



Care of Orphan Kittens

Susan Little DVM, Diplomate ABVP (Feline Practice)

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Kittens may be orphaned for many reasons or may require additional care if the queen is unable to provide all the kitten's needs. The queen meets many needs of her kittens: heat, humidity, nutrition, immunity, elimination, sanitation, security, and socialization. In circumstances where the queen is in poor health, has inadequate milk supply or has too large a litter, partial hand rearing or fostering can be used. Options include allowing two queens to raise two litters together communally or supplemental hand feeding. The litter can be divided into 2 groups for supplemental hand feeding. If there are marked differences in size, divide the kittens into groups by body weight. One group is left with the queen, while the other group is hand fed with milk replacer. The groups are exchanged 4 times daily so that all benefit to some degree from the queen's milk and maternal care. It is important to feed the group returning to the queen just before reuniting them so they will not nurse immediately.



The ideal replacement for a queen who is unable to care for her kittens at all is a foster queen. This provides the orphan with optimal nutrition, reduces mortality, improves immune status and promotes normal social development. Foster queens should have a litter of kittens that are no more than 14 days older than the orphan(s). Otherwise, they may reject the newcomers or the larger and older kittens may crowd out any smaller orphans. However, very often a foster queen is unavailable and orphan kittens must be hand-raised.

Maintaining favorable environmental conditions is essential for survival of orphans. An incubator is ideal for newborns, but various boxes, carriers or other containers can be adapted. Bedding should be provided that is free of strings or threads, and that is warm, soft and absorbent. Some popular choices are old towels, disposable diapers, and synthetic fleeces. Bedding should be changed frequently to maintain sanitation.



Normal kittens huddle close together with the queen to regulate their body temperature until they develop control of their own thermoregulation. Orphan kittens are very sensitive to changes in heat and humidity. Hypothermia develops quickly in the absence of a heat source. The environmental temperature should be maintained at 89-93F for newborns, with humidity of 55-65%. At 2 weeks of age, the environmental temperature should be 81-84F and by 3 weeks and older, it should be 75-81F. Various heat sources can be used, such as hot water blankets, rice bags, and hot water bottles. The kitten should always be able to crawl away from the heat source and protection should be provided in the form of towels or blankets to prevent thermal injury. Heat lamps are safe to use as long as the kitten can move out of the light, but the use of heating pads should be discouraged. Place a thermometer in the area to monitor environmental temperature. Hyperthermia can quickly induce dehydration.

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In most cases, it is desirable to house a litter of orphaned kittens together. Occasionally, suckling occurs among littermates, which can cause skin trauma. In these cases, it might be better to isolate the kittens from each other. However, both physical and social development is improved by contact with littermates. As well, regular and gentle human handling helps increase social stimulation and normal behavioral development. Singleton orphans may become a "one person" cat and generally asocial to other humans. The socialization period for kittens to humans is from 2 to 7 weeks of age, so adequate handling of singleton kittens is especially important in this time period. Singleton orphans may also develop poor socialization with other cats and this must be taken into consideration.

Sanitation is important when raising orphan kittens, especially if they have not received colostrum. They should be kept isolated from adult cats and from kittens of other litters. Good husbandry practices can decrease the risk of disease. All feeding equipment and bedding should be kept clean. Any caretakers should wash their hands before handling orphan kittens. Until about 3 weeks of age, kittens cannot voluntarily eliminate feces or urine. Caretakers must stimulate the urogenital reflex after every feeding by gently swabbing the perineal area with a warm, moistened (with water or vegetable oil) cotton ball or soft cloth. It is also advisable to gently but thoroughly wipe over the kitten's body with a warm moist cloth once weekly to ensure cleanliness.



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Queen's milk supplies complete nutrition for neonatal kittens. As well, it also supplies non-nutritive factors that aid digestion and neonatal development as well as immunity. The nutrient content of queen's milk varies extensively with the stage of lactation, a fact that may account for discrepancies in reports from different investigators. Later in lactation, queen's milk contains more energy, protein, lactose, calcium and phosphorus. However, the milk intake of nursing kittens remains fairly constant during the first 4 weeks of life (about 47 g/day). Queen's milk also contains high concentrations of the amino acids arginine and taurine. A comparison of queen's milk with that of other species can be found in *Small Animal Clinical Nutrition* (4th edition, 2000) p. 331. Queen's milk differs so markedly from that of other species that there is no comparable milk substitute.

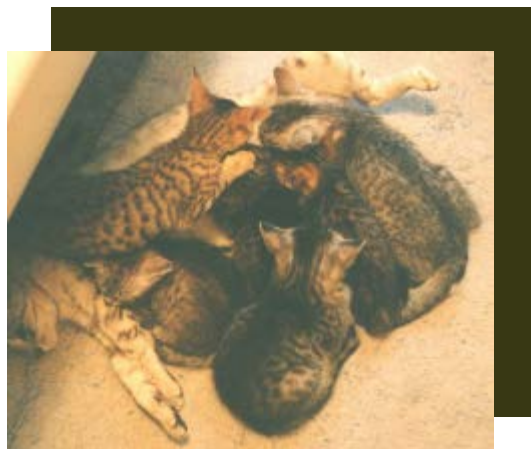



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My first Egyptian Mau queen, Cairo, happily nursing any and all who are interested ! She was an ideal foster queen.

The nutrient requirements of nursing kittens have not been well studied. There are no NRC or AAFCO nutrient recommendations for nursing kittens. However, kittens fed milk



replacers typically grow faster than those who are nursing. Nutrient recommendations for nursing kittens have been based on the composition of queen's milk. While most of the studies on the composition of queen's milk are older, a more recent study (Adkins, 1997) has provided information that should enable manufacturers to improve their products. The nutrient profile of commercial and home-prepared milk replacers should approximate queen's milk as much as possible. Up to date information has recently been published (Small Animal Clinical Nutrition, 4th edition, 2000). Where information about specific nutrients in nursing kittens is lacking, the AAFCO recommendations for growing kittens should be used.

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It is estimated that kittens less than 4 weeks old require up to 24 kcal ME/100 g BW daily. Queen's milk contains about 0.85-1.6 kcal/ml and milk replacers contain approximately 1 kcal/ml as fed. The water intake of nursing kittens is quite high since their bodies are composed of about 78.8% water at 1 week (compared to 67.1% in the adult). Average water intake for kittens is 155-230 ml/kg BW/day. Orphan kittens should receive about 180 ml/kg BW/day and additional water should be given if the volume of milk replacer does not provide enough water.

A wide variety of commercial milk replacers are available for kittens. Commonly available ones include KMR® (by [Pet-Ag](#)), Nurtural® (by [Veterinary Products Lab](#)), and Just Born® (by [Farnam Co. Inc.](#)). The manufacturer's feeding guide should be used for each. A comparative review of several kitten milk replacers is found in *Small Animal Clinical Nutrition*, 4th edition, p. 1065.



Several problems can occur when using commercial milk replacers. Products with low energy density may require a higher volume of intake than is possible for the orphan. These kittens may fail to gain weight, and in some cases, will lose weight. The stomach capacity of most orphans in the first week of life is under 15 ml. On the other hand, very concentrated formulas may not allow for enough water intake daily. The milk replacer should be able to provide the daily water requirement of 180 ml/kg. If the product has to be diluted to provide adequate water intake, nutritional needs may not be satisfied and hypoglycemia may result. Since most artificial milk replacers are based on cow's milk, they will be low in some amino acids. Milk replacers that are too low in arginine may cause cataract formation and products low in taurine may result in wasting kittens. Products with osmolarity much higher than queen's milk may induce diarrhea.

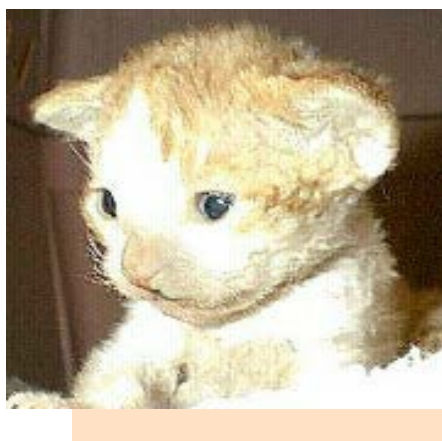


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Many home-prepared diets have been used for orphan kittens. Like commercial products, they are usually based on cow's milk. While there is no nutritional advantage to the use of goat's milk in home-prepared formulas, it remains popular among breeders since it is perceived to cause less diarrhea. Several foods should not be used in home-prepared formulas: egg white (binds biotin, causes diarrhea), cottage cheese (forms hard coagula in the stomach), cream (high concentrations of short and medium chain fatty acids, whereas queen's milk is rich in linoleic acid).

Hygiene is very important when preparing and feeding milk replacers. All feeding equipment should be cleaned thoroughly and boiled in water between feedings. When using powdered milk replacers, only the volume that will be used in 24 hours should be prepared and refrigerated. The powder must be well mixed to avoid clumps in the formula that could clog feeding tubes. Most ready-to-use milk replacers can be frozen in portions in ice cube trays if needed to avoid spoilage. When home-prepared diets are used, all the ingredients should be fresh. Since there are many potential problems with both commercial and home-prepared milk replacers, it is advisable to wean the kitten as soon as possible on to a diet designed for growing kittens.

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Hand feeding orphan kittens can be accomplished by bottle-feeding or tube feeding. Kittens who are vigorous with a good sucking reflex can be bottle-fed. While bottle-feeding allows kittens to nurse until they are full and thus avoids overfeeding, it is more time consuming than tube feeding. A variety of small pet nursers are available at pet and supply stores. The opening in the nipple may have to be modified; a horizontal slit using a razor blade may be preferable to a hole. The slit or hole should allow one drop of milk at a time to fall from the upturned bottle without squeezing it. When feeding kittens, the milk must be sucked from the bottle and never squeezed to avoid aspiration. The normal feeding position for kittens is in sternal recumbency with the head in a natural position. A variation on bottle-feeding is the Catac® nurser. This specially designed feeding system comes with a glass nurser and nipples. Another variation is to use the Catac® nipple on a 3 cc syringe. The milk replacer is loaded in the syringe and fed to the kitten with careful control of the plunger. If this method is not performed properly, aspiration may occur from rapid milk ejection.

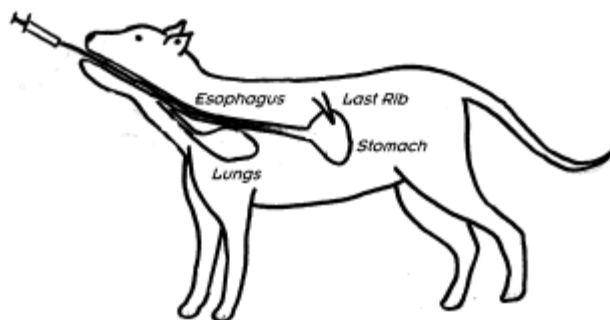
Feeding formula to a young Devon kitten using a syringe.



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Tube feeding is the method of choice for weak kittens with a poor sucking reflex. It is also the quickest method of feeding orphans and may be the best choice if a large litter must be hand raised. A red rubber feeding tube (5-8 Fr) and a syringe (various sizes are useful, from 3 ml to 10 ml) is used. The kitten is positioned in the same manner as for bottle-feeding. If the kitten is vigorous, tube feeding may be easier if the kitten is wrapped in a small towel. If the kitten is still with the queen, remove the kitten from her presence to avoid agitating her. The tube is measured so that the tip will be in the lower esophagus, but not in the stomach. Measure the tube so that the tip is placed 75% of the distance from the tip of the nose to the last rib. Mark the tube with a piece of tape; the tube must be re-measured and remarked every few days to allow for growth. Have all equipment and warmed formula ready before proceeding.

Drawing by Lesley Langley



The syringe and feeding tube should be warmed in a bowl of hot water before using to avoid cooling the formula. A warm feeding tube is also more pliable and easier to handle. The tube is then lubricated slightly and a drop of milk is allowed to form at the tip to encourage acceptance by the kitten. Gently advance the tube through the open mouth and down the esophagus. If the tube does not advance properly to the marked distance, it may be misplaced in the trachea and should be withdrawn and repositioned. Once in the esophagus, the tube should advance easily and with little distress to the kitten to the marked position. The formula is then administered slowly, over a period of a few minutes. The stomach should be palpably full after feeding, but not over distended or taut. The most common reason for aspiration when tube feeding is overfeeding the kitten. In general, it is better initially to underfeed and modify the amount of formula fed by



monitoring daily weight gains.

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Very young orphan kittens should be fed every 2-4 hours around the clock. This can eventually be decreased to feeding every 4-6 hours. The milk replacer should be warmed to about 38°C (100°F) before feeding. Problems will be encountered if the formula is fed too cold, or if it is fed too rapidly or in too large a volume. Regurgitation, aspiration, bloating and diarrhea may result. Diarrhea is a common problem encountered in hand raising orphan kittens. Mild diarrhea results in a loose, yellow stool and severe diarrhea causes a gray, watery stool. When diarrhea is observed, the milk replacer volume should be diluted 50% with water or an electrolyte solution for the next several feedings. The formula can then be gradually increased to full strength. Severe diarrhea may result in dehydration and require fluid therapy. It may also be helpful to reduce the volume of formula fed for several feedings; in general it is better to underfeed slightly rather than overfeed. Some breeders use probiotics (i.e. Bene-Bac by Pet-Ag) routinely when hand raising kittens to decrease the risk of diarrhea.

Orphan kittens should be weighed frequently to assess progress. Seriously underfed kittens will fail to gain weight and will be restless and cry excessively. The best way to assess the correct amount of formula to feed is to aim for a weight gain of about 10 g daily and the production of normal stool (firm and somewhat yellow).

Start weaning orphan kittens by offering them familiar formula in a saucer at 3-4 weeks of age. Gradually mix in small amounts of a good quality canned kitten diet to wean them to solid food. It is rarely necessary to use an intermediate food such as baby cereal, which has poor nutritional value for kittens anyway.



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