

# Examining The Cow: The Bovine Physical Exam

<sup>1</sup>Bradford Smith and <sup>2</sup>John K. House

<sup>1</sup>School of Veterinary Medicine, University of California, Davis, USA

<sup>2</sup>University Veterinary Clinic Camden, University of Sydney, Australia

## Examining the Cow

Why revisit the clinical examination of the cow? Simply because the history and clinical examination puts the veterinarian on the right track toward the correct solution (diagnosis) or sends us down the wrong track. If the individual cow(s) being examined represent a herd problem, we may institute programs or make management changes based on the diagnosis arrived at. Thus, asking pertinent questions and being thorough pay off.

Clinical problem solving in its broadest sense consists of:

- Presenting complaint and signalment
- History
- Observation at a distance
- Observation of environment
- Physical exam
- Ancillary tests, if indicated
- Analysis of all components
- Developing a therapeutic plan
- Treatment of affected
- Implementation of preventative strategies
- Assessment of response to treatment
- Ongoing surveillance and assessment of management interventions

The **presenting complaint** indicates what the owner or herdsman thinks the problem is. Producers are often very astute and the information they provide can be useful in solving problems. Conversely the owner's perception may be misleading so it is important to perform a thorough examination before taking action. The presenting complaint also provides an indication of the clients' expectations from the veterinarian. To avoid misunderstanding it is worth clarifying the clients concerns if they are not immediately clear. It is important that the clients concerns are addressed even if it comes to pass that their perception of the problem is not consistent with the disease or production limiting problem. Consideration should also be given to the implications for the herd. Most producers are looking for means of preventing disease although they may not express this objective.

**Signalment** (age, breed, sex, use) is helpful for prioritizing differential diagnoses according to relative likelihood in the population described. For example a 6 year old cow is much more likely to have clinical leukosis due to BLV than is a 2 year old. Similarly clinical hypocalcemia is common in older dairy cows but extremely rare in heifers.

The **history** should be collected in an organized manner to be sure that key information is consistently gleaned. Key information includes information on diet, vaccinations, date of parturition, milk production, when the problem started, progression of the problem, morbidity, mortality, number of animals at risk, number of animals affected, demographics of the animals at risk and the animals affected. Information can be documented most efficiently if a form is used and information is written down in a systematic manner. More diagnoses are missed for not asking or looking than for not knowing. One case involving cows with botulism was helped when it was noted in the case history that the clients' dog had gone missing when they had put up the silage that was currently being fed.

**Observation from a distance** before the animal is restrained in a head gate, chute, or crush enables the examiner to assess gait, lameness, posture, mentation, herding instinct, and other behaviors such as appetite when feed is provided. Likewise, **observation of the environment** often gives important clues which need follow up. In a case with 16 dead 18 month old dairy heifers, we noted that their pasture bordered a cemetery. In the pasture near the cemetery was the remainder of a small pile of leaves (**Japanese Yew** *Taxus cuspidatus*).

## Physical Examination

The PE requires a systematic consistent approach to avoid missing abnormalities. When you have completed a PE, you should be able to answer any question about the animal (was the left eye normal, what did the hard palate look like, was the milk normal, etc). As with the history, it is important to **write down the findings**. Bovine veterinarians are not immune to the trend toward a litigious society. Adequate documentation protects your clients' interest and minimizes your own liability. For example, if a producer purchases feed contaminated with a toxic compound the insurance company for the feed mill will be reluctant to pay damages to the farmer unless causality is clearly established. Conversely, in the case of a herd health disaster, the veterinarian may become a target of litigation. Well-documented records provide for a strong defence in such cases, conversely poor records suggest a poor standard of practice.

When teaching veterinary students how to do a physical examination we find it helpful to use a form that provides a checklist for all areas of the physical examination. The process of using a checklist promotes a thorough systematic approach. We initially recommend students work through the form until they think they have developed a systematic approach. We then have them do the physical examination without looking at the form and fill the form out without re-looking at the cow. With experience, a good PE should take 10 to 20 minutes.

At the conclusion of the physical examination a **problem list** and **differential diagnosis list** for each problem should be outlined. During this process the diagnosis often becomes clear as it is consistent with each of the problems identified. If not, defining a problem and differential diagnosis list is useful as it helps to prioritize ancillary diagnostic investigations directing often limited funds to procedures that are most likely to be informative. The signalment, history, physical examination findings and results of ancillary diagnostic tests can usually be compiled to provide a definitive diagnosis. With those cases in which the diagnosis is not evident the tendency is to look toward the next diagnostic test to provide the answer. Another alternative that should always be considered is the possibility that something was overlooked during the course of the process. When in doubt it often pays to go back to the beginning and repeat the physical examination.

Factors that limit one's ability to perform an adequate PE include aggressiveness of the patient, restraint facilities, economics, willingness of the owner to pursue the problem, and the veterinarian's capabilities. The goal should be to not let the veterinarian's capabilities be the limiting factor.

We like to perform the hands on PE starting at the back end of the cow, placing the thermometer in the rectum and collecting urine from cows before they get too excited. From the back of the cow we work we move to the left side of the neck, moving caudally along the left side and then cranially on the right side examining the head, and then finishing with a rectal examination. The last two procedures may be performed in reverse order.

## Steps in Physical Exam

1. Body Condition Score / estimate or where possible measure body weight  
Score should be appropriate for state of lactation. Compare to herd mates in same string.
2. Body Shape / Stance  
From side – Arched back may indicate abdominal pain such as peritonitis or sore feet.  
From back –
  - Empty cow is gaunt – indicates poor appetite and non-obstructed GI tract.
  - Full abdomen is normal (remember to consider dietary history, if the owner reports the patient has not eaten for 2 days a “normal” appearance to the abdominal fill may be abnormal)
  - Distended abdomen with pear, apple, or papple shape indicates vagal indigestion. Rumen in this case will be liquid or liquid with gas cap.
3. Collect urine
  - Ruminants have alkaline urine, which often gives false positive or 1+ readings for protein on dipsticks.
  - Acid urine may indicate paradoxical aciduria.
  - Blood and protein may be observed in the urine of post partum cows reflecting contamination from the uterine lochia.
  - Urinary tract infections and pyelonephritis are often accompanied by a strong smell of ammonia, mucus, and pus.
4. Temperature  
Points to remember about the rectal temperature:
  - a. Neonates have poor thermoregulation and many neonates with sepsis do not have a fever.
  - b. Increased temperature can be due to:
    - Fever
    - High ambient temperature and no access to shade (heat stroke)
    - Exercise
    - Drugs such as sulfonamides, erythromycin, acepromazine
    - Ergopeptine alkaloid toxicosis (fescue infected with *Neotyphodium coenophidium* fungus, or rye grass infected with *Claviceps purpurea*)
    - Neoplasia (rare in cattle)
  - c. Decreased temperature
    - Hypoglycaemia in neonates
    - Shock due to toxemia or hypovolemia
    - Hypothermia (neonate or hypocalcaemia in adult)
  - d. Normal temperature but ill
    - Toxins
    - GI upsets or displacements
    - Blood loss
    - Metabolic disorders and deficiencies
5. Heart
  - Rate often elevated initially – recheck when cow calms down
  - Rhythm (atrial fibrillation is the most common arrhythmia in cattle)
  - Intensity – increased with anemia, decrease with hypocalcaemia, pericarditis, others
  - Murmur – congenital or endocarditis
  - Congestive heart failure – brisket oedema, distended jugular
  - Palpate the brisket for oedema

6. Hydration

Assess by skin turgor, eyes, nose and mouth, and urine specific gravity

- Can clinically detect over 5%
- Death occurs at 15%

7. Lymph nodes

Can normally palpate prescapular, prefemoral, deep inguinal, and sometimes supra-mammary.

8. Lungs

Use auscultation and percussion. Pathology must be severe to pick up auscultation abnormalities on adult cattle, but it is effective on calves. Percussion is also most effective on younger animals with thinner chest wall. Note the effort of breathing and the timing of respiratory noises. Inspiratory stridor is often associated with extra-thoracic lesions whereas expiratory dyspnea often reflects reduced compliance of the lung.

9. Percuss for left displaced abomasum (LDA)

Simultaneous percussion over the left flank and last three ribs may reveal a ping that indicates LDA. A ping is a metallic sound varying in pitch as the rumen contracts behind the gas filled abomasum, which is trapped between the rumen and body wall. There may also be gurgles and bubbles heard as gas moves into or out of the abomasum. Differentials include a rumen ping or gas cap on a body wall abscess.

10. Auscult, palpate, and percuss the rumen

There should be regular strong primary contractions. The rumen should be like bread dough dorsally and resilient liquid ventrally.

Percussing with a finger while listening with a stethoscope should not reveal boinks or pings. A boink is a high pitched monotone sound caused by gas in a viscus (the rumen in this case). A rumen boink extends from about the 10<sup>th</sup> rib to the hip. Check for anterior abdominal pain by applying pressure in the xiphoid region using a fist or knee. A grunt indicates pain (usually TRP, also perforated abomasal ulcers and other causes of peritonitis).

11. Mammary gland or male genitalia are palpated, and milk visually examined

In males, have urine cup handy and catch sample at this point.

12. Vulval mucous membranes

Look for pale or icteric membranes. Check for IPV lesions and vaginal discharge.

13. Auscult and percuss right side of abdomen for pings and boinks.

The spiral colon of sick cows frequently contains some gas and gives a roughly circular 20 cm area of boink centered high on the last rib. Don't make too much of this.

Caecal gas results in a boink that runs from right hip to under the ribs. If distended is often palpable per rectum.

RDA gives a boink or ping that may be variable in size but usually is audible on a line between the hip and the elbow on the 11<sup>th</sup> rib.

14. Examine the heart and thorax on the right side.

15. Examine the head.

- a. Is the nose clean and moist, or dry and dirty?
- b. Blood from nose?
- c. Restrain the head and look in eyes – check for scleral injection (toxaemia or uraemia), fibrin and WBC's in anterior chamber, corneal ulcers, tumours.
- d. Check mouth for lesions. Smell breath.
- e. Evaluate cranial nerves.

16. Check faeces and perform rectal exam

- Look for melaena, fibrin, blood
- Are they normal or is it diarrhoea? If diarrhoea, does it smell foul? If so, probably indicates inflammatory lesion leaking protein (most common is *Salmonella*).
- Are rectal examination findings compatible with rest of PE?

**Ancillary Tests**

Now consider whether you need ancillary tests to help with the diagnosis.

- CBC
- Chemistry and electrolyte panel
- Trace mineral panel
- Urinalysis
- Serology
- Faeces for culture, parasites, etc.
- Centesis and analysis of recovered fluid
- Tracheal aspirate
- Rumen pH
- Rumen chloride
- CSF
- Biopsy liver, kidney or a mass
- Aspirate mass for cytology or culture
- Ultrasound
- Endoscopy
- Radiology

Analyze results

Make a Therapeutic Plan and put it into action.

Implement preventative management plan

Assess response to treatment, alter plan as indicated.

Monitor incidence of new cases and or production response to management interventions