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Raising Healthy Kittens

Normal Growth and Development

- ◆ Typical birth weight 90 to 110 grams; some pedigreed breeds can be much lighter or heavier at birth
- ◆ Influenced by many factors such as breed, number of kittens in litter
- ◆ Weigh kittens at birth on a gram scale, again 12 hours later, and daily for first two weeks of life
- ◆ Identify each kitten accurately and keep a growth chart; first sign of illness may be failure to grow
- ◆ Normal kittens gain 50-100 grams per week (10-15 g/day); should double birth weight by two weeks old
- ◆ Well-fed kittens have plump abdomens and appear content; hungry or ill kittens cry excessively, appear restless, have lean abdomens; queens may neglect sick kittens
- ◆ Eyes open about 10 days of age (range 2-16 days); kittens recognize queen by sight by about four weeks; iris remains blue-gray until four to six weeks; ear canal at birth is blocked by ridges of skin but widens and opens by about nine days of age (range 6-17 days); newborn kittens have a good sense of smell; pain perception is present at birth
- ◆ Crawling is well developed by 7-14 days; walking begins about two weeks of age; elimination of urine and stool is a reflex stimulated by the queen; voluntary urination and defecation appear at about three weeks

Examination of the Neonatal Kitten

- ◆ Observe kitten's response to environment, body condition, mentation, posture, locomotion, and breathing; ill kittens may be isolated from the rest of the litter
- ◆ Normal body temperature for new-born kittens is about 36°C; temperature then rises slowly, reaching 38°C by about two weeks and then gradually reaches adult levels (38-39.5°C) by about seven weeks; for the first week of life, kittens cannot regulate their body temperature; no shiver reflex until about six days old
- ◆ Normal heart rate can be over 200 beats per minute (range 220-260); normal breath rate 15-35 breaths/minute
- ◆ Inspect for obvious abnormalities: cleft palate/lip, umbilical hernia/infection, open fontanels, limb deformities/contractures, abnormal urinary or rectal openings, etc.
- ◆ Umbilical cord should be dry and free of discharges; normally falls off by day three
- ◆ Check for normal urination/defecation by stimulation of rear end with soft moist cloth or cotton ball; check for constipation or diarrhea (present in about 60% of sick kittens), as well as urine colour
- ◆ First baby teeth to appear are incisors and canines at three to four weeks of age; premolars appear five to six weeks of age

- ◆ Coat should be clean and shiny; healthy neonatal kittens may have dark pink or red gums until seven days old, whereas sick neonates often have pale, gray, or bluish gums
- ◆ Full abdomen is normal in well-fed kitten, but swollen abdomen in an ill kitten may indicate swallowed air

Therapeutics

Hypothermia (low body temperature):

- ◆ Occurs when rectal temperature is under 35°C; associated with poor breathing, impaired immune system function, slow heart rate, poor intestinal function, coma
- ◆ Rewarm slowly using: incubator, heat lamp, hot water bottle; room temperature should be 32°C with 55-65% humidity; turn often and monitor rectal temperature carefully to avoid over-warming
- ◆ Never attempt to feed hypothermic kittens until they are rewarmed (risk of aspiration)

Hypoglycemia (low blood sugar):

- ◆ Common due to immature liver function and rapid depletion of energy stores
- ◆ Signs include lethargy, poor suckle reflex, crying and limp body
- ◆ If not hypothermic or dehydrated, give dextrose solution (from your vet) orally (50% dextrose solution, 1/4 ml per 30 grams body weight)

Dehydration:

- ◆ Gums should be moist and either dark red or pink
- ◆ Pale gums and slow capillary refill time (have your vet show you how to do) may indicate 10% dehydration or more
- ◆ Normal neonatal urine is clear and colorless; in dehydration, urine is dark yellow
- ◆ Use warmed oral electrolyte solution when kitten is not hypothermic, not seriously dehydrated
- ◆ If unstable/seriously ill, dehydration must be corrected at the vet clinic with fluid therapy

Kitten Losses

- ◆ Rates vary from 4% (in disease-free research colonies) to over 30% (in some pedigreed catteries)
- ◆ Pre-weaning losses of over 15-20% should be vigorously investigated
- ◆ Typical risk periods for losses: during pregnancy (absorptions, abortions), at birth (stillborns), in the first 2 weeks of life, and the period immediately after weaning
- ◆ Investigation requires examination/treatment of individual kittens, diagnostic testing, full necropsies (including cultures and histopathology); kittens that die at home should be refrigerated until necropsy (not frozen) and entire body should be submitted to a qualified pathologist
- ◆ Most common factors: low birth weight, congenital defects, trauma, inadequate nutrition, maternal neglect, environmental factors, infectious diseases and parasitism, neonatal isoerythrolysis (NI)

Low Birth Weight

- ◆ Multiple causes, may be hard to determine: prematurity, inherited diseases (i.e. inborn errors of metabolism), birth defects, in utero infections, and others
- ◆ Kittens under 75 grams at birth often have a poor survival rate
- ◆ Become familiar with average birth weights for your breed and your own cats
- ◆ Kittens losing more than 10% of their body weight after birth have a poor prognosis

Congenital defects

- ◆ Defects present at birth, may be due to multiple causes (i.e. genetics, drugs, infections, spontaneous abnormalities, etc.)
- ◆ Up to 20% of live-born and stillborn kitten deaths involve major anatomical abnormalities
- ◆ Defects include: cleft palate, craniofacial defects (i.e. Burmese, American Shorthair head defects), heart defects, open abdomen, skeletal abnormalities, incomplete twinning

Trauma

- ◆ Up to 10% of kitten losses attributed to trauma during birth or during the first three days of life
- ◆ May be due to maternal neglect or cannibalism

Inadequate nutrition

- ◆ Kittens should nurse within two hours of birth, colostrum only absorbed within first 16-18 hours
- ◆ First born kitten may be subjected to a long wait before nursing if delivery is prolonged
- ◆ Difficult births may produce kittens that are too exhausted and traumatized to nurse effectively
- ◆ Inadequate milk production associated with: first time queens, aged queens, queens who are sick or malnourished, difficult labors, familial trait, mastitis, litters of small weak kittens

Environmental Factors

- ◆ Environmental stressors (overcrowding, noise, poor ventilation, etc.) may compromise maternal care
- ◆ Temperature fluctuations may be harmful to neonatal kittens; high room temperatures combined with high humidity promote some infectious diseases (pneumonia, mastitis); low temperatures can predispose to chilling

Infectious Diseases

- ◆ Highest death rates from infectious diseases are in the first 2 weeks of life and post-weaning period
- ◆ Pathogens include: *Strep*, *Mycoplasma*, herpesvirus, calicivirus, parvovirus, FeLV, FIV, FIP, *Toxoplasma*, *E. coli*, *Pasteurella*, Staphylococci, *Bordetella*, *Chlamydomphila*. Most important are *Strep. canis* (Group G, beta-hemolytic), coliform bacteria (i.e. *E. coli*), respiratory viruses especially herpesvirus

- ◆ Bacterial infections such as *E. coli* and *Strep. canis* may be significant cause of kitten losses, especially between 5-10 days of age
- ◆ Important route of bacterial infection is the umbilicus; dip cords in 2% iodine
- ◆ Check umbilicus daily for swelling, redness, discharges

Neonatal Isoerythrolysis (NI)

- ◆ Responsible for up to 50% of deaths in some pedigreed catteries
 - Two main blood types, A (dominant) and B (recessive); AB blood type is rare
 - Most non-pedigreed cats are blood type A (95-98%), some breeds may be over 30% type B
 - Antibodies are naturally occurring; no previous pregnancy or transfusion is necessary for antibody production
 - Type B cats have strong antibodies against type A red blood cells
 - NI occurs in blood type A kittens born to a type B queen mated to a type A male
 - Kittens are born healthy; some die suddenly; others stop nursing within first 3 days with suggestive signs: failure to thrive, red-brown urine, jaundice, anemia
 - Prevention: remove kittens from queen for first 16-18 hrs and foster nurse kittens with type A queen if available or hand feed milk replacer; plan breedings carefully; blood type all breeding cats; record blood type on pedigrees

Frequency of Type A and Type B Cats by Breed

Breed	% Type A	% Type B
Abyssinian	86	14
American Shorthair	100	0
Birman	82	18
British Shorthair	64	36
Burmese	100	0
Cornish Rex	67	33
Devon Rex	59	41
Exotic Shorthair	73	27
Himalayan	94	6
Japanese Bobtail	84	16
Maine Coon	97	3
Norwegian Forest Cat	93	7
Oriental Shorthair	100	0
Persian	86	14
Russian Blue	100	0
Scottish Fold	81	19
Siamese	100	0
Somali	82	18
Sphynx	83	17
Tonkinese	100	0

Giger U. Blood typing and crossmatching to ensure compatible transfusions. *In* Kirk RW and Bonagura JD (eds): *Current Veterinary Therapy XIII Small Animal Practice*. Philadelphia: W.B. Saunders, pp. 396-399, 2000

Tube Feeding (see also: <http://www.catvet.homestead.com/orphan1.html>)

- ◆ Hand feeding kittens can be accomplished by bottle feeding or tube feeding:
- ◆ Bottle feed kittens who are vigorous with a good sucking reflex; avoids overfeeding, but more time consuming than tube feeding; use small pet nurser, Catac[®] nurser, or a nipple on a 3-ml syringe
- ◆ Tube feeding is method of choice for weak kittens with a poor sucking reflex; quickest method of feeding orphans; best choice if a large litter must be hand raised.
- ◆ Problems occur if formula is fed too cold, fed too rapidly or in too large a volume; may result in regurgitation, aspiration, bloating, diarrhea (common)
- ◆ To resolve diarrhea, milk replacer volume should be diluted 50% with water or electrolyte solution for next several feedings; formula can then be gradually increased to full strength; also helpful to reduce volume of formula fed for several feedings; in general, better to underfeed slightly rather than overfeed; consider using probiotics
- ◆ Weigh kittens frequently to assess progress; aim for weight gain of about 10-15 grams daily and production of normal stool (firm and somewhat yellow)