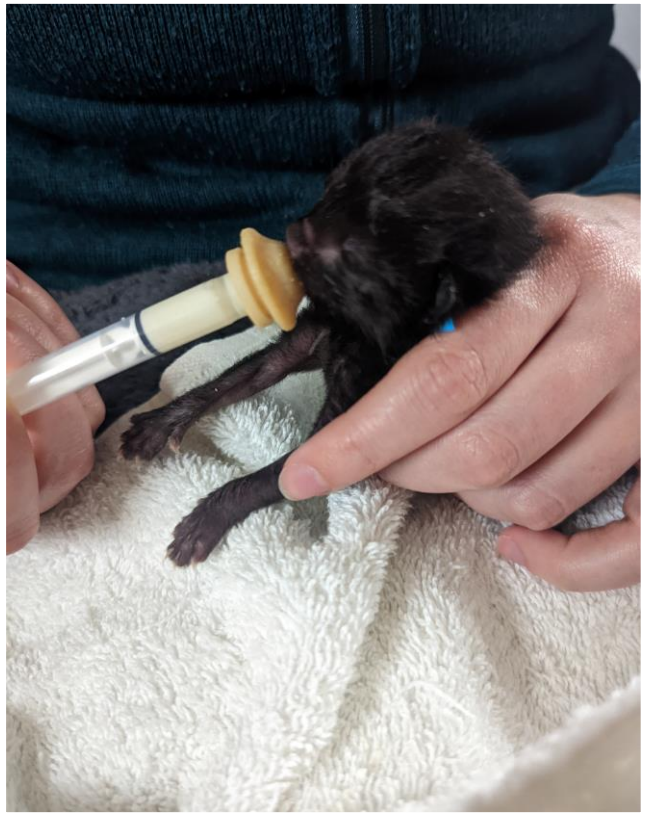
IOWA STATE UNIVERSITY
College of Veterinary Medicine

Puppies and Kittens:
Not Just Small Dogs and Cats



Jessica Griffith, RVT, VTS (ECC)

April 12th, 2023

About Me

Outline

- General terms
- Normal vital parameters
- 3 common emergencies
- Stabilization
- Nursing care and patient monitoring

Neonate vs Pediatric

Neonates

- Used for period between birth and 3 weeks of age, or until the animal can urinate and defecate without stimulation

Pediatrics

- General term used for the first 3-6 months
  - Can be divided and include weanling, infant, juvenile, and adolescent

Approximating Age

- **2-3 days** – umbilical cord dries and falls off
- **5-14 days** – eyelids and external ear canals open
- **7-14 days** – crawling
- **14-21 days** – urinating & defecating spontaneously

Neonatal Vitals

- **Temperature (rectal)**
  - 1 week: 95-98°F
  - 2-3 weeks: 98-100°F
- **Heart Rate**
  - 1 week: 220-250 bpm
    - Higher in kittens
  - 2-12 weeks: higher than adult, but no defined parameters
- **Respiratory Rate**
  - 15-30 rpm
- **MM/CRT**
  - Light pink, <2 seconds
- **Hydration**
  - Visibly clear urine

Neonatal Lab Values

- **Hematocrit**
  - Canine:
    - 0-2 weeks: 29-53%
    - 2-4 weeks: 27-37%
  - Feline:
    - 0-2 weeks: 34-37%
    - 2-4 weeks: 26-27%
- **Total Protein**
  - Canine: 3.4-5.2 g/dL
  - Feline: 4.0-5.2 g/dL

Neonatal Lab Values

- **Blood Glucose**
  - Canine: 52-127 mg/dL
  - Feline: 76-129 mg/dL
- **Urine Specific Gravity**
  - 1.008-1.012

Phone Triaging

- Open-mouth breathing
- Non-responsive
- Flaccid
- Trauma/fracture/wound
- Lethargy/weakness
- Vomiting/diarrhea

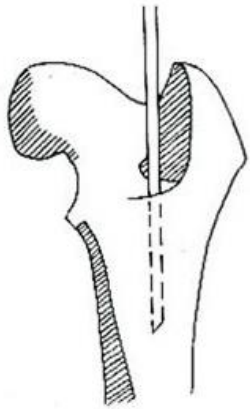
Common Emergencies

- Hypothermia
- Hypoglycemia
- Hypovolemia/ dehydration

Access - Intravenous

- Cephalic or jugular
- 22-24 gauge catheter
- Use 22-20 ga needle to puncture skin if IVC burrs

Access - Intraosseous



- Proximal femur (trochanteric fossa)
- Humerus (greater tubercle)
- 18-22 gauge needle
- Parallel to the long axis
- Not for long-term use

Hypothermia

Temperature (rectal):
- 1 week: 95-98°F
- 2-3 weeks: 98-100°F

- Environment
  - 0-1 week: 86-90°F
    - Up to 96°F for kittens
  - 2-3 weeks: 80-85°F
  - 4 weeks: 70-75°F
- Treatment
  - Heat support

https://vetwarming.com/
http://curadle.com
https://www.snugglesafe.co.uk/

Hypoglycemia

Blood Glucose:

- Canine: 52-127 mg/dL
- Feline: 76-129 mg/dL

- Physiology
  - Limited glycogen stores and gluconeogenesis
  - Hepatic stores depleted within 24 hours
- Signs
  - Crying, weakness, tremors, seizures, coma

Hypoglycemia

Blood Glucose:

- Canine: 52-127 mg/dL
- Feline: 76-129 mg/dL

- Treatment
  - Corn syrup applied to gums
  - 0.5-2 mL/kg of 10-25% dextrose solution IV as bolus
  - 1.25-5% dextrose as CRI
  - Recheck BG and adjust supplementation PRN
  - If normothermic, enteral feeding is best

Hypovolemia/Dehydration

- Difficult to assess accurately in neonates
  - Skin turgor, PCV, mucous membranes, CRT unreliable

Renal function and HCT lower than adult until 8 weeks of age

Pereira, K. (n.d.). Neonatal sepsis in dogs: Incidence, clinical aspects and mortality. Retrieved March 5, 2023, from https://doi.org/10.1016/j.theriogenology.2021.10.015

Dehydration

- **Signs**
  - Deepening of ventrum and mucous membrane color
  - Yellow urine and increased USG
    - Normal: 1.008-1.012
- **Treatment**
  - IV/IO fluids (*warmed* LRS)
    - Bolus of 20-40 mL/kg
    - Correct dehydration over ≥12 hours
    - Maintenance: 80-200 mL/kg/day

Little. (2011). VIII Feline Reproduction and Pediatrics. In *The Cat*. Elsevier.

Nursing Care

Technician utilization!

- **Treatments**
  - Environment
  - Maintaining IV/IO access
  - Feeding (syringe, bottle, orogastric/nasogastric tube)
- **Monitoring**
  - Vitals
  - Weight
  - Feedings/caloric intake

Environment

- Ambient Temperature
  - 0-1 week: 86-90°F
    - ≤96°F for kittens
  - 2-3 weeks: 80-85°F
  - 4 weeks: 70-75°F
- Humidity
  - 55-60% RH
- Oxygen
  - 21-40% FiO2

- Monitor rectal temperature frequently if hypothermic
- Keep other heating sources on only half of area
  - Ensure bedding is not too tall for neonates to move over

Maintaining IV/IO Catheters

- Remove IO catheters as soon as unnecessary or venous access can be achieved
- Inspect every 12-24 hours for patency, phlebitis, oozing
- Keep wrapped to prevent soiling

Feeding Neonates

- 0-2 weeks: every 2-3 hours
- 3-4 weeks: every 4 hours
- 4 weeks: begin gruel and free water
- 4-5 weeks: transition from canned to dry food

Be patient!

Feeding Neonates

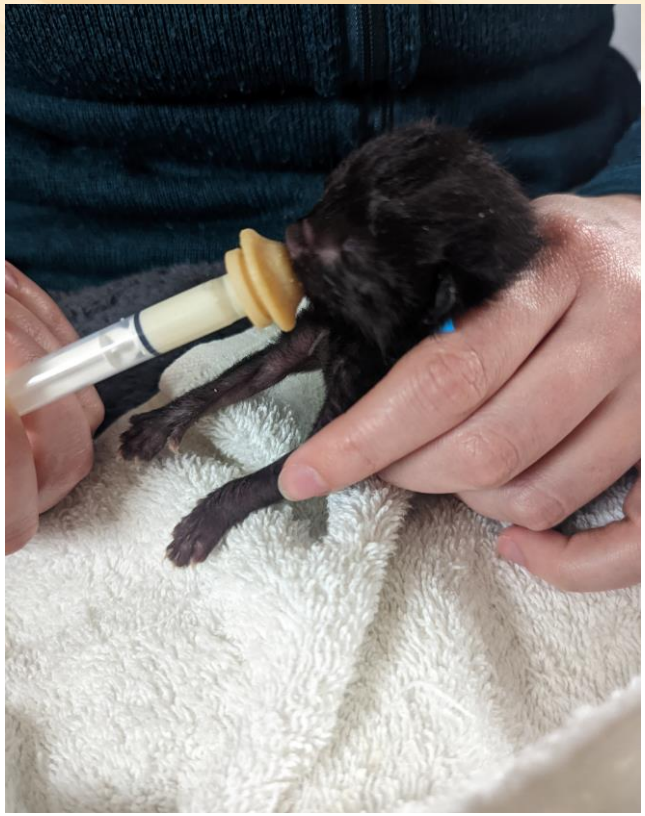
"Rules"

- Patients must be ≥96°F
- Patient in sternal or sitting recumbency
  - Never in lateral or dorsal
- Stimulate before feeding
- Warm formula to 96-100°F
- Feed weakest/smallest first
- Circle-feed to give opportunity for full feedings
- Stimulate again after feeding

Feeding Neonates – Bottle/Syringe

- **Pros**
  - Supports strong suckling reflex
  - Patient determines when full
  - Minimal training
  - Materials (cheap, commercially available)

- **Cons**
  - Time-intensive
  - Bloating
  - Aspiration risk
  - Requires patient strength



Bottle Feeding

1. Choose bottle and nipple (milk should just drip out of nipple when bottle is upside down)
2. Place patient in sternal recumbency with head in neutral position (don't extend head/neck) and place nipple in patient mouth at even level
3. Allow patient to nurse until full

Bottle Feeding

- Do not squeeze bottle
- Wash supplies after each use
- Store unused milk replacer as directed (24-72 hours in refrigerator)
- Can also use syringes, but pressure is difficult to control

Feeding Neonates - Orogastric

- **Pros**
  - Quick
  - Accurate feedings
  - Materials (cheap, red rubber catheters and syringes)
- **Cons**
  - Requires training
  - Risk of instilling into lungs
  - Risk of vomiting
  - Limited by age

Orogastric Tube Feeding

- Kittens: 5 Fr
- Puppies: 5-10 Fr

Preparing the Catheter:

- Using red rubber catheter, hold up to patient and mark tip of nose and last rib on catheter
- Cut excess length past last rib measurement

https://mms.mckesson.com/
https://www.petcoach.co/

Orogastric Tube Feeding

1. Prime catheter with warm formula
2. Patient in sternal recumbency with head slightly ventroflexed
3. Pass tube straight into mouth (closer to left side) and slowly advance
4. Catheter should pass easily with no resistance (watch for coughing or respiratory distress)
5. Instill milk over 2-3 minutes
6. Kink catheter and remove swiftly

Feeding Neonates

Other Routes

- Nasogastric
  - Short-term (<14 days)
  - Gastric decompression
  - Can be dislodged
- Esophagostomy
  - Long-term
  - Requires GA
  - Risk of infection/inflammation at insertion site
  - Can by dislodged
  - No ability to decompress stomach

Weight Monitoring

- Neonates may lose up to 10% BW in first 24 hours
- BW should double birth weight by 10 days (10-14 days if fed milk replacer)

- Expect 5-10% BW gain daily
  - Canine: varies
  - Feline: 10-15 g/day

https://www.amazon.com/

Weight Monitoring

- Gram scale for patients <1 kg
- Baby scale for patients <10 kg

- Be consistent about *when* you weigh!
  - Before or after feedings, stimulating bladder/bowels, etc.
- Weigh at least every 12 hours
  - Every 4 hours if <1 week old

https://www.lovetoknowpets.com/

Energy Requirements

- 20 kcal/100 g/day

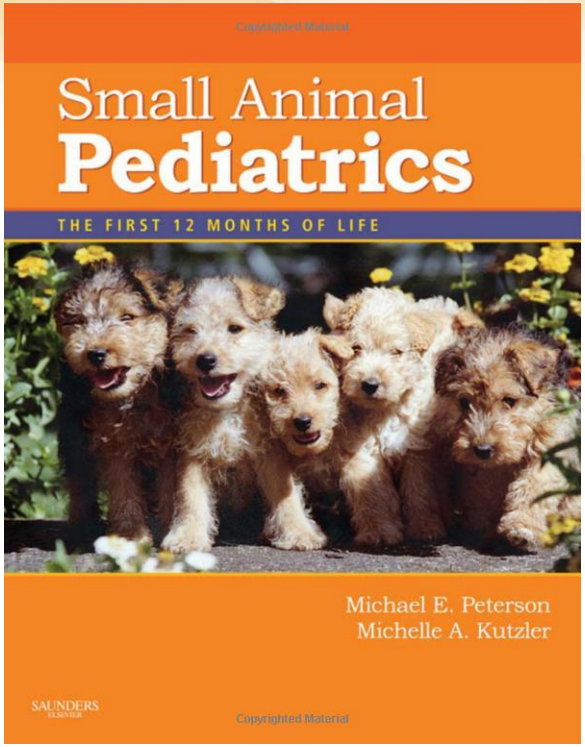
- Stomach capacity ~4 mL/100 g
  - Commercial formulas usually <1 kcal/mL
  - May be able to go slightly higher than standard stomach capacity over time
    - Risk of vomiting, diarrhea, and aspiration

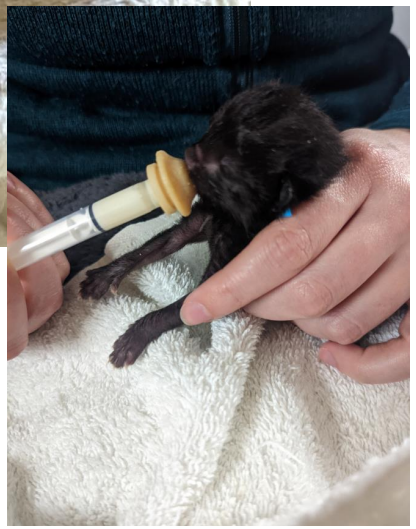
https://www.amazon.com

Diet Type (PetAg®)	Caloric Density	Feeding Directions	Use
Esbilac canned puppy milk replacer	12.3 kcal/15 mL (0.82 kcal/mL)	30 mL/4 oz BW per day (1 mL/3.73 g BW per day)	Refrigerate, use for up to 72 hours
Esbilac powdered puppy milk replacer	13.5 kcal/15mL (0.9 kcal/mL)		Mix 1:2 w/ water, refrigerate, discard after 24 hours
KMR canned (kitten milk replacer)	12.45 kcal/15 mL (0.83 kcal/mL)		Refrigerate, use for up to 72 hours
KMR (kitten milk replacer)	11.1 kcal/15 mL (0.74 kcal/mL)		Mix 1:2 w/ water, refrigerate, discard after 24 hours

Additional Resources

- Small Animal Pediatrics by Michael E. Peterson
- www.maddiesfund.org › kitten bottle feeding and stomach capacity chart
- www.maddiesfund.org › Puppy Bottle Feeding and Stomach Capacity Chart
- https://www.uwsheltermedicine.com/library/resources/feline-guide-to-raising-orphan-kittens
- ASPCA Pro: aspcapro.org





Questions

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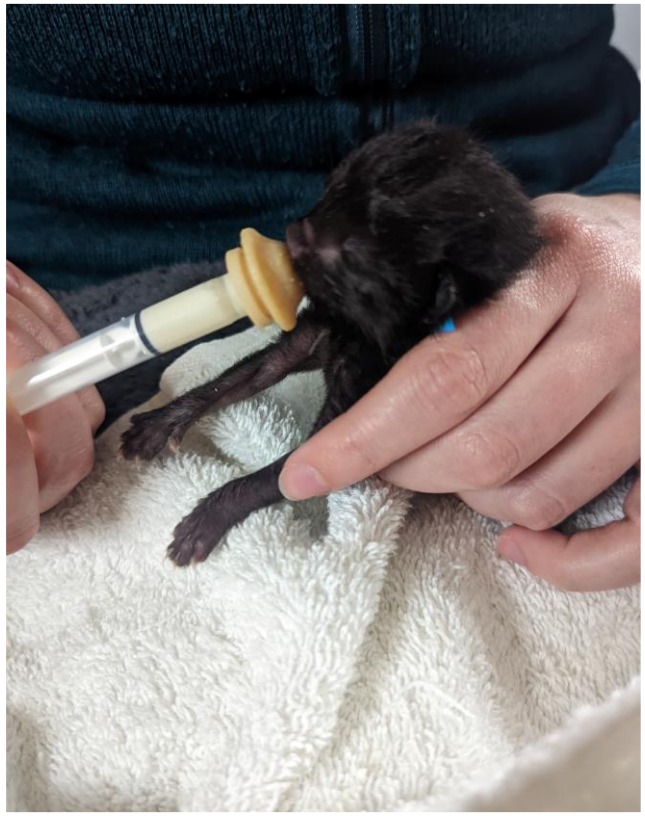

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