

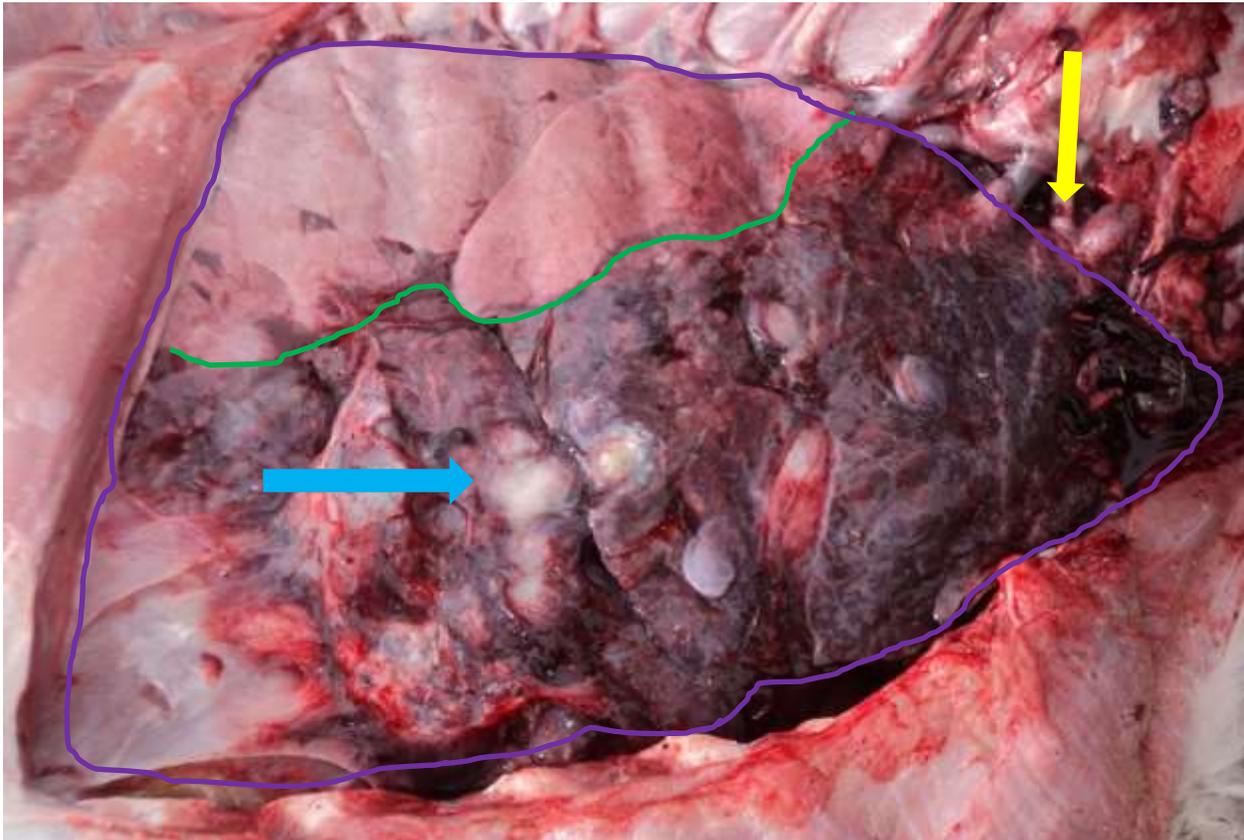
It is a cold fall day in Sagebrush County, NM. Clouds threaten snow as you and Dr. Tietbaum arrive at Smith Bison Ranch. You are met at the truck by the two sisters who own and operate the ranch – Barbara and Florence Smith – they ask you to call them Buffy and Flo. The sisters are really worried. They have been noticing some of their adult cows losing condition and seeming less active. This morning they were stunned to find a cow dead. They called Dr. Tietbaum for help. You all drive out to the corrals and working facilities where the sisters have corralled 11 bison. On the drive out to the ranch Doc had warned you that bison are unpredictable and dangerous to work with. As you start pushing these up to the chute however, you can see they really are quite sick. All eleven of the cows are acting tired and breathing hard, and five of them are lame. Dr. Tietbaum examines each cow in the chute while he visits with the Smith sisters about these cows and the ranch in general. After inheriting the ranch from their father, the sisters decided to raise bison instead of cattle. Until this episode, they have been quite successful, growing their herd to 60 head of breeding cows. They buy only certified healthy bulls for breeding purposes. They raise their own replacement heifers, but three weeks ago they bought twelve bison cows from out of state to add to their herd. They had not yet introduced these new cows into the herd, and are glad because these 11 Doc is examining plus the one that died are the new cows.

Dr. Tietbaum takes the temperature of each bison. The highest temp is 105.6 F. Convert this to degrees Celcius.

- a. 40.8 C
 - b. 90.6 C
 - c. 158.1 C
 - d. 37.8 C
-
1. Doc uses his stethoscope to listen to the heart and lungs of each cow. He listens to one cow's heart for 15 seconds. He counts 9 heart beats. What is the heart rate of this cow?
 - a. 3 bpm
 - b. 12 bpm
 - c. 36 bpm
 - d. 45 bpm

 2. Doc is done with the exam and wants to disinfect his stethoscope and thermometer. He uses a dilute solution of cleaner to do this. You made a gallon of the cleaner up earlier by following Docs directions to use 5 ml of concentrate per 1 L of water. How many ml of concentrate did you use to make a gallon of cleaner?
 - a. 5
 - b. 9
 - c. 19
 - d. 30

Doc tells the sisters he has a good idea what is going on, but he wants to do a necropsy on the dead cow to see if he is on the right track. You and Dr. Tietbaum carry necropsy equipment out to the dead cow and get to work. You get into the thorax and see an ugly sight in the lungs. Here is what you saw.



The cow was laying on her left side with her head pointing to the right of the picture. Dr. Tietbaum explains that most of what is in the picture is lung tissue (circled in purple). The problem is that only the soft pink colored tissue above the green line is healthy, functional lung. The lung below the green line is consolidated and no longer functioning as lung. The yellow arrow is pointing to adhesions where the inflammatory processes have glued the lungs to the chest wall. The blue arrow points to a large abscess. There are several other abscesses visible. Doc cuts into some of these abscesses.

3. One of the abscess lesions above is $2\frac{1}{2}$ inches in diameter. How big is this in cm?
 - a. About 1.0 cm
 - b. About 2.5 cm
 - c. About 6.25 cm
 - d. About 8.75 cm



This is caseous necrosis (translated it means cheesy like rotten tissue). The yellow stuff should not be there.

Dr. Tietbaum is ready to make his field diagnosis and let you start doing some math. Doc tells Buffy and Flo that their bison are suffering with a severe respiratory infection that he believes is caused by a bacteria called *Mycoplasma bovis*. This is bad news because *M. bovis* is hard to treat, and many of the cows are in advanced stages of infection. The bacterium often affects cattle and causes respiratory disease and sets up the abscesses seen in the pictures. In addition, it can also cause arthritis (joint inflammation), and disseminate (scatter around) to other tissues in the body. Mycoplasma is a unique bacterium in that it does not have a cell wall. Many of the antibiotics we commonly use (such as Penicillin and Ceftiofur) attack the cell wall of bacteria. By not having a cell wall, Mycoplasma is unaffected by these antibiotics. Fortunately a newer generation antibiotic called Draxxin (tulathromycin) is in the macrolide class which inhibits protein synthesis and stops bacterial growth. Doc decides to treat all the bison cows with Draxxin at the cattle dose of 2.5 mg/kg SQ. The concentration of is 100 mg/ml. Flo volunteers that all of the cows uniformly weigh about 900 pounds.

4. How much do the cows weigh in kg?
 - a. 410 kg
 - b. 1980 kg
 - c. 900 kg
 - d. 675 kg

5. How many mg of Draxxin will each of these bison cows require?
 - a. 900 mg
 - b. 1025 mg
 - c. 164 mg
 - d. 2.5 mg

6. How many ml will be given?
 - a. 100
 - b. 22.5
 - c. 10.2
 - d. 2.5

7. How will the drug be given?
 - a. By injection in the muscles.
 - b. By bolus in the mouth.
 - c. By injection into a vein.
 - d. By injection under the skin.

8. Doc tells Buffy and Flo that the prognosis is poor and to expect a final death loss up to 75%. How many of the original 12 bison would die at this percent death loss?
 - a. 3
 - b. 6
 - c. 8
 - d. 9

9. The Draxxin is expensive stuff. A 100 ml vial will cost Dr. Tietbaum \$435.00. How much would Doc have to charge per ml just to break even?

- a. \$0.04 per ml
 - b. \$0.44 per ml
 - c. \$4.35 per ml
 - d. \$43.55 per ml
10. If an entire vial of the drug will be used, Dr. Tietbaum charges by the vial instead of by the ml. He has to be able to make a profit and be able to replace the drug in his stocks, so he charges a 5% mark up on each 100 ml vial. How much does he charge per vial?
- a. \$500.00
 - b. \$477.25
 - c. \$456.75
 - d. \$440.50
11. How many total ml of Draxxin were injected into the 11 surviving bison?
- a. 10.2 ml
 - b. 200.4 ml
 - c. 112.2 ml
 - d. 12.1 ml
12. It took more than one vial to treat these bison. How much Draxxin is pulled from the second vial?
- a. 2.2 ml
 - b. 10.2 ml
 - c. 12.2 ml
 - d. None
13. Dr. Tietbaum will charge by the ml for the amount used from the second vial at the same rate as the per bottle price. How much will Dr. Tietbaum charge for this extra amount?
- a. \$55.75
 - b. \$53.07
 - c. \$46.61
 - d. \$44.37
14. What is the total cost of the visit, exams and treatments if Dr. Tietbaum charges \$60.00 for the farm visit, \$10.00 exam fee per bison, and \$75.00 necropsy fee? Don't forget the Draxxin.
- a. \$701.75

- b. \$757.50
- c. \$961.75
- d. \$1,235.25

15. What fraction of the charges are pharmaceuticals?

- a. 1/3
- b. 1/2
- c. 2/3
- d. 3/4

As you drive away from the Smith Bison Ranch you ask Dr. Tiebaum how much profit he will see out of this visit. He tells you to figure it up as he estimates charges. He tells you to remember to take into account all the costs he endured on the visit as follows - replacement of the Draxxin (he tells you to figure that up), vehicle costs (wear and tear, fuel) \$20.00, used supplies (needles and syringes, etc) \$10.00, lab submissions \$45.00.

16. How much profit will Doc realize form this visit?

- a. \$535.50
- b. \$476.35
- c. 259.78
- d. \$194.43

Another question occurs to you. If the Draxxin was so expensive, why did the Smith sisters agree to use it? Dr. Tietbaum reminds you that the old standby antibiotics, which may be much cheaper, simply do not work against Mycoplasma. He adds that the Draxxin only has to be dosed once, and with bison that is very good, because the more they are stressed, the sicker they will become. He looks over and smiles and adds that each bison is worth quite a bit. He tells you that the latest numbers he saw said that a buffalo carcass is worth \$3.88/lb. It is worth it to the Smith sisters to save these breeding cows that will raise calves for slaughter.

17. If a carcass dresses out at 60% how much will a 700 pound slaughter animal dress out in pounds?

- a. 600 lb
- b. 540 lb
- c. 420 lb
- d. 360 lb

18. How much will this carcass be worth?

- a. \$760.58
- b. \$954.73
- c. \$1629.96
- d. \$1843.24

In the days that follow, Dr. Tietbaum gets lab results back confirming his diagnosis. He calls the bison ranch and is pleased to hear that he was wrong about the death rate. As it turns out just three more of the cows died.

19. What was the total percent of bison that died?

- a. 3%
- b. 12.5%
- c. 25%
- d. 50%