Ruminant Digestive Disorders
Based on Hoard’s Dairyman’s Feeding Guide, by Mike Hutjens, as well as World of Dairy Cattle Nutrition by Dr. Knowlton and Jill Nelson of the Holstein Foundation.

Metabolic disorders in dairy cows occur at varying rates on different farms, but all result in lost profitability. Ration adjustments, daily animal inspections, and a good VCPR (Veterinary Client Professional Relationship) can prevent many of these problems, but these problems can never be completely eliminated. The overall goal is to minimize the occurrence of these disorders as much as possible.

The following represent the most common feed-related health problems in dairy cattle. Remember that most metabolic disorders of a cow occur near or around calving. The weeks prior to calving to a month or two after represent the greatest risk and cows in these time frames should be monitored extra carefully.

**Acidosis - AKA: SARA (Subacute Rumen Acidosis)**
*Description:* when the pH (acidity) of the rumen drops below 6 for an extended period of time. The cow’s feed intake will decline, and her manure will be runny and very stinky (like spoiled raw chicken). Her milk fat percentage will drop below the milk protein percentage. Acidosis can be designated as Subclinical or Clinical. Subclinical is a pH between 5 and 5.5; Clinical Acidosis is more severe, and occurs when the pH is below 5. If the pH drops below 5, the cows will become dehydrated with sunken eyes. In this case, immediate veterinary care is needed.

*Prevention:* avoid including too much high energy feeds, too large of feed particles, and adding unsaturated oils. Adding sodium bicarbonate (baking soda) to the diet can raise the rumen pH. Increasing the amount of long forages (fiber) to increase saliva production can also help, as the saliva works as a buffer in the rumen. Do not practice slug feeding (feeding 5+ lbs. of grain per meal).

**Laminitis - AKA: Acidosis-Laminitis; Lameness; Founder**
*Description:* laminitis occurs when the blood vessels in the tissue of the hoof become inflamed and dilate. It can be caused by environmental and/or dietary factors. In dietary cases, if a) VFA production exceeds absorption, b) if rumen pH falls below 5.5, or c) if the blood vessels become inflamed due to a blood poisoning, the bone inside the hoof will swell. Because the hoof cannot expand, but the bone can, a cow can experience intense pain from this situation. Laminitis can be either Clinical or Subclinical; subclinical will be less serious but occur over a months-long period. Clinical laminitis will be severe and will occur abruptly, usually because of grain overload. Grain-overload usually also causes acidosis; as such acidosis and laminitis can be linked in some cases depending on the cause.

*Prevention:* same as rumen acidosis; also additions of zinc and copper to the diet can help, as deficiencies in these minerals can also cause lameness. Finally, the B Vitamin Biotin can work as a preventative measure.

**Bloat**
*Description:* gases routinely build up in the rumen due to fermentation, requiring the cow to belch frequently to release the gas. If gas is trapped in the rumen due to compaction, formation of foam, or an inability to belch (lack of eructation), the animal will become bloated and distended. Her left side will balloon, her breathing will be shallow and difficult, and death can occur in serious cases. A tube through the mouth into the rumen will evacuate the gases; mineral oil or other anti-foaming agents (such as propylene glycol) can eliminate the foam that traps gases.
Prevention: Legume-based pastures (e.g. soybeans and alfalfa) can increase the production of gaseous foam, in part due to the low saliva production that results from this diet. Slug feeding can also create gaseous foam (feeding 5 lbs. of grain per meal). If legume-based bloat occurs, gradually introduce animals to lush pasture. To minimize grain bloat, keep the grain consumed per serving to less than 5 lbs. Seek a veterinarian immediately for severe bloat. Some animals may develop chronic bloat (lifelong reoccurring bloat); culling should be considered in these cases.

Displaced Abomasum - AKA: Twisted Stomach, DA

Description: in up to 90% of these cases, the abomasum (fourth stomach chamber; the one most like our own stomach) will become inflated with gas and will move from the lower right side of the cow to the left side. In rare cases, the stomach will twist to the right, causing the stomach to completely twist and block the flow of food and blood. Immediate veterinary surgery is needed in this case. DA’s normally occur in the first month of lactation. A cow with a DA will have reduced feed and water intake, appears to be in pain or in discomfort, and may have dark streaks in their feces (which will be reduced). DA’s can be identified by ‘pinging’ the rib cage of a cow with a stethoscope. A normal cow will have a deep thudding sound, while a DA will produce a banjo-ish noise that can be heard with the stethoscope.

Prevention: keep the cow’s rumen full of feed by allowing constant access to forage. Avoid sudden increases in grain to avoid gas formation in the abomasum. In addition, hypocalcemia (milk fever) can reduce stomach movements, increasing the risk of a DA; calcium supplementation can help prevent hypocalcemia. Finally, a DA can be occur if there is nothing in the abomasum to digest; monitor cows that go off feed closely for a DA.

Ketosis - AKA: Acetonemia

Description: in a nutshell, ketosis is when high energy demands force a cow to break down bodily stores of fat too quickly. If too much fat is needed, the digestive tract will not be able to break it down efficiently, causing a byproduct called a ketone to form in the blood. These ketones will cause a cow’s breath to smell like nail-polish remover. The cow will appear thin, and milk production will drop. Ketosis can result from other conditions; this is called Secondary Ketosis and results when other disorders force a cow to utilize her reserves of fat. For example, if a cow had a DA and her feed intake dropped off during peak milk production, her body would have to break down fat to compensate for lowered energy intake. Primary Ketosis is when ketosis occurs only because of an increased breakdown of fat.

Prevention: cows with a high BCS are at the greatest risk for ketosis. As such, ensure that cows are not over-conditioned at the time of calving. Avoiding sudden feed ration changes and feeding the highest quality forage to newly calved cows will also help.

Hypocalcemia - AKA: Milk Fever, Parturient Paresis

Description: Hypocalcemia is simply when the bodily calcium levels of a cow drop too low. Calcium is needed for muscles to contract, and when there isn’t enough calcium, a cow will experience partial paralysis. This is simply due to the fact that her muscles cannot contract, not because of any nerve damage. Calcium levels in the body can drop rapidly before, during, and immediately after calving due to the increased bodily demands for the nutrient. Initially, a cow with low calcium will stagger or stumble, but as the situation progresses, she may not be able to stand up at all and will have a dopy, drugged appearance. Hypocalcemia can make a cow more susceptible to a DA due to reduced stomach contractions. Ketosis can also be an issue if a cow is off her feed. Despite the seriousness of this disease, which can end in death, it is very easy to treat; a simple IV of calcium will cause a complete turn-around in the cow’s health.
Prevention: avoid feeding excessive calcium during a cow’s dry period. If a cow has limited access to calcium before calving, her body will become better at utilizing the stores of calcium in her bones. Supplement large amounts of Vitamin D for three days before calving to help her body utilize calcium more efficiently. Feed a balanced mineral ration designed by a nutritionist that focuses on magnesium, potassium, phosphorus, and of course calcium. Adding anionic salts will reduce rates of milk fever as it helps a cow stores and utilize calcium more efficiently.

Grass Tetany - AKA: Hypomagnesia

Description: an animal that walks stiffly, appears disoriented, and/or convulses may have Grass Tetany, or low levels of bodily magnesium. Frequent urination and loss of appetite are other common symptoms. Treatment requires an injection of magnesium sulfate or Epsom salts under the skin.

Prevention: spring pastures are often low in magnesium. This is most common in wheat and rye that is heavily fertilized. Adding inorganic magnesium or supplying legumes such as alfalfa or soybeans will help as well.

Hardware Disease

Description: this is simply the consumption of a piece of metal such as a wire or nail. This material will settle into the reticulum due to its low location. Sharp metal objects can pierce the wall of the reticulum causing irritation and fluid leakage. Animals with this condition will stop eating and hunch their back to try to ease the pressure of the object. Body temperature may increase due to infection. Heart rate and breathing may be affected depending on where the puncture occurs and ends. The cow’s manure may have tarry streaks if internal bleeding occurs. She will not respond to a withers pinch due to the pain in her abdomen. If a cow has not received one already, she can be treated with an orally-given magnet, which will trap metal objects and prevent them from migrating into the rest of the digestive tract.

Prevention: efforts to keep metal out of feed troughs are of vital importance. A magnetic bar in feed processing equipment can also aid in prevention.

Excessive Fiber - AKA: Poopin’ Bricks

Description: see AKA. Basically a cow consumes too much fiber, causing her feces to lose its normal consistency. This can result in anal blockage (compacted bowels) and digestive obstruction. A suppository or stool softener can help her pass her feces.

Prevention: work with a nutritionist in order to avoid diets that are too high in fiber.

Johnne’s Disease (pronounced YO-neez) - AKA: Chronic Enteritis

Description: Infection and swelling of the intestinal tract prevents the absorption of water and nutrients into the blood. A cow slowly starves to death with a stomach full of food. Johnne’s is spread by manure-contamination of food and water. The feces of the cow will look like green-ish brown hot water. This disease is can be thought of as highly severe diarrhea with no cure.

Prevention: remove all infected cows asap. Prevent the introduction of fecal matter into feed and water. Separate calves from cows within 24 hours of birth.
Ruminant Digestive Disorders

Name: __________________________________________

1. Define acidosis: ____________________________________________________________________________________

2. What is the difference between clinical and subclinical acidosis? __________________________________________

3. What type of actions can make acidosis more likely to occur? ______________________________________________

4. What is slug feeding? ________________________________________________________________________________

5. What is laminitis? ___________________________________________________________________________________

6. What is the difference between clinical and subclinical laminitis? __________________________________________

7. Which is more likely to be linked to acidosis, clinical or subclinical laminitis? Why? __________________________

8. What is bloat? _______________________________________________________________________________________

9. What causes bloat? ___________________________________________________________________________________

10. What are three ways in which an animal with bloat can be treated? __________________________________________

11. What is an abomasum? ______________________________________________________________________________

12. What is a Displaced Abomasum (DA)? __________________________________________________________________
13. What causes a DA? 

14. How do you identify a DA? 

15. Why would a cow that is off feed be more prone to a DA? 

16. What is ketosis? 

17. What is the underlying cause of ketosis? 

18. What is the difference between primary and secondary ketosis? 

19. How can ketosis be prevented? 

20. What is hypocalcemia? 

   a. How does a nutritional disorder cause partial paralysis in a cow? Isn’t paralysis related to the nervous system? 

21. Why are DAs and ketosis more common when a cow has hypocalcemia? 

22. What are four things that a producer could do to prevent hypocalcemia? (2 pts)
23. What is grass tetany?

24. How is grass tetany similar to milk fever?

25. What is hardware disease?

26. What is the treatment for hardware disease?

27. Excess fiber in the diet can cause what problem?

28. What is Johnne’s Disease?

29. Why would a cow with Johnne’s look like they are starving if they have been eating constantly?

30. A cow is brought to you with a high temperature, a pinging abomasum, breath that smells like nail-polish remover, and she does not respond to a withers pinch. Her manure is streaked but solid, she is responsive, and she is able to stand and move but with noticeable pain and discomfort. What is your diagnosis or diagnoses?