PHYSICAL EXAMINATION OF RUMINANTS
JUNIOR PRACTICUM

SMP 9/7/2010

OBJECTIVES: Perform a complete physical examination of a ruminant which includes:

1) Obtaining a complete signalment and history
2) Observations about the environment (including other animals)
3) Observation of the animal at a distance
4) Vital signs (taken while animal is quiet or unstressed)
5) Examination of the head
6) Examination of the left side of the animal
7) Examination of the udder, genitalia, and tail
8) Examination of the right side of the animal
9) Examination of the mouth
10) Examination of milk and urine (if appropriate)
11) Rectal examination

1. **Introduction** – prior to initiation of the physical examination, the following information will have been obtained:
   a) Signalment
      i) Breed
      ii) Sex
      iii) Age
      iv) Color
      v) Weight/size
      vi) Stage of lactation/gestation
      vii) Function or purpose – i.e. meat, milk, show, embryo donor/recipient, pet
   b) Client complaint
   c) History
      i) Calving/breeding date
      ii) Pregnancy status
      iii) Feed – source, quantity, quality, where and how it is fed
      iv) Vaccinations
      v) Magnet administration (dairy cattle)
      vi) Closed or open herd
      vii) Number of animals affected
      viii) Number of animals in herd
      ix) Exposure to other domestic or wild animals
      x) Mastitis history

2. **Physical examination**
   a) Observation at a distance

i) Patient
    a) Attitude
    b) Temperament/behavior
    c) Body condition (Dairy 1-5, Beef 1-9, Llama 1-10)
    d) Skin Condition
    e) General conformation – feet, legs, topline, udder, etc.
    f) Gait, posture, stance
    g) Defecation, urination
    h) Rate and character of respiration – i.e. thoracic excursions, abdominal effort, inspiratory:expiratory ratio
    i) Abdominal contour, symmetry from side to side
ii) Patient environment (if applicable)
    a) Walls, floor, bedding
    b) Feces, Urine
    c) Feed, Water
    d) Ventilation, dampness, crowding
    e) Other animals
    f) Body condition of other animals

b) Temperature, pulse rate, respiration rate (TPR)
    i) See table 1 at end of notes

c) Head
    i) Symmetry
    ii) Ears – temperature, discharge (character), muscle tone, hemorrhage
    iii) Eyes (examination of both eyes; note any asymmetry)
        a) Pupil diameter/position
        b) Menace response
        c) Pupillary light reflex
        d) Appearance of iris, lens, anterior chamber
        e) Assessment of hydration – eye position within the orbit, upper eyelid skin tent
        f) Discharge – character
        g) Conjunctival mucous membrane color
        h) Sclera – color, vessel injection
    iv) Nose
        a) Character of muzzle – temperature, moisture, etc.
        b) Menace response
        c) Pupillary light reflex
        d) Air movement at each nostril (mirror test, cotton test)
        e) Erosions, ulcers, plaques
        f) Odor – character
    v) Submandibular area – lymph nodes (it is difficult to detect distinct submandibular lymph nodes in a normal animal), edema, salivary glands
    vi) Laryngeal, retropharyngeal palpation – swelling, lymph nodes, salivary glands, elicit cough
    vii) Percussion of sinuses

d) Oral examination
   i) Mucous membrane color – pink, hyperemic, red, purple
   ii) Capillary refill time (≤ 2 seconds)
   iii) Odor
      a) Purulent or necrotic odor
      b) Ammonia – rub roof of mouth and smell fingers, ammonia smell correlates with azotemia in ruminants (doesn't work in horses, why?)
   iv) Dental pad – ulcers
   v) Gingiva – hyperemia, toxic line, ulcers
   vi) Teeth
   vii) Tongue
   viii) Hard palate
   ix) Soft palate
   x) Papillae – color, shortening or blunting (BVD??)
e) Left side of the neck
   i) Integument
   ii) Pre-scapular lymph nodes – palpable in normal cattle
   iii) Jugular vein – size, patency, venous pulsations (abnormal if radiate to mandible), referred carotid arterial pulsations (visualized at thoracic inlet and up to 2/3 up the neck)
   iv) Trachea – palpation, auscultation of bronchial breath sounds, compression to elicit cough
f) Left forelimb
   i) Temperature
   ii) Pain, heat, swelling
   iii) Joints
   iv) Median arterial pulse palpation (simultaneously listen to the heart) – pulse rate, character, strength, rhythm, deficit
g) Left thorax
   i) Palpation of the cardiac area – locate the apex beat (~ 5^{th} intercostals space)
   ii) Auscultation of the heart; move from apex to base inch by inch
      a) Rate – normal, slow, fast
      b) Heart sounds – which ones (S1, S2, S3, S4), intensity, splitting
      c) Rhythm
         (1) normal sinus
         (2) regularly irregular
         (3) irregularly irregular
      d) Murmurs – systolic/diastolic, point of maximum intensity, grade (1 to 5), ejection (crescendo/decrescendo), regurgitant (steady holosystolic)
      e) Clicks, rubs
   iii) Auscultation of the lungs – breath sounds
      a) Normal lung field
         (1) See table 2 at end of notes
      b) Normal sounds
         (1) Bronchial – trachea and hilar area, large airways, full inspiration and expiration clearly heard

(2) Vesicular – Peripheral lung field, faint “whispy” full inspiratory and short expiratory sound
(3) Bronchovesicular – combination of bronchovesicular, full inspiratory and short expiratory phase

c) Abnormal (adventitious) breath sounds
(1) Increased intensity of normal breath sounds (harsh) – pulmonary consolidation
(2) Decreased intensity of normal breath sounds – pleural effusion, pneumothorax, pneumatocele
(3) Crackles – discontinuous explosive nonmusical sound, fluid in airways,
(a) low pitch – large airway
(b) high pitch – small airway
(c) friction rub – pleura
(4) Wheezes – musical sounds, collapsing or constricted airways
(a) low pitch
(b) high pitch
(c) stridor – upper airway obstruction

d) Percussion of the thorax
(1) Plexor/pleximeter
(2) Resonant sounds – aerated lung, pneumothorax, pneumatocele (bullae)
(3) Dull sounds – consolidation, pleural effusion, abscess, heart, abdominal viscera
(4) Pain response – pleuritis

iv) Brisket palpation – edema

h) Left side of the abdomen
i) Contour
ii) Auscultation – rumen activity
iii) Rumen contractions
a) Rate – 1-2/min
(1) Primary contractions (mixing)
(2) Secondary contractions (eructation)

iv) Palpation
a) Rumen consistency
b) Layers
(1) fiber
(2) fluid
(3) particulate
(4) gas

v) Simultaneous auscultation and percussion for pings
a) location, anatomical boundaries
b) outlines areas of gas

vi) Succession (auscultation and ballotment) – outlines areas of fluid and gas accumulation

vii) Magnet?? – check with compass

viii) Prefemoral lymph nodes – palpable in normal cow

i) Umbilicus – thickness, moisture (patent urachus?), discharge (omphalophlebitis?)
j) Left hind limb
    i) Temperature
    ii) Pain, heat, swelling
    iii) Joints
k) Udder and teats
    i) Appearance, temperature, symmetry, consistency
    ii) Appearance of milk
    iii) Suppramammary lymph nodes – size, consistency, temperature (not palpable in normal cows)
l) Vulvar mucous membranes – color, capillary refill time
m) Right hind limb (as for left hind limb)
n) Right side of the abdomen
    i) Contour
    ii) Auscultation – borborygmus
    iii) Simultaneous percussion and auscultation – location and anatomical boundary of pings
    iv) Succession – fluid and gas
    v) Palpation and ballotment of liver behind right costal arch
o) Right thorax
    i) Auscultation of lungs (as for left thorax)
    ii) Auscultation of heart
        a) As for left side
        b) Evaluate right AV valve region
p) Examination for abdominal or thoracic pain
    i) Sternal compression – upward compression just caudal to the xiphoid
        a) Left side – hardware disease
        b) Right side – abomasal ulcers, hepatic abscess
q) Right side of neck (as for left side)

r) Additional exams (if applicable)
    i) Milk
        a) Strip plate or back plate
        b) California Mastitis Test (CMT)
            (1) Number (somatic cell count assessment)

Negative (-)	Clear, milk-like	0-200,000 cells/ml
Trace	slightly streaky	150,000-500,000
1	Streaky	400,000-1,500,000
2	Slimy	800,000-5,000,000
3	Gelatinous	>5,000,000

(2) Color (pH assessment)
  (a) Light blue = -, normal pH
  (b) Dark blue = +, alkaline milk – reflects a depression in secretory activity as a result of drying off or inflammation
  (c) Yellow – Y, Acidic milk (pH $\leq$ 5.2), very rare observation and indicates fermentation of lactose by bacterial action within the gland
(3) Screening test for subclinical mastitis. It is of no real value if clinical mastitis is already determined by inflammation of the gland and abnormalities in the milk
(4) Normally elevated during first week of lactation
(5) Less useful in sheep and goats since they tend to have higher SCC in normal milk and they may not respond to subclinical infection with an elevated CMT test

c) Milk ketones

ii) Urinalysis
  a) Dipstick with ketones
  b) Specific gravity
  c) Sediment

iii) Rectal examination – systematic examination should identify the following:
  a) Rumen – size, consistency, motility, dorsal sack, ventral sack
  b) Left kidney $\pm$ ureter
  c) Mesenteric root
  d) Aorta and external ileac arteries
  e) Uterus, ovaries and cervix
  f) Urinary bladder
  g) Internal iliac lymph nodes
  h) Abnormal structures or abnormal location
    (1) Small intestine – right caudal quadrant, normally just a vague mushy feeling
    (2) Cecum – normally not identifiable unless displacement or torsion
    (3) Large intestine – descending colon only; spiral, ascending, and transverse colon normally not palpable
    (4) Abomasum – normally not palpable unless right side displacement or volvulus

Table 1: Normal TPR for Food Animal Species

Species	Temperature °F	Pulse/Heart Rate	Respiration Rate
Adult Bovine	100.5-102.5	40-80	12-36
Calf	101.5-103	100-140	30-60
Adult Sheep	102-103.4	60-120	12-70
Lamb	102.5-104	120-160	30-70
Adult Goat	101.5-103.5	70-110	15-40
Kid	102-104	120-160	40-65
Adult Llama	99.5-102	60-80	10-30
Pig	101-103	50-80	20-60

Table 2: Normal Lung Boundaries for Ruminants

Species	# Ribs	Tuber Coxae	Midthorax	Olecranon
Bovine	13	11	9	5
Sheep/Goat	13	11	8	5