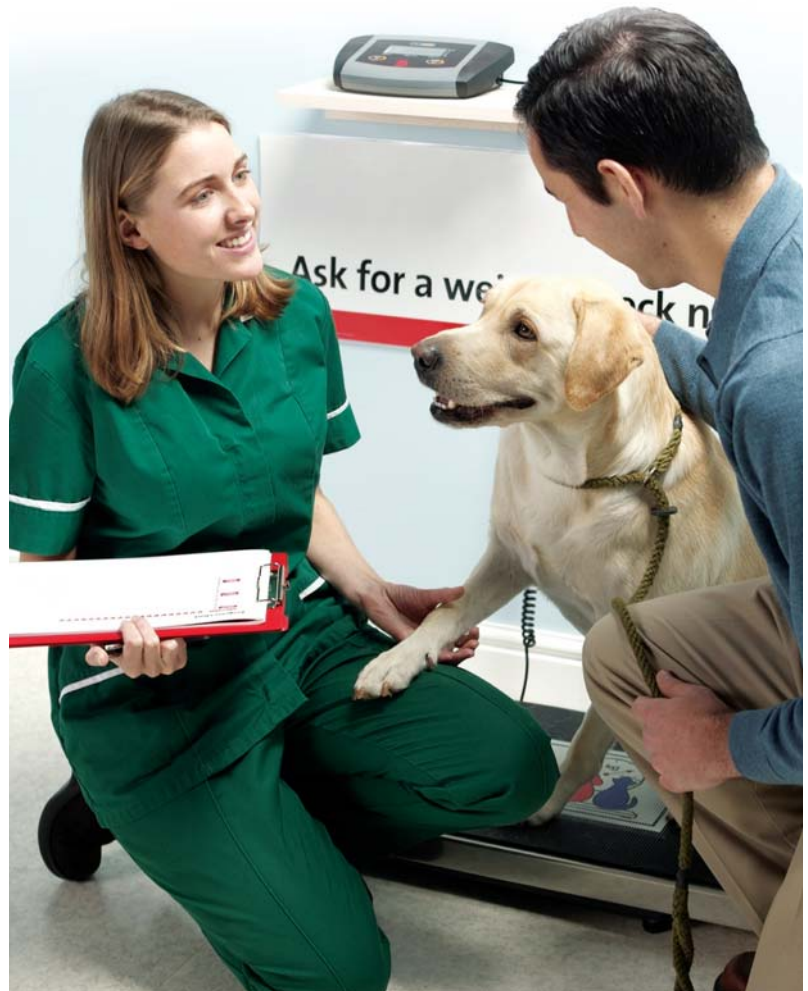
Individual cats may have energy requirements that vary by up to 50% or more above or below the average requirement. Therefore, it is important to remember that the recommended feeding ranges on pet food labels are **only** a starting point.

The true number of calories needed by the individual cat is that which maintains optimal body weight.

3.2 Energy

Requirements can vary considerably from individual to individual. In puppies that will grow to over 25 kg when adult, a diet with a high energy content is more likely to cause skeletal growth problems.

Since obesity is implicated in many different diseases, the priority is to maintain optimal weight at all times. Therefore, prevention of obesity should be an important goal of feeding programmes. Energy requirements change with age and with neuter status, and therefore it is important to maintain an appropriate weight management programme where the pet is weighed regularly and the weight is recorded.



Clinical note

Up to 50% of middle-aged cats are overweight, making it essential to keep all cats on a weight management programme throughout life, to continuously monitor their body weight. Obesity increases the risk of death in middle-aged cats 2.7 times above that of lean cats.

3.3 Fat and essential fatty acids

These are necessary in the diet. Ensuring an adequate intake of essential fatty acids is key to maintaining a normal skin and coat. For dogs and cats that are prone to being overweight, a lower level of total fat is usually recommended, while making sure that the diet contains sufficient levels of EFA (Essential Fatty Acids).

3.4 Protein

Excessive amounts of protein may contribute to the progression of renal disease, especially as foods high in protein are often high in phosphorus as well. Once the protein requirements are met, excessive amounts of protein will be stored as fat.

3.5 Calcium and phosphorus

These are other nutrients of concern. Homemade foods are often deficient in calcium and have excessive amounts of phosphorus. Even some commercial diets have very high phosphorus levels. This is of concern since a high phosphorus intake has been linked with an increased progression of renal disease while phosphorus restriction may slow the progression of chronic renal disease and improve long-term survival. On the other hand, feeding excessive amounts of calcium may lead to calcium oxalate stones and various orthopaedic problems, especially when fed to puppies.

Clinical note

Up to 25% of young, adult dogs may already be affected by subclinical kidney disease.

One clinical study revealed that 22.4% of all dogs over five years of age examined at a European veterinary teaching hospital for a variety of reasons had abnormal kidney function tests.

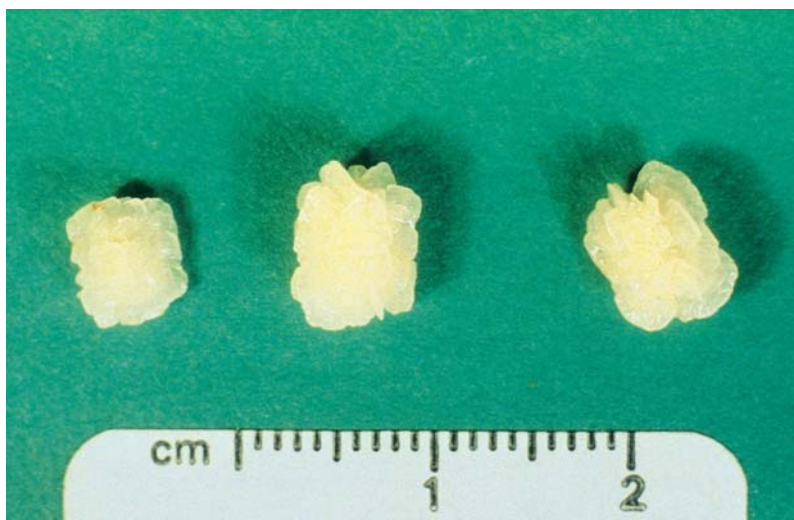
Clinical note

Cats with renal disease are usually not diagnosed until three-fourths or more of the kidney function has been lost. Renal disease is the second most common cause of non-accidental death in cats. In order to help cats live longer and

more healthy lives it is essential to minimise phosphorus excess. This is best done by feeding a good quality cat food that varies with the life stage of the cat such as the Science Plan™ range.

Let your client know

Typical supermarket foods may contain both calcium and phosphorus well in excess of what is recommended for cats.



Calcium oxalate dihydrate urolith removed from the bladder of a cat with hematuria and dysuria.

Summary

Summary of key points

1. **Life stage nutrition** is the practice of feeding animals foods that meet the **optimal nutritional needs** at different ages or physiological states.
2. The history of the pet is important information to obtain from the pet owner.
3. There are specific **key nutritional factors** that are important to control if you want to maintain the good health of a pet.
4. Cats typically eat **10–20 small meals** throughout the day and night.
5. **Neutering** reduces the amount of calories needed by 25% in the dog and by 24–33% in the cat.
6. **Activity levels** are one of the key factors in determining energy requirements in cats and dogs.
7. **Multi-cat households** can **increase** the social and psychological stress, particularly if there is overcrowding.
8. **Up to 25%** of young, adult dogs may already be affected by **subclinical renal disease**.
9. To help pets **live longer**, it is important to **avoid an excess of phosphorus** in the diet.

Self-assessment questions

1. Why is life stage nutrition important?
2. Does malnutrition occur in affluent societies?
3. What information would you have to get from the pet owner regarding the history of a normal, healthy dog or cat?
4. What are the most important key nutritional factors in life stage feeding?
5. How do essential fatty acids benefit the pet?

4

Reproducing dogs and cats



Definitions

Pre-natal: preceding birth

Neo-natal: pertaining to the first week of birth

The objectives of a good reproductive feeding programme are to optimise:

- conception
- number of puppies or kittens per litter
- ability of the bitch and the queen to deliver
- viability of the puppies and kittens, both pre-natally and neo-natally
- lactation.

Correct feeding and management will increase the likelihood of successful reproduction and healthy puppies and kittens, whereas improper nutrition will negatively affect the reproductive performance of bitches and queens.

Definitions

Morbidity: the condition of being diseased

Mortality: the statistical number of deaths



FACTORS	REPRODUCTIVE AND HEATH CONSEQUENCES
UNDERFEEDING	Small litter size Low birth weight Increased neonatal morbidity and mortality Decreased milk yield Decreased immunity and decreased response to vaccination Decreased fertility later Hair loss and weight loss in bitches
OBESITY	Decreased ovulation Decreased fertility Silent heat Prolonged interoestrous interval Anoestrus Smaller litters
MALNUTRITION* Protein deficiency	Low birth weight Increased neonatal morbidity and mortality Decreased neonatal immunity
CARBOHYDRATE-FREE FOOD	Low birth weight Increased neonatal morbidity and mortality Increased numbers of stillbirths
ZINC DEFICIENCY	Fetal resorption Smaller litters
IRON DEFICIENCY	Decreased immunity and response to vaccination
PYRIDOXINE AND BIOTIN DEFICIENCY	Decreased immunity and response to vaccination
HYPERVITAMINOSIS A	Congenital abnormalities Smaller litters
HYPERVITAMINOSIS D	Soft-tissue calcification

* *Malnutrition is not common when balanced commercial foods are fed, but may occur if homemade foods are not properly formulated.*

Both females and males need to be fed correctly in order to breed optimally. Females have specific concerns relating to:

- oestrus
- pregnancy
- lactation.

Most male dogs and cats that are used in breeding programmes will thrive on a complete food for the maintenance of adults but some will need either more of the food or a more energy dense food that better meets their increased needs.

Definitions

Oestrus: time of receptivity to mating

Anoestrus: non-occurrence of oestrus

Interoestrus: period between oestrus

The following gives you a short synopsis of the nutritional needs in the three reproductive stages of the bitch and queen.

4.1 Oestrus

In order to ensure the best possible oestrus and mating it is important that both the nutrition as well as the weight of the bitch and queen is appropriate. A bitch or a queen should never be either underweight or overweight, as this will have consequences throughout the pregnancy and lactation.

Bitches tend to have a depressed appetite during oestrus. They might also experience vomiting. To reduce these problems it may be better to feed small meals immediately before and after mating.

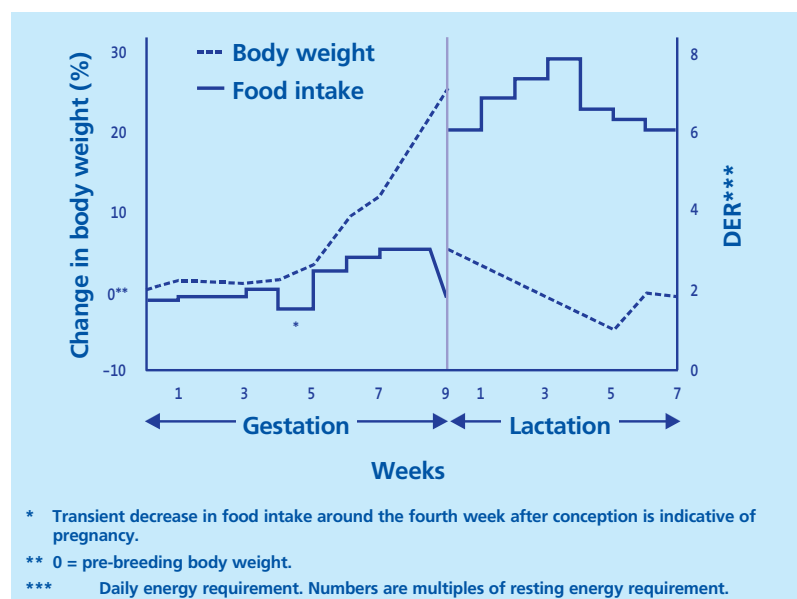
During oestrus, queens typically reduce food intake and body weight may decline. Therefore, it is important to feed them a high quality maintenance food.

	Dogs	BITCHES IN OESTRUS CAN BE FED A HIGH-QUALITY MAINTENANCE FOOD FOR ADULT DOGS, SUCH AS:
	Science Plan Canine Adult	
	Science Plan Canine Adult Large Breed	
	Science Plan Canine Adult Mini	
	Science Plan Canine Adult Light	
	Science Plan Canine Sensitive Skin	
	Science Plan Canine Sensitive Stomach	
	Science Plan Canine Oral Care	
	Science Plan Canine Nature's Best Mini/Medium	
	Science Plan Canine Nature's Best Large/Giant	
	Cats	QUEENS IN OESTRUS CAN BE FED A HIGH QUALITY MAINTENANCE FOOD FOR ADULT CATS, SUCH AS:
	Science Plan Feline Adult	
	Science Plan Feline Sensitive Skin	
	Science Plan Feline Sensitive Stomach	
	Science Plan Feline Nature's Best Adult	

4.2 Gestation

Dogs

A dog is pregnant for 55-70 days with an average of 63 days. The period of gestation is divided into 21-day trimesters. Usually bitches will gain about 15–25% of their pre-breeding weight before they whelp. After the birth the bitch should only weigh about 5–10% more than what they did before they were bred. Dogs do not need to maintain a body fat reserve to provide energy for the subsequent lactation because they can increase their food intake during lactation.



Typical changes in body weight and food intake of a bitch during gestation and lactation.

KEY NUTRITIONAL FACTORS FOR GROWING DOGS

FACTORS	RECOMMENDED LEVELS IN FOOD (Dry Matter)	
	Gestation/lactation*	Lactation**
Energy density (kcal ME/g)***	3.5–4.5	4.0–5.0
Energy density (kJ ME/g)***	14.6–18.8	16.7–20.9
Crude protein (%)	22–32	25–35
Crude fat (%)	10–25	≥18
Soluble carbohydrate (%)	≥23	≥23
Crude fibre (%)	≤5	≤5
Calcium (%)	0.75–1.5	1.0–1.7
Phosphorus (%)	0.6–1.3	0.7–1.3
Ca/P ratio	1:1–1.5:1	1:1–2:1
Sodium (%)	0.35–0.60	0.35–0.60
Chloride (%)	0.50–0.90	0.50–0.90
Digestibility	Above average	Above average

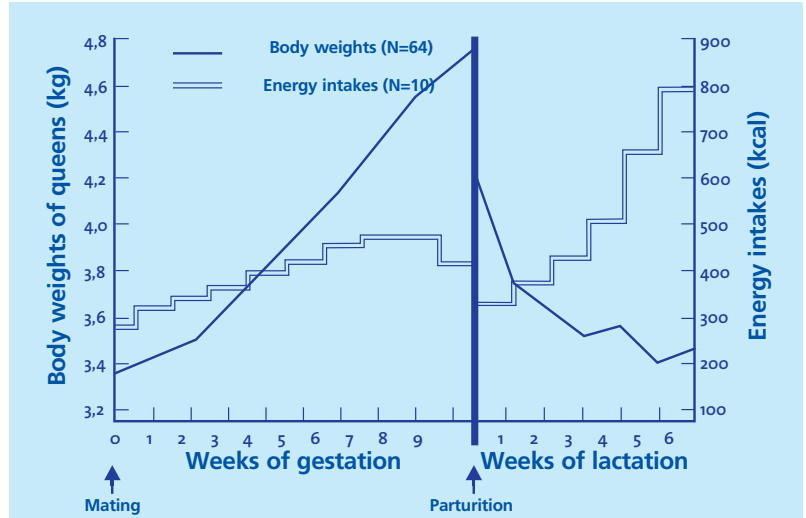
* Gestation for all bitches and for lactation of bitches with four or fewer puppies.

** Lactation for bitches with litters of more than four puppies. Some giant-breed bitches may need this type of food during gestation in order to maintain body weight, particularly during late pregnancy.

*** If the caloric density of the food is different, the nutrient content in the dry matter must be adapted accordingly.

Cats

Gestation usually lasts 63–65 days (range 58–70 days) in queens. Weight gain increases linearly from conception to birth in queens. This pattern is different from that of most other species, which experience small increases in body weight until the last third of gestation, when weight gain and energy intake greatly increases.



Body weight and energy intake during gestation and lactation in queens.



Unlike bitches, queens only lose 40% of the weight gained during gestation at parturition (birth). The remaining 60% of the weight gain will be used during the lactation period to sustain milk production.

KEY NUTRITIONAL FACTORS DURING GESTATION

4.2.1 Water

Water is important for normal reproduction and should always be freely available.

4.2.2 Energy

In dogs, only 2% of the foetal mass is developed at 35 days of pregnancy and a total of 5.5% at 40 days. This means that during the first two thirds of gestation the bitch has similar energy requirements as those of adult maintenance. After day 40, the foetal tissue grows exponentially and the energy intake therefore increases markedly during week 5 and peaks between weeks 6 and 8 of gestation. The energy requirement for gestation peaks at about 30% above adult maintenance for bitches with small litters, whereas energy needs for bitches with larger litters can increase by 50–60%.

Energy needs are highest during the last week of gestation. However, at this time the gravid uterus may take up so much space that the bitch finds it difficult to ingest enough food. This is especially the case for giant breeds that may have very large litters. Some giant-breed bitches will need a special energy-dense food suitable for reproducing dogs from the very start of gestation in order to meet their requirements.

The energy requirement of the queen increases steadily during gestation. Food should be fed free choice to allow the queens to adjust their food intake to meet their energy requirements.

Let your client know

Food intake may decrease drastically just before whelping and some bitches may completely stop eating.

Let your client know

Food intake normally fluctuates during gestation. There are two common times where food intake and weight declines:

- two weeks after mating (thought to be implantation of the embryo)
- during the last week of gestation.



4.2.3 Protein

In dogs, the protein requirement increases from 40-70% above maintenance during late gestation and follows the increase in energy requirement. The quality of the protein should also be higher to improve vigour of newborn puppies and minimise neonatal mortality. Protein synthesis in the queen is greatly increased during gestation. In addition, the protein quantity and quality is important to provide essential amino acids for growth and development of the foetuses. Protein levels at or above 35% dry matter are recommended.

Let your client know

Protein deficiency in cats during pregnancy may result in:

- lower birth weights
- higher mortality of the kittens around birth
- impaired immunocompetency in the kittens
- delayed home orientation (ability of kittens to orient to and return to the nest)
- abnormal locomotor development of the kittens (movement)
- decreased emotional responsiveness in the kittens (aggressive or fearful kittens).

4.2.4 Fat

To improve digestibility and to provide energy, it is important to increase the fat levels in the food. This is usually achieved by feeding a diet that contains 10–25% DM fat for the bitch and at least 18% DM fat for the queen. It is important that the diet contains omega-3 fatty acids. These play an important part in the development of the foetal brain.

4.2.5 Carbohydrate

Because more than 50% of the energy for foetal development is supplied by glucose, bitches have a high metabolic requirement for glucose during the last weeks of gestation. Therefore, the diet should contain more than 20% DM carbohydrate.

4.2.6 Calcium and phosphorus

For dogs, during the last 35 days of gestation requirements for calcium and phosphorus roughly increase by 60% because of rapid skeletal growth of the foetuses. On the other hand, an excessive intake of calcium during gestation may predispose the bitch to eclampsia during lactation and therefore a sensible balance needs to be reached. It is **very** important to remember, that even if the bitch is a large breed (more than 25 kg), she still needs a high level of energy and calcium in her diet. **This means that you should never feed a Large Breed Puppy product to a pregnant bitch** – no matter what her size – as it contains far too little energy, fat and calcium to sustain the growth and development of the foetuses.



Queens need levels of calcium and phosphorus that are greater than those needed for normal adult maintenance in order to support the skeletal development of the foetuses.

4.2.7 Digestibility

The digestibility of a food is important when feeding pregnant bitches and queens. During late gestation, the uterus takes up so much space in the abdomen, that unless the food is easily digestible, the bitch or queen might not be able to ingest enough food because she needs to eat large amounts to meet her requirements.

Let your client know

Pregnant queens need an appropriate food for reproducing **before** they become pregnant. This helps conception and increases the survival rate of foetuses.

Dogs	ALL OF THE ABOVE REQUIREMENTS WILL BE MET BY FEEDING THE PREGNANT BITCH THE FOLLOWING WAY:
THE FIRST TWO THIRDS OF PREGNANCY: EXCELLENT QUALITY, MAINTENANCE FOOD FOR ADULT DOGS, SUCH AS:	
Science Plan Canine Adult	
Science Plan Canine Adult Mini	
Science Plan Canine Large Breed	
Science Plan Canine Sensitive Skin	
Science Plan Canine Sensitive Stomach	
Science Plan Canine Nature's Best Adult Mini/Medium	
THE LAST THIRD OF PREGNANCY: EXCELLENT QUALITY, ENERGY DENSE, HIGHER PROTEIN AND HIGHER CALCIUM FOOD SUITABLE FOR REPRODUCING DOGS, SUCH AS:	
Science Plan Puppy	
Science Plan Puppy Mini	
Science Plan Nature's Best Puppy Mini/Medium	
NEVER FEED A PREGNANT DOG A LARGE BREED PUPPY PRODUCT	

Cats	ALL OF THE ABOVE REQUIREMENTS WILL BE MET BY FEEDING THE PREGNANT QUEEN THE FOLLOWING WAY:
THROUGHOUT THE ENTIRE PREGNANCY: EXCELLENT QUALITY, ENERGY DENSE, HIGHER PROTEIN AND HIGHER CALCIUM FOODSUITABLE FOR REPRODUCING CATS LIKE:	
Science Plan Kitten	
Science Plan Nature's Best Kitten	

4.3 Lactation

Successful lactation depends on body condition before breeding and on adequate nutrition throughout gestation and lactation.

During lactation, nutrient requirements for dogs are directly related to milk production, which in turn depends primarily on the number of suckling puppies.

Clinical note

A German shepherd bitch with six puppies may produce about 1.7 litres of milk per day during the third and fourth week of lactation.

Beagles with 5-7 puppies will produce an average of 1.05 litres of milk per day at four weeks. In contrast, a woman produces about 750 ml milk per day during a three-month lactation.



After parturition, a bitch should weigh 5–10% more than her pre-breeding body weight. During the first 2–5 days of lactation, the milk production is approximately 2.7% body weight but after that, the quantity of milk produced primarily depends on the number of nursing puppies. The puppies' intake of solid food begins to increase around the fifth week, after which milk production progressively declines.

For cats, lactation is the most energy-demanding stage of their life. Peak milk production typically occurs at three to four weeks of lactation. Even with feeding the queen free-choice food, she will still need to get a lot of the required energy for milk production from the fat she gained during pregnancy. The queen should weigh between 700 to 900 g more than the weight she was before breeding after she has given birth to her kittens. Her appetite will be reduced 24–48 hours before birth, but should return to normal or to an increased level within 24 hours of parturition.

Let your client know

Some queens are reluctant to leave the nest box during the first few days of parturition. Make sure that owners know that it is important to place both food and water very near the enclosure to allow easy access.



KEY NUTRITIONAL FACTORS DURING LACTATION

4.3.1 Water

Although water is often overlooked as a nutrient, it is actually the first nutrient needed for lactation. Water is needed in large quantities to produce milk and to aid in thermoregulation. Therefore, it is critical that large amounts of fresh, clean water are available at all times during lactation.

4.3.2 Energy

After whelping, the bitch's energy requirement steadily increases and peaks between three and five weeks at a level that is two to four times higher than that of normal adult maintenance for dogs. The energy requirements return to normal adult maintenance levels about eight weeks after whelping.

With cats, the high energy demands of lactation are best met by feeding energy-dense foods.

Clinical note

A 35 kg bitch nursing a large litter may require 5–6 litres of water per day at peak lactation.

Clinical note

All of the requirements will be met by feeding the lactating bitch and queen with a high quality, energy dense, calcium and protein rich food suitable for lactating pets.

For dogs:

- Science Plan™ Puppy
- Science Plan™ Puppy Mini

For cats:

- Science Plan™ Kitten.

4.3.3 Protein

In dogs, the requirement for protein increases more than the requirement for energy during lactation. This means that the protein-energy ratio must be higher in foods for lactation than in foods for adult maintenance. This is another reason why it is so essential to feed a lactating bitch a special diet.

During lactation, queens increase protein synthesis to supply milk with protein concentrations suitable for growth (approximately 36% DM milk protein).

The protein source should:

- be highly digestible
- have a high biologic value
- be animal-based
- supply at least 35% DM protein.

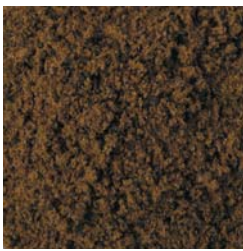
4.3.4 Fat

Fat provides essential fatty acids and energy and enhances fat-soluble vitamin absorption. An increase in fat intake results in better food efficiency during lactation and will result in a higher fat content in the milk.

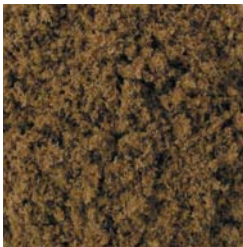
A dietary source of docosahexaenoic acid (DHA) is required for the normal development of the retinal function in nursing kittens. Therefore, DHA should be included in foods fed to lactating queens.

Common ingredients that contain DHA are:

- fish meal
- poultry meal.



Fish meal



Poultry meal

4.3.5 Carbohydrate

Carbohydrate is absolutely essential for the lactating bitch to maintain appropriate lactose levels in the milk.

4.3.6 Calcium and phosphorus

For dogs, mineral requirements during lactation are determined by mineral excretion in milk and thus by the number of nursing puppies. Bitches need 2–5 times more calcium during peak lactation than for adult maintenance. Queens need greater levels of calcium and phosphorus than those required to maintain lactation.

4.3.7 Digestibility

There are considerable nutritional demands associated with lactation and therefore it is important to recommend foods with above-average digestibility for lactating bitches and queens.

Dogs

ALL OF THE ABOVE REQUIREMENTS WILL BE MET BY FEEDING THE LACTATING BITCH THE FOLLOWING WAY:

AN EXCELLENT QUALITY, ENERGY DENSE, HIGHER PROTEIN AND HIGHER CALCIUM FOOD SUITABLE FOR LACTATING DOGS, SUCH AS:

Science Plan Puppy

Science Plan Puppy Mini

Science Plan Nature's Best Puppy Mini/Medium

Cats

ALL OF THE ABOVE REQUIREMENTS WILL BE MET BY FEEDING THE LACTATING QUEEN THE FOLLOWING WAY:

AN EXCELLENT QUALITY, ENERGY DENSE, HIGHER PROTEIN AND HIGHER CALCIUM FOOD SUITABLE FOR LACTATING CATS, SUCH AS:

Science Plan Kitten

Science Plan Nature's Best Kitten

Summary

Summary of key points

1. **Correct feeding and management** will increase the likelihood of successful reproduction and healthy puppies and kittens.
2. A bitch or a queen should never be either underweight or overweight **when being mated**.
3. A dog is pregnant for an average of 63 days, while cats are pregnant for an average of 63–65 days.
4. After the birth, the **bitch** should lose most of the weight she has gained during gestation. **Queens** only lose 40% of the gained weight.
5. **In dogs**, the energy requirements increase during week 5 of gestation and peaks between weeks 6 and 8 of gestation. **In cats**, the energy requirements of the queen increases steadily during gestation.
6. **You must never feed a Large Breed Puppy diet to a pregnant or lactating bitch.**
7. During lactation, nutrient requirements for dogs are **directly related to milk production**. Cats have **very increased energy need** no matter the amount of milk they produce.

Self-assessment questions

1. What are the objectives of a good reproductive feeding programme?
2. How is the appetite of the bitch and queen during oestrus?
3. Why do cats need a fat reserve to maintain energy for lactation when dogs do not?
4. How does the size of the litter influence the energy requirement of the bitch during gestation?
5. Food intake normally fluctuates during gestation. When is the food intake reduced and why?
6. What may protein deficiency in the cat during pregnancy result in?
7. What is one of the roles of omega-3 fatty acids in the foetus?
8. Why is the digestibility of the food for pregnant bitches and queens important?
9. What diets could you feed a pregnant bitch?
10. What diets could you feed a lactating queen?

5

Puppy and kitten

Compared with the young of other species, newborn puppies are relatively immature at birth, with a skeleton that has a low degree of mineralisation.

Large-breed puppies are more premature and more susceptible to malnutrition and developmental orthopaedic diseases during the rapid growth phase than small-breed puppies.

Growing dogs and cats progress through three critical phases in the first twelve months of life, during which nutrition is essential for survival and healthy development.

NURSING PERIOD

- Largely influenced by the nutrition of the bitch or queen during gestation and early lactation.

WEANING PERIOD

- Very stressful, due to changes in food and environment.

POST-WEANING PERIOD

- Occurs from 2–12 months of age
- Is a critical time for skeletal and other development
- Nutrition has proved to be the most important non-genetic factor for healthy bone development in dogs.

5.1 Nursing period

The birth weight of puppies and kittens is the single most important measure of their chance of survival and reflects, among other factors, the adequacy of the bitch's or queen's nutrition during pregnancy. Mortality may be as high as 10–30% with two thirds of the deaths occurring during the first week of life.

5.1.1 Colostrum and milk

The liquid that comes from the mammary glands the first few days after whelping or giving birth is known as colostrum. The composition of the milk changes rapidly to become normal or 'mature' milk between 24 hours after giving birth and the end of the first week of lactation in dogs, and between 24 and 72 hours in cats.

Clinical note

Colostrum:

- transfers antibodies
- provides a concentrated source of energy
- provides a concentrated source of selected nutrients
- produces a laxative effect to help the puppy and kitten get rid of early foecal waste.



Definition

Milk is a complete food for neonates. The composition of milk is designed to support the normal growth rate of neonates. Milk from different species of animals contains the same components but in different proportions. Canine milk is higher in energy, protein and minerals than cows' milk.

Let your client know

That queens' milk varies markedly from that of other species. Consequently, milk from other species is not suitable for nursing kittens.

Clinical note

The immune system of neonatal puppies and kittens is immature. This is offset by the passive transfer of antibodies, which can protect against various infectious diseases. The transfer takes place in two places:

- the placenta:
 - 5–10% of antibodies
- the colostrum:
 - the remaining 90–95% of antibodies.

Colostrum has a different composition from that of mature milk. Due to the high content of dry matter, colostrum is somewhat sticky and viscous, which makes nursing more difficult, especially for weaker puppies and kittens.

Clinical note

Kittens acquire passive systemic and local immunity from consuming either colostrum or mature milk.

Systemic immunity is acquired when the kitten gets colostrum within the first twelve hours of life. During this time, kittens absorb intact antibodies across the intestines.

This means that if a kitten does not receive either colostrum or queen's milk from another cat during this absorptive window, it is left immunologically compromised and susceptible to infections.

After sixteen hours, passive antibody transfer no longer occurs in kittens. Instead, the queen's milk provides a local concentration of antibodies within the GI tract.

This helps prevent invasion of microorganisms into the blood-stream and is called passive local immunity. The local immunity persists as long as the kittens receive the milk of the queen.

Both the systemic as well as the local immunity is important in maintaining the health of kittens until their immune system is mature.

Clinical note

The high content of antibodies in the queen's milk is the reason why newborn kittens can be raised successfully and with full immunocompetence by a foster queen. The limiting factor is only the twelve-hour window where the kitten can actually absorb the antibodies.

SYSTEMIC IMMUNITY



LOCAL IMMUNITY



5.1.2 Energy

The milk of bitches and queens is extremely digestible. Energy requirements for puppies and kittens consist of:

- energy needed for maintenance
- energy needed for growth.

Since puppies and kittens sleep more than 80% of the time and huddle together in a warm box they are able to decrease their energy requirement for maintenance so more energy can be used for growth. By six weeks of age, male kittens are significantly heavier than female kittens and consume a proportionately larger quantity of food.



5.1.3 Protein

The protein digestibility of bitches' milk is up to 99%. Compared with cows' milk, bitches' milk contains about twice as much protein per 100 ml and has higher content of different types of amino acids.

5.1.4 Carbohydrate

Lactose is the primary carbohydrate in milk. Lactose levels in bitches' and queens' milk are about 30% lower than in cows' milk. Puppies and kittens produce lactase in their intestines, so they can digest the lactose. As they are weaned, the production of lactase decreases, which explains why milk can cause digestive upsets, especially in kittens.

5.1.5 Calcium and phosphorus

In dogs, colostrum has a very high level of calcium. However, after 2–3 days it decreases. In cats, the calcium levels in colostrum are quite low, but increase significantly by mid to late lactation.

5.1.6 Iron

Milk is a poor source of iron, and puppy requirements are usually higher than the intake. The main iron supply comes from the foetal stage and increases again when puppies receive additional food at weaning. This is one of the reasons why puppies should receive additional food as soon as possible (around three weeks of age).



Let your client know

Never try to supplement puppies with extra iron. It may damage the gastrointestinal tract or inhibit the uptake of other minerals. Instead, make sure that the bitch is fed correctly during pregnancy and lactation.

Clinical note

Science Plan™ Puppy and Science Plan™ Puppy Mini have the same composition but different sizes of kibbles. The smaller kibble size of Science Plan Puppy Mini makes it uniquely suitable to young puppies of small breeds.

5.2 Weaning period

Puppies and kittens should be encouraged to start eating solid food as soon as possible.

This practice will:

- reduce reliance on the bitch and the queen
- reduce the nutritional burden on the bitch and queen
- help overcome iron deficiency in the puppies
- make complete weaning less stressful.

Most puppies and kittens will start eating solid food between 3–4 weeks of age. Often, during play, puppies will come in contact with the bitch's food and progressively start eating small amounts. Similarly, kittens will accidentally step into the food bowl and then get a taste of the food when they groom themselves.



Let your client know

Puppies and kittens can be offered gruel to stimulate food intake at three weeks of age. Gruels can be made by:

- blending a moist puppy food such as Science Plan Puppy or Science Plan™ Kitten with an equal amount of warm water
- grinding dry food such as Science Plan Puppy Mini and Science Plan Nature's Best™ Puppy Mini/Medium or for kittens Science Plan Kitten and Science Plan Nature's Best™ Kitten and mixing one part dry food with three parts of warm water.

Puppies and kittens are very prone to vomiting and diarrhoea during this period. If this problem occurs, the gruel can be made from a highly digestible moist food intended for the dietary management of diarrhoea with a minimum of about 25% protein, like Prescription Diet™ Canine i/d™ or Feline i/d™.



As the interest in solid food increases, the water content of the gruel can be reduced progressively. Puppies should be eating sufficient quantities of solid food at five weeks of age because the bitch's milk production will probably start declining. To reduce the stress of weaning as much as possible, it is recommended that puppies and kittens initially be offered the same food as they are going to eat after weaning. Not only will they readily recognise this diet as food, but GI upsets associated with further food transitions will also be avoided.

Let your client know

At 3–5 weeks, kittens lap at food but do not chew on it.

By 6–8 weeks of age, most kittens have learned to eat solid, unmoistened foods and therefore gruel is no longer necessary.



Clinical note

Some owners believe that kittens can be weaned on to a gruel made of either fish and yoghurt or something similar.

These homemade diets for weaning are rarely nutritionally adequate. It is a much better choice to use a complete diet such as Science Plan™ Kitten.

Clinical note

When pet owners obtain a kitten that has been fed a cat food of poor quality, the kitten will often be very small. When the clinic changes the diet to a more appropriate food, like Science Plan™ Kitten, the kitten will often show an impressive growth spurt.

Additional information

Kittens should grow at approximately 100 g per week until about 20 weeks of age. At 20 weeks, males typically gain 20 g/day, while females gain 11 g/day. Growth rate slows as kittens approach 80% of adult size at 30 weeks and reach adult body weight at week 40 (10 months). Some additional weight gain may occur after 12 months of age and represents a phase of maturation and muscle development.

Growth curve for female and male kittens. Note after four weeks of age there are significant gender differences in growth rates: female kittens grow at a slower rate and are normally smaller than males.

5.3 Post-weaning period

The ultimate goal of a feeding plan for a puppy and a kitten is to create a healthy adult. The specific objectives of the feeding plan are to:

- optimise growth
- minimise obesity
- minimise developmental orthopaedic disease in puppies.

This is done by preventing nutritional deficiencies or excesses from occurring. The requirements for all nutrients increase during growth compared with requirements for adult dogs. However, energy and calcium levels are of special concern:

- energy for small and medium-breed puppies to avoid obesity
- energy and calcium for large and giant-breed puppies to ensure skeletal health.

In addition, the method of feeding is important, especially in larger breeds. Unlimited feeding has been shown to increase the prevalence of skeletal abnormalities in large and giant-breed puppies and to increase the prevalence of obesity in all puppies.

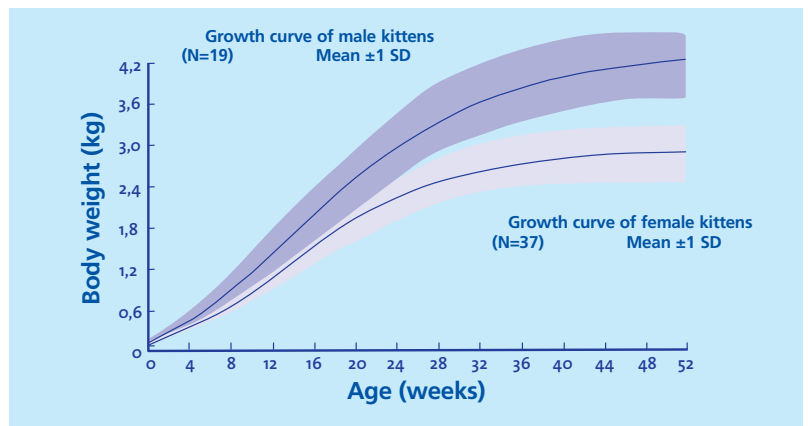
KEY NUTRITIONAL FACTORS FOR GROWING DOGS

FACTORS	RECOMMENDED LEVELS IN FOOD (dry matter)	
	Adult bodyweight <25 kg*	Adult bodyweight >25 kg**
Energy density (kcal ME/g)	3.5–4.5	3.2–3.8
Energy density (kJ EM/g)	14.6–18.8	13.6–15.7
Crude protein (%)	22–32	20–32
Crude fat (%)	10–25	8–12
Calcium (%)	0.7–1.7	0.7–1.2
Phosphorus (%)	0.6–1.3	0.6–1.1
Ca/P ratio	1:1–1.8:1	1:1–1.5:1
Digestibility	Above average	Above average

* For dogs with an adult body weight of less than 25 kg. These dogs can be fed the same food as recommended for gestation/lactation. Balanced commercial foods may match the profile for gestation/lactation of most bitches and growth of puppies whose adult weight does not exceed 25 kg.

** For large and giant-breed dogs (adult body weight of more than 25 kg).

If a kitten is not receiving the nutrition that it needs, its growth rate will slow.

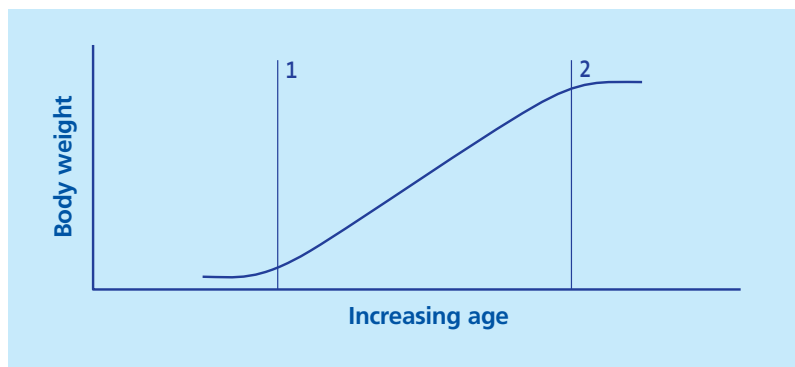


5.3.1 Energy

Both kittens and puppies need energy for:

- maintenance
- growth.

During the first weeks after weaning when body weight is relatively small and the growth rate is high, puppies use about 50% of their total energy intake for maintenance and 50% for growth. Gradually the growth curves reach a plateau, as puppies become young adults.



Typical sigmoidal growth curve of puppies. Growing puppies have two energy needs: the energy needed for maintenance, and the energy required for the accretion of body tissue. During the first weeks after weaning, when body weight is relatively small and growth rate exponential, puppies use about 50% of the energy for maintenance and 50% for growth. Gradually the growth curve reaches a plateau. As body weight increases, the share of energy needed for maintenance increases progressively, whereas the part for growth becomes less important. The starting line (line 1) and endpoint (line 2) of exponential growth can shift depending on the breed and individual variation.



Clinical note

Great Dane puppies may have energy requirements that are 25% higher than those of other breeds. This finding should not be extrapolated to other giant-breed puppies; it is specific to Great Danes.

Let your client know

If a puppy is fed too much food during growth, this may contribute to it becoming overweight or even obese. Obesity has a number of consequences:

- it may contribute to skeletal disorders by increasing the load and stress on immature bones
- it may result in an increased number of fat cells, which may predispose to overt obesity in later life.

This makes it essential to convince the puppy owner of the importance of regular weight check ups. Advise them that the best thing to do is to enroll the puppy in the Hill's Best Start for a Healthy Life Programme to monitor its weight every 2–4 weeks.

Owners often believe that if they feed their dogs more food they will grow taller and/or more muscular. This is not the case. The dog will simply reach their adult size earlier and place additional strain on an immature skeleton.

Clinical note

Developmental skeletal disease typically occurs in two forms:

- osteochondrosis
- dysplasia (hips, elbows).

Developmental skeletal diseases are multi-factorial diseases in dogs, influenced by genetics, environment and nutrition. Rapid weight gain (too much energy) and nutrient excesses (calcium) may disturb the development of cartilage and bones, leading to permanent problems.

Because of this shift in energy usage, the total food intake of a German shepherd puppy (adult body weight 35 kg) increases very slowly after about 4 weeks of age.

Based on Resting Energy Requirement (RER) we can give recommendations of how much energy a puppy should receive:

Until about 50% of adult weight:	3 × RER
Thereafter	2.5–2 × RER
When 80% of adult weight has been reached	1.8–2 × RER

5.3.2 Protein

The protein requirements for growing dogs are different from those of adult dogs, not just in the quantity needed but also in the quality. The protein requirements for growing dogs follow a pattern similar to the energy requirements. This means that the same nutrient profile is appropriate throughout this phase of growth (post weaning to adulthood). For kittens, protein requirements are high at weaning and then gradually decrease to adult levels.

5.3.3 Fat

It is important to make sure that growing dogs and cats have a source of essential fatty acids. Fat contributes greatly to the energy density of a food and excessive energy intake can affect the bone formation in large and giant-breed dogs. Therefore it is important that puppy food for large and giant-breed dogs contains extra L-carnitine to help build muscle mass instead of fat tissue.

Clinical note

L-Carnitine has been shown to increase the bone mass, the bone density and the muscle mass in large-breed puppies and to help prevent hepatic lipidosis (fatty liver).



Let your client know

Never supplement the diet of a puppy with extra calcium! Feed a proper, high quality puppy diet instead.

Definition

Hip dysplasia: an abnormal development, or growth, of the hip joint manifested by varying degrees of laxity of surrounding soft tissues, instability of the joint and malformation of the femoral head and acetabulum with osteoarthritis.¹

5.3.4 Calcium and phosphorus

Although growing dogs need more calcium and phosphorus than adult dogs, the minimum requirements are relatively low. Intestinal absorption of calcium can vary from almost 0–90% and phosphorus absorption can increase to almost 80% to adapt to intake. The homeostatic mechanism of calcium may be less precise in young puppies. In puppies between two and six months of age, intestinal absorption of calcium never decreases below approximately 40%, even if they receive high levels of calcium in the food. This means that they are unable to compensate for foods with a high calcium content.

Excessive amounts of calcium, especially in combination with a high energy intake, have been shown to pre-dispose puppies of large and giant breeds to developmental skeletal problems, such as hip dysplasia. (For more information on developmental orthopaedics see VNA [NAP] 4).

Clinical note

Foods for large and giant-breed puppies should contain:

- 0.7–1.2% DM Calcium.
- 3.5 kcal metabolisable energy/g dry matter.

Smaller breeds are less sensitive to high levels of calcium and therefore food for them can contain 0.7–1.7% DM calcium.

Clinical note

Although dogs show far more severe signs of developmental disorders, even cats can become ill. It has been shown that over feeding at early stages of development does increase the likelihood of the cat developing hip dysplasia, regardless of the weight of the cat in adulthood.

Unlike with puppies, calcium excess in kittens has not so far been shown to be associated with developmental orthopaedic disease. However, very high concentrations of calcium significantly reduce the availability of magnesium. Calcium should be provided in amounts that are sufficient to meet the needs of growing kittens while avoiding impairing the availability of other nutrients.

Calcium deficiency in combination with phosphorus excess is most commonly observed in kittens fed unsupplemented all meat diets.

5.3.5 Digestibility

Puppies and kittens that are fed a diet that is low in energy density and digestibility need to eat large quantities of food. This increases the risk of:

- flatulence
- vomiting
- diarrhoea
- a pot-bellied appearance.

Therefore, foods recommended for puppies and kittens should be more digestible than average.

Clinical note

Calcium deficiency in combination with phosphorus excess manifests itself by limping, pain and a reluctance to move.

Puppies	ALL OF THE ABOVE REQUIREMENTS WILL BE MET BY FEEDING:
	PUPPIES OF LARGE AND GIANT BREEDS
	Science Plan Large Breed Puppy
	Science Plan Nature's Best Puppy Large/Giant
	PUPPIES OF SMALLER BREEDS
	Science Plan Puppy
	Science Plan Puppy Mini
Science Plan Nature's Best Puppy Mini/Medium	
Kittens	ALL OF THE ABOVE REQUIREMENTS WILL BE MET BY FEEDING:
	Science Plan Kitten
	Science Plan Nature's Best Kitten

Summary

Summary of key points

1. **Large-breed puppies** are more frequently premature and are more susceptible to malnutrition and developmental orthopaedic diseases during the rapid growth phase than small-breed puppies.
2. Birth weight of puppies and kittens is the single most important measure of their **chance of survival**.
3. The liquid that comes from the mammary glands the first few days after giving birth is called **colostrum**.
4. Kittens acquire both **systemic and local immunity** from either colostrum or the mature milk.
5. By six weeks of age, male kittens are significantly **heavier** than female kittens.
6. **Lactose levels** in bitches' and queens' milk are about 30% lower than in cows' milk.
7. Puppies should receive additional food as soon as possible.
8. Puppies and kittens can be offered gruel to stimulate food intake at **three weeks of age**.
9. If puppies or kittens develop **diarrhoea** during weaning, they can be fed Prescription Diet™ Canine i/d™ or Feline i/d™.
10. **Unlimited feeding** has been shown to increase the prevalence of skeletal abnormalities in large and giant-breed puppies and to increase the prevalence of obesity in all puppies.
11. In puppies between 2 and 6 months of age **intestinal calcium absorption** never decreases below approximately 40%, even if they receive high levels of calcium.

Self-assessment questions

1. What are the three critical phases in the first 12 months of the life of growing dogs and cats?
2. When does the composition of milk change from colostrum to mature milk?
3. Why is it important for the puppy and kitten to receive colostrum?
4. Why can newborn kittens be raised successfully and with full immunocompetence by a foster queen, even though she is no longer producing colostrum?
5. Why is it important to encourage puppies and kittens to start eating solid food as soon as possible?
6. How can you make gruel for puppies and kittens?
7. Why is it not optimal to offer the kittens gruel made of fish and yoghurt?
8. Why are the levels of energy and calcium of particular concern in puppies?
9. How much energy should a puppy receive?
10. What are some of the consequences of obesity in puppies?
11. What does the inability to decrease calcium absorption below 40% mean to the puppies?
12. What can be the consequences of feeding a kitten an all meat diet?
13. What diets could you feed:
 - large-breed puppies?
 - smaller-breed puppies?
 - kittens?

FOOTNOTES

- 1 Brinker WO, Piermattei DL, Flo GL, eds. *Diagnosis and treatment of orthopedic conditions of the hindlimb. In: Handbook of Small Orthopedics and Fracture Treatment, 2nd ed. Philadelphia, PA: WB Saunders Co, 1990; 341–470.*

6

Adult cats and dogs

Depending on breed, adult dogs are those that are fully-grown (typically older than twelve months of age) but below five (large breeds) to seven (smaller breeds) years of age.

Cats generally reach adulthood between 10–12 months of age. Cats near seven years of age may be considered older or senior because of the increasing prevalence of age-related disease and the onset of mild behavioural, physical and metabolic changes related to ageing.

The most important health concerns in adult dogs and cats that may benefit from proper nutritional management are:

- dental disease
- obesity
- renal insufficiency
- cardiac disease.



6.1 Nutritional factors in adult dogs and cats

6.1.1 Water

Water accounts for approximately 56% of an adult dog's body weight, and even though cats have a very high ability to concentrate their urine, it is still essential for both dogs and cats to have unlimited access to clean, fresh water.

6.1.2 Energy

Energy requirements can vary considerably from individual to individual. Since obesity is implicated in many different diseases, the priority is to maintain optimal weight at all times. Recent surveys have shown that the prevalence of obesity increases progressively to peak in middle-aged dogs and cats. Therefore, prevention of obesity should be an important goal of feeding programmes for young, adult pets. The owner often finds it difficult to judge the weight of their dog or cat, and therefore it is important to maintain an appropriate weight management programme where the pet is weighed regularly and where the weight is recorded.

Let your client know

Hill's Pet Slimmer Programme is great for **preventing** obesity as well as for curing it.



6.1.3 Calcium and phosphorus

Both phosphorus and calcium are nutrients of concern. Homemade foods are difficult to balance and may contain excessive amounts of phosphorus. This is especially true for cats eating unsupplemented meats in which the calcium concentration is very low and the phosphorus concentration very high. Even some commercial diets have very high phosphorus levels. This is of concern since a high phosphorus intake has been linked with an increased progression of renal disease while phosphorus restriction may slow the progression of chronic renal disease and improve long-term survival. On the other hand, feeding excessive amounts of calcium may lead to calcium oxalate stones.

Clinical note

An excess of phosphorus appears to be of greater concern for adult cats fed commercial foods. This is of special concern when it comes to:

- lower urinary tract
- renal disease.

Let your client know

After the amino acid requirements are met for the individual dog, the addition of more protein provides no known benefit. This fact often runs contrary to popular belief that more protein is better.

6.1.4 Protein

In excessive amounts, protein may also contribute to the progression of renal disease, especially as foods high in protein are often high in phosphorus as well.

6.1.5 Sodium and chloride

Sodium and chloride in higher amounts have not been considered harmful for young, healthy dogs. However, because diseases where high sodium and chloride are contraindicated are often not diagnosed until late, it is prudent to avoid excessive amounts of sodium and chloride in dog food. The situation is quite different in cats, however. A study performed at the Hill's Science & Technology Centre has demonstrated the danger of increasing the long-term sodium intake of cats that have early, unsuspected renal disease. When such cats are fed a diet with a high-sodium content, they show a progressive deterioration in renal function. Since early renal disease can be extremely difficult to detect, it must be recommended to avoid diets with high sodium content for cats.

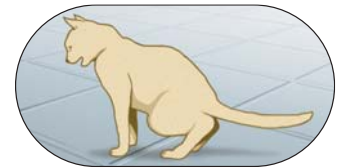
Recognising the signs of FLUTD

There are a number of warning signs that indicate that a cat may be suffering from Feline Lower Urinary Tract Disease.



Changes in urination

- Urine passed little and often
- Urinating outside the litter tray
- Urinating in different places to usual



Straining to urinate

- Tense, hunched posture
- Arched back
- Crying out while urinating



Abnormal urine

- Blood-stained urine
- Dark urine



Changes in behaviour

- Licking urethral opening frequently
- Restless, listless, hiding away
- Refusing to eat



6.1.6 Fats and essential fatty acids

Both fats as well as fatty acids are necessary in the diet, but the total level of fat should be reduced in diets meant for dogs or cats that are prone to becoming overweight. An adequate intake of essential fatty acids is key to maintaining a normal skin and shiny coat.

6.1.7 Food texture

Food texture is one of the keys to decreasing plaque and calculus accumulation and maintaining gingival health. Although even normal dry food has some effects on oral health, an adult food that has been designed with specific textural qualities can be of benefit in oral health.



Dental calculus and periodontal disease are the most prevalent diseases in cats one year and older.

Let your client know

80% of dogs and 70% of cats two years and older have periodontal disease. Science Plan™ Oral Care can help maintain healthy mouth and gums.

Let your client know

The nutritional profiles of the flavour variants in Science Plan are identical, so the owner can feed different flavours with the same high quality nutrition.

Dogs

THE GENERAL PARAMETERS OF FEEDING ADULT DOGS WILL BE MET BY FEEDING:

Science Plan Canine Adult

Science Plan Canine Adult Mini

Science Plan Canine Adult Large Breed

Science Plan Canine Light Adult



Science Plan Canine Sensitive Skin



Science Plan Canine Sensitive Stomach



Science Plan Canine Oral Care

Science Plan Nature's Best Canine Adult Large/Giant

Science Plan Nature's Best Canine Adult Mini/Medium

Cats

THE GENERAL PARAMETERS OF FEEDING ADULT CATS WILL BE MET BY FEEDING:

Science Plan Feline Adult

Science Plan Feline Light Adult



Science Plan Hairball Control Formula Adult



Science Plan Indoor Cat



Science Plan Feline Sensitive Skin



Science Plan Feline Sensitive Stomach

Science Plan Nature's Best Feline Adult

7

Senior cats and dogs

Ageing in itself is not a disease. However, the likelihood of sickness increases with age due to the normal, age-related, physiological changes. In people and companion animals, nutrition may be one of the more important aspects of geriatric care because delay or elimination of the two or three leading causes of death would profoundly affect life expectancy.

Let your client know

Younger animals adapt easily to fluctuations in nutrient intakes, but older animals may no longer be able to cope with excesses, borderline deficiencies or changes in nutrient intake and quality. Therefore, foods for older dogs and cats should meet allowances more rigorously and consistently.

In dogs, the three leading non-accidental causes of death are:

- cancer
- kidney disease
- heart disease.

More importantly, older animals are seldom fortunate enough to suffer only from a single disease – they are more likely to suffer from a multitude of problems that may markedly influence the course of each other.

The overall goals of feeding older adult dogs and cats are similar to those for feeding the young adults:

- maximise the length of life
- ensure the best possible quality of life.

There is a real opportunity to improve both the length as well as the quality of life of the older pet through proper nutritional management.



7.1 Nutritional factors in senior dogs and cats

7.1.1 Water

Older pets are more prone to dehydration due to disturbances in the regulation of water balance in the body. Medications and chronic renal insufficiency will compromise the ability to concentrate urine. Therefore, it is important to provide older dogs and cats with a fresh, clean water supply and to monitor the water intake at all times.

Let your client know

Some cats prefer to drink straight from the tap or even from the owner's glass. If this is the case, they should allow the cat to do so to encourage further drinking.



7.1.2 Energy

With increasing age, lean body mass decreases while fat mass increases. Older pets become slower and less active and therefore require less energy to meet their needs. Very senior pets are often underweight but should be checked carefully by a veterinarian before any decisions are made for their nutritional needs.

Let your client know

Both obesity and severe weight loss significantly increases the risk of mortality in cats over eight years of age. Obese cats are nearly three times as likely to die as cats of optimal weight.

Let your client know

Older dogs are more likely to become overweight or obese. Very old cats, on the other hand, are more likely to be underweight.

Clinical note

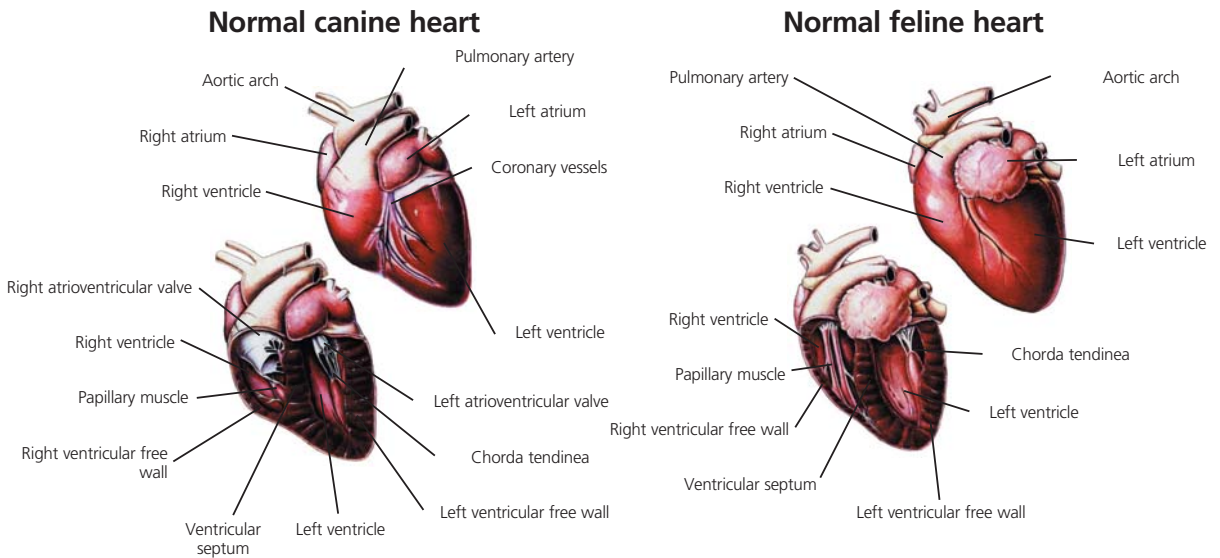
Older cats should be fed a diet with 0.5–0.7% DM phosphorus unless overt renal disease is diagnosed.

7.1.3 Calcium and phosphorus

Some degree of clinical or subclinical renal disease is often present in older dogs and cats. Excessive phosphorus intake should therefore be avoided and phosphorus should preferably be moderately restricted.

7.1.4 Protein

Healthy older dogs and cats should receive enough protein and energy to avoid protein energy malnutrition. However, improving protein quality rather than increasing protein quantity can provide sufficient protein for the dog and cat without giving them an excess of protein.



Let your client know

Moist grocery pet foods have the highest average sodium content with levels that are nineteen times higher than the minimum allowance for adult maintenance. A special senior diet will give the pet a healthier level of sodium.

7.1.5 Sodium and chloride

Older dogs and cats have an increased prevalence of heart disease and renal disease. Healthy cats and dogs will excrete excessive sodium in the urine, but in the early stages of heart disease, pets may lose the ability to do this. As a result, the workload on the heart is increased. Recent research has revealed that cats with subclinical (undetected) renal disease show a progression in their renal disease if fed a diet high in sodium.

7.1.6 Fats and essential fatty acids

A relatively low fat intake combined with added L-carnitine helps prevent obesity in healthy, older pets. However, some pets may need different foods at seven years of age than they will at thirteen years of age. Very old pets have a tendency to lose weight and have an increased need of essential fatty acids, and fat digestion declines with 10% in older cats. Essential fatty acids should be provided at levels at or above those recommended for young to middle-aged adults.



7.1.7 Fibre

Older pets are prone to develop constipation, which may be helped by an increased fibre intake. Fibre facilitates GI health by a variety of mechanisms. Dietary fibre:

- promotes normal intestinal motility
- provides fuel for the cells lining the colon.

These effects can be achieved by feeding small amounts of soluble and insoluble fibre.

7.1.8 Food texture

Oral disease is the most common health problem in the older pet and should always be addressed by a complete dental procedure under full anaesthesia. Foods designed to reduce the accumulation of dental substrates and to help control bad breath are an important part of an oral home-care programme for older dogs and cats.

Let your client know

It is essential that older cats and dogs have regular dental procedures under full anaesthesia. This is the only way to truly ensure good oral health.



7.1.9 Palatability and digestibility

There are a number of concerns about palatability and digestibility for older cats due to the increase in:

- reduced sense of smell
- reduced sense of taste
- oral disease
- metabolic disturbances
- use of medications
- reduced digestion.

Foods for very old cats should be highly palatable and highly digestible.



Cat with dental disease

Summary

Summary of key points

1. **Large-breed dogs** are considered **adult** from twelve months to five years of age.
2. The **prevalence of obesity** increases progressively, peaking in middle-aged dogs and cats.
3. It is important to maintain an **appropriate weight management programme** where the pet is weighed regularly and the weight recorded.
4. **Homemade diets** are difficult to balance.
5. **Restriction of phosphorus intake** may slow the progression of chronic renal disease and improve long-term survival.
6. Dental calculus and periodontal disease are the **most prevalent diseases** in cats one year and older.
7. Foods for older dogs and cats should meet **nutritional allowances** rigorously and consistently.
8. Both obesity and severe weight loss significantly increases the **risk of mortality** in cats over eight years of age.
9. Excessive protein intake and thereby often-excessive phosphorus intake should be avoided in older cats and dogs due to the risk of **subclinical renal disease**.

Self-assessment questions

1. Why are cats near seven years of age considered older or senior?
2. What are the most important health concerns in adult dogs and cats that may benefit from proper nutritional management?
3. Why is more protein not better?
4. In dogs what are the three leading causes of death that affect life expectancy?
5. Why are older pets more prone to dehydration?
6. What type of diet has the highest average sodium content? Why is this bad?
7. Why should essential fatty acids be provided to older pets at levels at or above those recommended for young to middle-aged adults?

Building your portfolio

Photocopy and use the form below to keep a record of your answers to the questions below. Keep this information for your portfolio.

Exercise

a. Explain to Mr Titters, in simple terms, why his pet dog Femme will need to change her feeding programme now that she is over seven years of age.

b. What type of feeding programme would you recommend for Femme during this stage and why?



LEVEL 1

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