

## **Raising Healthy Kittens**

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### Normal Growth and Development

- ◆ typical birth weight 90 to 110 grams (roughly 3-4 ounces)
- ◆ influenced by many factors such as breed, number of kittens in litter
- ◆ weigh kittens at birth on a gram scale, again 12 hrs later, and daily for first 2 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 2 weeks old
- ◆ well fed kittens have plump abdomens and appear content; hungry kittens cry excessively, appear restless, have lean abdomens.
- ◆ eyes open about 10 days of age (range 2-16 days); kittens recognize queen by sight by about 4 weeks; iris remains blue-gray until 4-6 weeks; ear canal at birth is blocked by ridges of skin but widens and opens by about 9 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 2 weeks of age; elimination of urine and stool is a reflex stimulated by the queen; voluntary urination and defecation appear at about 3 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 group and neglected by queen
- ◆ normal body temperature for new-born kittens is 95-97°F; temperature then rises slowly, reaching 100°F by about 4 weeks of age; for first few weeks of life, kittens cannot regulate their body temperature; they lack a shiver reflex until about 6 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 fontanel, limb deformities/contractures, abnormal urinary or rectal openings, etc.
- ◆ umbilical cord should be dry and free of discharges; normally falls off by day 3
- ◆ 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 3-4 wks of age; premolars appear 5-6 wks of age
- ◆ coat should be clean and shiny; healthy neonatal kittens may have dark pink or red gums until 7 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



**Photo 1: normal umbilical cord**

### Therapeutics

#### *Hypothermia (low body temperature):*

- ◆ occurs when rectal temperature is 78-95°F; 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 85-95°F 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 in the body
- ◆ if not hypothermic or dehydrated, smear dab of corn syrup on gums, or give dextrose solution (from your vet) orally (1/4 ml per ounce 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 (such as Pedialyte) when kitten is not hypothermic, not seriously dehydrated
- ◆ if unstable/seriously ill, dehydration must be corrected at the vet clinic with IV fluids

### Kitten Losses

- ◆ rates vary from 4% (in disease-free research colonies) to over 30% (in some pedigreed catteries)
- ◆ pre-weaning losses of over 20% should be vigorously investigated

- ◆ typical time 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)
- ◆ 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 (under 90 grams/3 ounces)*

- ◆ 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 (2-1/2 ounces) at birth have very high death rate
- ◆ 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, 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 (insufficient oxygen) or the first 3 days of life
- ◆ may be due to maternal neglect or cannibalism

#### *Inadequate nutrition*

- ◆ kittens should nurse within 2 hours of birth, colostrum only absorbed within first 16 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)

#### *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*, *Chlamydia*. Most important are *Strep. canis* (Group G, beta-hemolytic) and coliform bacteria (i.e. *E. coli*)
- ◆ *Strep. canis* may be significant cause of kitten losses, especially between 5-10 days of age
  - carried in vagina of young queens and in prepuce of toms, uncommon in older queens
  - associated with internal and external umbilical abscesses, septicemia, peritonitis
  - diagnosis by culture of umbilicus, liver, abdominal cavity, lungs at necropsy; treat remaining litter mates with oral amoxicillin
  - preventative management program for catteries experiencing confirmed losses to *S. canis*:
    - kittens: single SC injection of 0.25 ml of 1:6 dilution in sterile 0.9% saline of product containing 150,000 IU/ml benzathine and procaine penicillin G
    - queen: one SC injection of 150,000 IU of the same product (undiluted)
    - single dose given to queen at parturition may temporarily suppress the *S. canis* population

#### *Neonatal Isoerythrolysis (NI)*

- responsible for up to 50% of deaths in some pedigreed catteries
- two main blood types, A (dominant) and B (recessive); third blood type is rare (AB)
- 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
- 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
- Treatment: kittens with severe anemia require transfusion with washed type B blood (preferably from the queen); despite treatment, death rate is high
- 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



**Photo 2: urine from kitten with NI (on left) and urine from normal kitten (on right)**

### 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

#### Tube Feeding

- ◆ 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<sup>®</sup> nurser, or a nipple on a 3 cc 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 grams daily and production of normal stool (firm and somewhat yellow)