Learning Objectives

After completing this module, your basic understanding should include:

- Knowing why dogs are considered omnivores.
- Being able to competently assess a dog's feeding plan.
- How different lifestages need different feeding protocols.
- Realizing the importance of your being an advocate for the dog’s best interest regarding proper nutrition.
Introduction

Feeding a dog either below or above an optimal nutrient concentration can negatively affect biologic performance and/or health. Continual assessment to ensure that a dog is fed correctly throughout its entire life is something the veterinary health care team should take seriously AND view as an obligation. Healthy dogs can oftentimes remain healthy if fed healthy! We are not just concerned about how the dog looks on the outside, but how it is ‘performing’ on the inside. This module will specifically focus on feeding dogs without major medical or disease conditions.

Figure 1. It is important to be concerned about a dog’s internal organs, and not just its outward appearance.
Dogs Are Omnivores

Dogs, like cats, belong to the order Carnivora. But this classification doesn’t make dogs carnivores. The order Carnivora contains many animal species that eat only meat (carnivores), eat meat and plants (omnivores), and eat only plants (herbivores). Pandas, as an example, belong to the order Carnivora, but are herbivores.

Dogs and cats require the same nutrient building blocks as people and other animals: water, fat, carbohydrates (depending on lifestage), proteins (amino acids), vitamins, and minerals. Dogs, like people though, have evolved to efficiently use a wide variety of diets, involving plants and animals. This ability makes dogs omnivores, whereas cats are carnivores (See I.3, Feeding Cats module). Some additional facts regarding dogs being omnivores:

KEY UNDERSTANDING

Although dogs and cats both belong to the order Carnivora, dogs are omnivores based on their eating behavior, tooth structure, and intestinal length.
Dogs Are Omnivores

- **Eating behavior.** Wolves (the closest ancestor to domestic dogs) and coyotes (close relatives) routinely eat herbivorous mammals (rodents, small mammals and large mammals such as buffalo and deer). The intestinal tract of such prey is readily eaten, meaning that these close relatives to domestic dogs routinely eat plant material. In addition, wolves and coyotes frequently eat fruits and berries. Dogs eat similarly if allowed to roam.

- **Tooth structure.** Dogs have canine teeth, which they use for ripping and tearing, and molar teeth with flatter surfaces, which they use for crushing (including, grinding plant material for easier digestion).

- **Small and large intestine length.** The canine small intestine is similar to that of animals that digest an omnivorous diet. The ratio of digestive tract length to total body length is 4:1 for cats, 6:1 for dogs, and 10:1 for rabbits (an herbivore).

- **Nutrient requirements and metabolism.** Much can be learned about an animal’s nutritional requirements by analyzing its natural food source. True carnivores use prey tissues such as muscle and liver to provide energy and nutrients, including protein, certain amino acids (taurine), certain fatty acids (arachidonic acid), and niacin (a B vitamin). Consequently, carnivorous animals (e.g., cats) developed more efficient digestive and metabolic pathways to use these nutrients, and have lost the ability or have a decreased ability to synthesize them from building blocks. Being omnivorous and receiving a varied diet of plant and animal tissue, dogs maintained or improved their ability to synthesize nutrients from building blocks.
Dogs Are a Diverse Species

The American Kennel Club lists 150 canine breeds as eligible for registration (www.akc.org). This variety arose because people sought to produce dogs with specific traits to enhance performance, show, or behavioral characteristics. The result is a diverse species that differs widely in head shape, size, coat characteristics (color, length, etc.), and musculoskeletal structure. Dogs as a species are probably more diverse than any other land mammals. As an example, some Yorkshire terriers may weigh two pounds or less, whereas some mastiffs may weigh 300 pounds or more. Mixed breed dogs add to the wonderful diversity of the canine species.
The diversity of dogs affects how they should be fed to optimize health and performance. For starters, let’s define what veterinarians mean by small, medium, large, and giant breeds.

- **Small**: Those dogs that will weigh less than 20 pounds when fully grown.
- **Medium**: Those dogs that will weigh between 20 and 55 pounds when fully grown.
- **Large**: Those dogs that will weigh between 55 and 100 pounds when fully grown.
- **Giant**: Those dogs that will weigh more than 100 pounds when fully grown.

These definitions have practical applications. Small dogs generally require more calories, and therefore more food per pound of body weight than large dogs. Large- and giant-breed puppies should be fed differently than puppies of smaller breeds. To help avert skeletal diseases such as hip dysplasia, puppies that will weigh more than 55 pounds when full grown should be fed growth foods with reduced calcium and reduced energy (fat), compared to most grocery store puppy foods, for controlled growth.
Many People Treat Their Pets Like Family Members*

A majority of American households (~57%) have dogs, cats, or both pets in residence. Over 90% of these people consider his or her pet a ‘member of the family’. Here are some other interesting facts about dog ownership:

• Americans spend about $5 billion on holiday presents for their furry friends.
• 63% of dog owners surveyed said they give their dogs presents at Christmas.
• 36% of dog owners give their dogs presents on their birthday.
• About one-quarter of dog owners (27%) sign their dog’s name on greeting cards or notes.
• 64% of surveyed pet owners said they include news about their pet, and 36% include a photograph in their holiday cards.
• About one-third (37%) of dog owners have their dog’s picture prominently displayed in their homes, and 14% display it at their place of work.

Figure 5. Pets are becoming a more important part of the family.
Many People Treat Their Pets Like Family Members*

- In about 20% of households containing a dog or cat, the owner leaves the TV, radio, or stereo on when the animal is left alone, presumably so it won’t become lonely.
- 39% of dogs are permitted to sleep at night on some family member’s bed.
- 45% of pet owners set up a special bed for their pet in the house.
- In 75% of the nation’s dog-owning households, the dog is treated to rides in the family car.
- In one-third (34%) of households surveyed, the dog goes along on family vacations.
- When a pet dies, 58% of pet owners bury the pet on their property.

*Source: American Humane Association Fact Sheet. American Humane Association, National Resource Center. 63 Inverness Dr. E., Englewood, CO.
Lifestage Nutrition

Lifestage nutrition is the practice of feeding dogs to meet their optimal nutritional needs at a specific age or physiologic state:

- Growth (puppy)
- Adult (young to middle-aged adult)
- Gestation/lactation (reproductive female)
- Older (senior)

The concept of lifestage nutrition recognizes that feeding either below or above an optimal nutrient concentration can negatively affect biologic performance and/or health. This module is based on lifestage nutrition and continual assessment to ensure that dogs are fed correctly for life. For more information, see I.4, Lifestage/Lifestyle Nutrition and I.5, Nutritional Assessment modules.

Figure 6. Puppy, adult and senior beagles.
This module begins with young to middle-aged dogs because most dogs are adults, and the nutrient needs of adult dogs serve as a good basis for comparing nutrient needs for other lifestages.

Young to middle-aged dogs are those that are full grown (about 12 months old) and not over five (large breeds) to seven years (small breeds) old. The goals of nutritional management are to maximize longevity and quality of life (i.e., disease prevention). Major health concerns for dogs in this age group are dental disease, obesity, and kidney disease. Also, many owners are concerned about their dog’s outward appearance.

**Figure 7. Focus on the adult dog**

![Dental Disease, Obesity, Kidney Disease]

**Figure 8. Major concerns regarding adult dogs include dental disease, obesity and kidney disease - all of which can be positively influenced with proper nutrition.**
Feeding Young To Middle-Aged Adult Dogs

There are two steps in the nutritional assessment process:
1. Assess the pet, food, and feeding method
2. Develop a feeding plan, which includes selecting a food and feeding method.

Assess the Pet. This should include:
- Obtaining an accurate and detailed history
- Reviewing the medical record
- A veterinarian conducting a comprehensive physical examination
- Evaluating results of laboratory and other diagnostic tests

During assessment, the feeding goals should be established, risk factors for nutrition-related diseases considered, and key nutritional factors identified.

KEY UNDERSTANDING

Ideally, the minimum dietary database for each dog should be updated regularly and kept as part of the patient record.
Feeding Young To Middle-Aged Adult Dogs

A minimum dietary database for all canine patients should include:

- The type of food fed (homemade, commercial, dry, moist, semi-moist, etc.)
- Recipes if homemade food represents the majority of the diet
- Brand names of commercial foods
- Names of supplements, treats, and snacks
- Method of feeding (free choice, meal feeding, etc.)
- Quantities fed
- Recent changes in food type, intake, and preferences
- Access to food for other pets or livestock
- Who in the family buys food for the pet
- Who in the family feeds the pet
- Appetite changes with estimates of magnitude and duration.
Feeding Young To Middle-Aged Adult Dogs

Energy Needs!

The general type and level of activity (e.g., house pet, confined to kennel, working dog, etc.) and neuter status should be noted because these factors are important determinants of energy requirements. Obesity occurs twice as often in neutered dogs than in reproductively intact dogs. Activity and various types of stress significantly influence the energy requirements of individual dogs and should be taken into account when estimating energy requirements. Food intake should be adapted as needed to maintain optimal body weight and body condition.

Key nutritional factors for young to middle-aged adult dogs include water, energy, fat, fiber, calcium, phosphorus, protein, sodium, chloride, and food texture.

Neutered Not neutered

Figure 9. Non neutered dogs have 25% more energy needs as compared to neutered dogs
Graphically, the daily energy requirement for a population of dogs results in a bell-shaped curve; therefore, the energy intake of individual dogs may vary by about 50% above or below the average requirements, even within the same age group. All estimates of energy needs—and therefore food fed—should be evaluated by body condition assessment and adjusted as needed. Prevention of obesity should be an important goal of each feeding program for young adult dogs.

In addition, fat serves as a carrier for the absorption of fat-soluble vitamins (A, D, E, and K). Linoleic acid and alpha-linolenic acid are considered essential EFAs because dogs lack the enzymes to synthesize them. Ensuring an adequate intake of EFAs is key to maintaining healthy skin and coat, brain, retinas and cartilage. Increasing the amount of fat in foods increases palatability and EFA levels; however, energy content also increases.

Figure 10. Energy requirements can vary greatly, even for similar type dogs in the same age group.

Figure 11. An equal amount of fat contains 2.43 times the energy as protein or carbohydrate, making fat the most concentrated energy source.
Fiber reduces the energy density of the food and helps promote a sense of fullness, so dogs beg less. Some fiber in the food helps regulate healthy bowel function.

Commercial foods contain adequate and sometimes excessive amounts of calcium and phosphorus and, therefore, should not be supplemented. However, calcium is often deficient and phosphorus may be excessive in homemade foods, especially when most of the diet comes from meat and table leftovers. Up to 25% of the young adult dog population may be affected by undiagnosed kidney (renal) disease. Excess phosphorus in food can accelerate progression of chronic kidney disease, whereas phosphorus restriction may slow the progression of chronic kidney disease and improve long-term survival. It is therefore prudent to feed foods that are adequate but not excessive in phosphorus.
The amount of protein in commercial foods for healthy dogs varies widely (15 to 60% on a dry matter basis [DMB]). After the amino acid requirements are met for an individual dog, additional protein is used for energy. Excess dietary protein, above the amino acid requirement, is not stored as protein, but rather is detoxified by the liver and excreted by the kidneys, which may be harmful if a dog already has kidney disease.

Sodium levels in commercial foods for adult dogs range from ~0.10 to ~2.2% on a DMB (Dry Matter Basis) and are generally higher in moist foods than in dry foods. Chloride levels in food are typically ~1.5 times sodium levels. High sodium and chloride intake is contraindicated in dogs with certain diseases that may have a high blood pressure component such as obesity, kidney disease, and some disorders of the endocrine glands. Uncontrolled high blood pressure may lead to kidney, brain, eye, and heart damage. Dietary sodium chloride (‘table salt’) restriction is the first step in, and an important part of, antihypertensive (helping to control blood pressure) therapy. It is prudent to meet but not greatly exceed sodium and chloride requirements when selecting foods for adult dogs.

Figure 13. Ammonia is formed when amino acids from proteins are metabolized. The liver converts toxic ammonia to urea, which is excreted from the body by the kidneys in urine.

Figure 14. Many popular pet foods contain more sodium than pets actually need.
Feeding Young To Middle-Aged Adult Dogs

Periodontal disease (gum disease) is the most common health problem of adult dogs. Periodontal disease can be prevented in many dogs with routine veterinary care and frequent plaque control at home. Research has demonstrated that an adult dog food with specific textural properties and processing techniques can significantly decrease plaque and calculus accumulation and maintain gum health. Hill’s® Prescription Diet® Canine t/d® and Science Diet® Oral Care Adult dog food are such products.

Figure 15. Periodontal disease is the most common health problem of adult dogs.
Feeding Young To Middle-Aged Adult Dogs

Assess the Food. After the nutritional status of the dog has been assessed and the key nutritional factors and their target levels determined, the adequacy of the food should be assessed. The three most useful components when assessing foods for normal adult dogs are to:

- Ensure that the food has been tested or fed to dogs
- Determine the food’s dry matter (DM) nutrient content (especially for the key nutritional factors)
- Compare the food’s key nutritional factors with the recommended levels.

Whether or not commercial foods for healthy dogs have been animal tested can usually be determined from the nutritional adequacy statement on the product’s label (See the I.6, Pet Food Labels module). Commercial pet foods that have undergone Association of American Feed Control Officials (AAFCO) prescribed feeding tests provide reasonable assurance of nutrient availability and sufficient palatability to ensure acceptability (i.e., food intake sufficient to meet nutrient needs). Few, if any, homemade recipes have been animal tested according to prescribed feeding protocols.

Animal feeding tests using AAFCO procedures substantiate that Science Diet® Adult provides complete and balanced nutrition for the maintenance of adult dogs.

Figure 16. Example of an AAFCO feeding test statement.
Feeding Young To Middle-Aged Adult Dogs

In addition to having passed feeding tests, the food should be evaluated to ensure that key nutritional factors are at levels appropriate for promoting long-term health and optimal performance for the intended lifestage. Comparing a food’s nutrient content with the pet’s nutrient needs will help identify any significant nutritional imbalances in the food being fed. This comparison is fundamental to determining whether or not to feed a different food.

Assess the Feeding Method.
This part of the nutritional assessment process establishes how much food has been fed and how it has been offered (i.e., when, where, by whom, and how often). Nutrient requirements of animals are met by a combination of nutrient levels in food and amounts fed. Even if a food has an appropriate nutrient profile, significant problems may result if excess or insufficient amounts are consumed. Dogs are usually fed either free choice or in a restricted (time restricted or food restricted) fashion. Although free-choice feeding is most popular, it can lead to the most problems. Meal-restricted feeding is more time-consuming; however, it is more precise in delivering the required amount of food.

Feeding Plan
When done properly, assessment of the pet, the food, and the feeding method should provide a solid basis necessary to develop a feeding plan. The plan currently in effect may not need to be modified, may need some revisions or may require a significant change. In any case it is important to reassess the pet at regular intervals.

The goals of nutritional management for young to middle-aged adult dogs are to maximize longevity and quality of life (prevent or delay common diseases).
Feeding Young To Middle-Aged Adult Dogs

Select a Food. A new food should be selected if significant differences are seen between the recommended nutrient levels and those in the food currently fed. Providing the appropriate Hill’s® Prescription Diet® formula or Science Diet® product is a good way to gain client confidence that you are doing the best for the dog in regards to proper pet nutrition.

Determine a Feeding Method. The method of feeding may not need to be revised if it appears adequate. Free-choice feeding is popular and may suffice for healthy dogs unless obesity is an issue (~ well over 25% of US pets are overweight or obese). An understanding of the other pets in the home, which family member is responsible for selecting and purchasing the dog’s food and who feeds the dog regularly are helpful to evaluate the feasibility of new dietary recommendations and will increase compliance, if a food or feeding method change is necessary.

Reassessment. Owners should be encouraged to weigh their dog every month, either at home or at your practice, and should be made comfortable in discussing their pet’s nutritional needs. Dogs whose nutrition is well managed are alert, have an ideal BCS (3/5) with a stable, normal body weight, and a healthy coat. Stools should be firm, well formed, and medium to dark brown.

Visiting Hill’s Key to Clinical Nutrition will provide more information on feeding dogs.
Feeding Young To Middle-Aged Adult Dogs

A veterinarian should reassess all healthy dogs every six to 12 months. Because few if any homemade recipes have been tested according to prescribed feeding protocols, dogs should be reassessed more frequently if homemade food is a significant part of their calorie intake.

Figure 17. BCS 3/5. The ribs are palpable with a slight fat cover. The tail base has a smooth contour or some thickening. The bony structures are palpable under a thin layer of fat between the skin and bone. The bony prominences are easily felt under minimal amounts of overlying fat. Dogs over six months of age have a slight abdominal tuck when viewed from the side and a well-proportioned lumbar waist when viewed from above.
Feeding Older Dogs

Nutrition is one of the more important aspects of geriatric care, because delay or elimination of the two or three leading causes of death may profoundly affect life expectancy. In dogs, the three leading non-accidental causes of death are cancer, kidney disease, and heart disease. Moreover, especially in older dogs, one problem may markedly influence the course of another.

The overall goals of feeding older adult dogs are similar to those for young and middle-aged adult dogs: optimize quality and longevity of life and minimize disease.

Dogs are often considered older when they reach half of their life expectancy. A food change should be considered around the age of five years for large and giant-breed dogs and around seven years for small and medium-breed dogs.

<table>
<thead>
<tr>
<th>Age</th>
<th>10 years</th>
<th>15 years</th>
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</thead>
<tbody>
<tr>
<td>Small-breed dogs</td>
<td>38%</td>
<td>7%</td>
</tr>
<tr>
<td>Large-breed dogs</td>
<td>13%</td>
<td>.1%</td>
</tr>
</tbody>
</table>

Deeb BJ, Wolf NS, Studying longevity and morbidity in giant and small breed dogs, Veterinary Medicine 1994; 89 (Suppl.7); 702-713. Source: SACN 5th ed.
Feeding Older Dogs

**Assessment** All of the considerations previously discussed for young to middle-aged adult dogs (i.e., breed, gender, and health status) should be considered when developing key nutritional factors for older dogs. Special attention should be directed to changes associated with aging and diseases that are more prevalent in older animals, such as kidney disease, cancer, degenerative joint disease, heart disease, endocrine disorders, periodontal disease, behavioral changes and obesity.

Key nutritional factors for older dogs include water, energy, fat, fiber, calcium, phosphorus, protein, sodium, chloride, and food texture.

Older dogs are more prone to dehydration than younger dogs; therefore, continuous access to a fresh, clean water supply is very important for older dogs and water intake as well as urinations should be closely monitored.

With increasing age, lean body mass decreases, metabolic rate gradually declines, and body temperature may decrease. Older dogs become slower and less active, and their thyroid function may be impaired. All these changes result in a decrease in daily energy requirement around seven years of age. However, some very old dogs are often underweight and may have inadequate energy intake. Thus, it may be appropriate to feed a more energy-dense food to thin, very old dogs.
Feeding Older Dogs

Some degree of clinical or subclinical kidney disease is often present in older dogs. Excessive phosphorus intake should therefore be avoided. In a University of Minnesota, 2 year study, results proved that dogs with kidney disease lived twice as long when fed Hill’s® Prescription Diet® Canine k/d®, than dogs fed a composite grocery store brand.

Osteoporosis occurs frequently in older people but rarely a clinical problem in older dogs. This finding is probably due, in part, to lifetime feeding of calcium-replete commercial foods to most dogs. There should be little concern about calcium deficiency in older dogs unless unbalanced homemade foods are fed. Dietary supplementation with calcium carbonate, dicalcium phosphate, bone meal, or vitamin D may result in excesses.

As with all lifestages, healthy older dogs should receive enough protein and energy to avoid protein-energy malnutrition. However, improving protein quality, rather than increasing its intake is a prudent way to provide sufficient protein.

There is no nutritional need for higher levels of sodium and chloride found in some commercial dog foods, especially considering the increased prevalence of heart and kidney disease in older dogs. High sodium chloride (salt), intake may be harmful in diseases that have a high blood pressure component, such as obesity and chronic kidney disease, which are frequently seen in older dogs.
Feeding Older Dogs

A relatively low-fat intake helps prevent obesity in healthy older dogs. However, some dogs may need different foods at seven years of age than they will at 13 years of age. Very old dogs may have a tendency to lose weight. For these dogs, increasing the fat content of the food increases energy intake, improves palatability, and enhances absorption of fat-soluble vitamins. The fat level should be selected as needed to meet the desired energy density to achieve ideal body weight and condition (BCS 3/5).

Older dogs are prone to develop constipation, which may justify increased fiber intake. In addition, fiber added to foods for obese-prone older dogs dilutes calories.

Oral disease is the most common health problem in older dogs. Both veterinary and home care are important in the treatment and prevention of periodontal disease. Foods formulated to decrease the accumulation of plaque and tartar and help control gum disease and bad breath are an important part of the oral home-care program for older dogs.

Assessment of the food and feeding method for older dogs is similar to those procedures outlined for young and middle-aged dogs: compare the current food’s nutrient levels with key nutritional factors and nutrient requirements established during animal assessment, identify discrepancies between key nutritional factor levels and current intake, and decide whether changes in the food are required.
Feeding Older Dogs

Feeding Plan
In general, older dogs are more prone to obesity, degenerative joint disease, heart disease, and kidney disease than younger dogs. They also are usually less active than younger dogs. The feeding plan should be based on potential risk factors and information attained in the assessment. Because of the larger variation in health among older dogs, more attention should be paid to individual needs.

Nutritional status for healthy older dogs should be assessed at least every six to 12 months. Immediate reassessment should take place if clinical signs arise that indicate the current regimen is inappropriate or if the needs of the dog change.

As the dog ages, The bond often becomes stronger between the pet owner and pet. Keeping that pet as healthy as possible through proper nutrition will be paramount!
Gestation Assessment. The objectives of a good reproductive feeding program are to optimize the number of puppies per litter, the ability of the bitch to deliver, and viability of prenatal and neonatal puppies. Appropriate feeding and management will increase the likelihood of successful reproductive performance; conversely, improper nutrition can negatively affect reproductive performance.

Gestation in dogs averages 63 days and is typically divided into 21-day trimesters. Assessment includes a detailed dietary history, a physical examination, and pertinent clinical laboratory analyses. During the physical examination, particular attention should be given to body weight and body condition.

Feeding Plan. Requirements for energy, fat, protein, calcium and phosphorus increase gradually in each trimester of pregnancy. Throughout gestation and lactation, Hill’s® Science Diet® Puppy food is an ideal product for the nutritional demands of the bitch. This product (not Science Diet® Large Breed Puppy) is also the foods of choice for large and giant-breed dogs during gestation and lactation. All of these dry puppy formulas contain docosahexaenoic acid (DHA), a natural omega-3 fatty acid. Enhanced levels of DHA help with brain and vision development.
Feeding For Gestation/Lactation

Lactation Assessment. Successful lactation depends on body condition before breeding, and adequate nutrition throughout gestation and lactation. During lactation, nutrient requirements are directly related to milk production, which in turn depends primarily on the number of suckling puppies. A bitch’s nutrient requirement during lactation is greater than at any other adult lifestage and equal to or higher, in some cases, than for growth.

Milk production peaks during the third and fourth week of lactation. The puppies’ intake of solid food begins to increase around the fifth week, after which milk production progressively declines. Therefore, the stage of lactation and the number of nursing puppies primarily determine the bitch’s nutrient requirements for lactation.

Water is needed in large quantities to produce milk. Water requirements in ml are roughly equal to energy requirements in kilocalories. Therefore, it is critical that clean, fresh water be available at all times during lactation.

After whelping (giving birth), the bitch’s energy requirement steadily increases and peaks between three and five weeks at a level two to four times higher than the daily energy requirement for non-lactating adults. The energy requirement returns to adult maintenance levels about eight weeks after whelping. Bitches are capable of increasing food intake during lactation; however, the energy density of the food is usually the limiting factor for meeting daily energy requirement of lactating dogs. Body condition of bitches should be evaluated and food amounts adjusted as necessary to maintain an ideal body condition (BCS 3/5).
Feeding For Gestation/Lactation

The requirement for protein increases more than the requirement for energy during lactation. Therefore, it is recommended to feed a food containing more protein with increased digestibility during lactation.

Fat provides EFAs and energy and enhances fat-soluble vitamin absorption. An increase in fat intake results in better food efficiency during lactation. Increasing concentrations of fat will also increase the caloric density of foods and help meet the high energy requirements of bitches during lactation. The inclusion of FAs like DHA help increase the trainability of puppies and health of the retinas.

Mineral requirements during lactation are determined by mineral excretion in milk and thus by the number of nursing puppies. Bitches need two to five times more calcium during peak lactation than for adult maintenance.

Lactation represents an extreme test of a food’s nutritional adequacy, because no other lifestage or activity requires such a marked increase in energy density and nutrient content. The nutrient demands are directly related to the dam’s ability to produce milk. Food assessment includes a comparison of the current food’s levels of key nutritional factors with those recommended.

A lactating bitch’s nutrient needs are met by a combination of the nutrient levels in the food and the amount fed. Even if the food has an appropriate nutrient profile, significant under-nutrition may result if the bitch is fed an insufficient amount. If the bitch maintains normal body condition (BCS 3/5) and the puppies are growing at a normal rate, then the amount being fed is probably appropriate.
Feeding For Gestation/Lactation

During peak lactation, a bitch’s energy needs may be three to four times greater than its requirements for adult maintenance. The amount fed during lactation is usually offered either three times per day or free choice.

Feeding Plan. In practice, it is best to feed bitches free choice during lactation, except when the bitch has only a few puppies and may have a tendency to gain weight. Free-choice feeding is especially important for lactating bitches with more than four puppies. Some bitches are nervous throughout lactation and free-choice feeding will allow them to eat on their schedule. Meal-fed lactating bitches should receive at least three meals per day. Puppies may begin to eat the bitch’s food at three weeks of age; therefore, it is important that an adequate amount of food be supplied.
Feeding Growing Puppies

Growing dogs go through three critical phases in the first 12 months of life, during which nutrition is essential for survival and healthy development.

The bitch’s milk is a complete food for newborn puppies. Cow’s milk should not be fed to pups.

Puppies should be encouraged to start eating solid food as soon as possible. This practice will reduce the nutritional burden on the bitch and reduce reliance on the bitch. Most puppies will start eating solid food between three and four weeks of age, the time when deciduous (baby) teeth begin to erupt.

The specific objectives of the puppy-feeding plan are to optimize growth and minimize obesity and developmental orthopedic disease. The ultimate goal of a feeding plan for puppies is to create a healthy adult.

Figure 22. Focus on the puppy.

<table>
<thead>
<tr>
<th>Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Period</td>
<td>Period during which the transition is made from in utero (in the mother’s uterus) nutrition to postpartum (after delivery) nutrition. This period is largely influenced by the nutrition of the bitch during gestation and early lactation.</td>
</tr>
<tr>
<td>Weaning Period</td>
<td>Period which is very stressful due to vaccinations and changes in food and environment. The transition from bitch’s milk to solid food for further growth must therefore be handled properly.</td>
</tr>
<tr>
<td>Postweaning Period</td>
<td>Period that occurs from two to 12 months of age and is a critical time for skeletal and other development. Proper feeding during this period is especially critical for large-and giant-breed puppies because nutrition has proved to be the most important nongeneric factor for healthy bone development.</td>
</tr>
</tbody>
</table>
Feeding For Gestation/Lactation

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The specific objectives of the puppy-feeding plan are to optimize growth and minimize obesity and developmental orthopedic disease. The ultimate goal of a feeding plan for puppies is to create a healthy adult.

Figure 23. Progression of joint disease in a dog with rear-limb lameness due to severe bilateral hip dysplasia.
Assessment

Assess the Pet. Puppies should be fed to grow at an average rather than at a maximal (quick growth) rate. Growing animals reach a similar adult weight whether growth rate is rapid or slow, but feeding for maximal growth increases the risk of obesity and skeletal deformities. All puppies should have their body condition evaluated and reassessed at least every two weeks to allow for adjustments in amounts fed and growth rates.

The requirements for all nutrients increase during growth compared with requirements for adult dogs. However, these requirements should be supplied judiciously, as is the case with Science Diet® Puppy, and Science Diet® Large Breed Puppy formulas. Utilize these products with confidence.

Figure 24. Growth curves (weight vs. age) for Great Dane, Labrador retriever and beagle dogs. Note that rapid growth occurs during the first few months in all breeds, but is prolonged in giant-breed dogs such as Great Danes.
Assessment

Fat contributes greatly to the energy density of a food and therefore the increased energy needs of puppies. Excessive energy intake, however, can negatively affect bone formation in large- and giant-breed dogs. The fat content of foods for large- and giant-breed puppies should be controlled to decrease the likelihood of excessive energy intake.

Although growing dogs need more calcium and phosphorus than adult dogs do, the minimum requirements are relatively low. Foods for large and giant-breed puppies should contain reduced, (compared to most grocery store puppy foods) but adequate amounts of calcium to help prevent bone disease.

If puppies are fed foods low in energy density and digestibility, they would need to eat large quantities, increasing the risk of flatulence, vomiting, diarrhea, and a distended abdomen. Therefore, foods recommended for puppies should be more digestible than average.
Assess the Food. Puppies of small - medium sized breeds may continue to receive the same food as the bitch received during lactation IF it is the type and quality you are comfortable with. These puppies were probably transitioned to this food during weaning. Large and giant-breed puppies should be fed a food that contains less energy and calcium to allow for normal growth rate. If possible, such foods should be fed during early weaning.

The Guaranteed Analysis on pet food labels does not contain information about digestibility, but the product label will indicate whether the food has successfully completed an AAFCO trial or similar feeding trial for growth. Specific information about digestibility and energy density may be requested from the manufacturer; digestibility must be sufficiently high to avoid gastrointestinal problems.
Assessment

Growing dogs should not receive vitamin-mineral supplements when fed complete, balanced commercial foods. Supplements may be justified with homemade foods, but it is very hard to nutritionally balance these foods.

The calcium and energy content of treats should be similar to that recommended for the food. If not, the number of treats should be limited. Many treats increase caloric intake and given in large numbers may almost double a puppy’s calcium intake. Hill’s® Science Diet® treats are a healthy choice.

Figure 27. Science Diet® Treats
Assessment

Assess the Feeding Method. Assessment of feeding methods is critical to successful management of growing puppies, especially those of large and giant breeds. Free-choice feeding may increase body fat, predispose the dog to obesity and induce skeletal deformities at a young age. To breeders who want to maximize growth and skeletal development of large- and giant-breed puppies, it must be stressed that overfeeding predisposes these animals to skeletal deformities, with no assurance that the original desired result will ever be achieved. Weight gain and body condition should be monitored closely if free-choice feeding is used.

During the period of rapid growth, it is best for puppies to receive a specific amount of food. This amount can be fed in two to four meals per day. Feeding guidelines, supporting by body condition scoring, should govern this process.

Feeding Plan. The food assessment phase will determine whether or not it is necessary to change foods. If a change is indicated, it is best to select a food that has passed an AAFCO trial or similar feeding trial for growth. Even so, because AAFCO feeding trials only last 10 weeks, they probably will not expose problems related to excess calcium and energy consumption, especially in large- and giant-breed puppies. Once again, the Hill’s products specific for puppies are the appropriate choices - products you can provide with confidence.
Assessment

Free-choice feeding is not generally recommended for puppies unless they are extremely thin (BCS 1/5) or have difficulty maintaining adequate body weight. Meal-restricted feeding is appropriate for most puppies to allow better control of body weight and growth rate, and also helps a great deal in the housetraining process.

Owners should weigh growing puppies every week and record body weights and food intake, including treats. Owners should be taught body condition scoring techniques. Ideally, a veterinarian should reassess puppies at the time of routine examinations the first year, and more frequently if any indication of under- or over-nutrition is detected at that time. It is especially important to discuss obesity prevention with the client after neutering procedures. Reassessment should include body weight and body condition assessment, food assessment, and determination of correct food dosage.

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Summary

Feeding dogs to make them healthy then keep them healthy is not as easy as some pet food manufacturers may lead you to believe. Clients can be easily influenced by a myriad of other things that have nothing to do with the nutritional adequacy of the food. That is why YOUR understanding of feeding dogs is so important to the pets and people you serve. You have an obligation to share your knowledge!

Are you ready?

To continue, you will need to complete the quiz for this module. When you are ready, click on the forward arrow below to take you to the quiz.
The goals of nutritional management for young to middle-aged adult dogs are to maximize longevity and quality of life.

- True
- False