

**VMD 413. Veterinary Food Safety — Spring, 2006**  
**Final Examination (80 total points)**

1. On average, approximately what percentage of U.S. **disposable income** is spent for food? (2 pts)  
**10%**
2. On average, do we **spend more for food** via food service or retail establishments? (2 pts)  
**retail**
3. What **U.S. agency** is the source of most of our information about the occurrence of foodborne disease in this country? (2 pts)  
**Centers for Disease Control and Prevention, CDC**
4. What does one call a foodborne disease that results from inability to produce a normal **digestive enzyme**? (2 pts)  
**intolerance**
5. If **secondary cases** are noted during investigation of a foodborne outbreak, what type of disease must this be? (2 pts)  
**infection**
6. What frequent agent of foodborne disease can also cause **gas gangrene** in animals and humans? (2 pts)  
***Clostridium perfringens***
7. Among outbreaks of foodborne disease, why are those caused by **hepatitis A virus** especially difficult to investigate? (2 pts)  
**Incubation period is 4 weeks.**
8. Which bacterium can produce, in food, a toxin that is **not destroyed by boiling**? (2 pts)  
**staph, *Staphylococcus aureus***
9. What is the most likely food vehicle of **anisakids**? (2 pts)  
**marine fish (& squid)**
10. What food, important in developing countries, presents a significant threat of **cyanide poisoning**? (2 pts)  
**cassava (manioc)**

11. How has the BSE outbreak affected the U.S. **blood supply**? (2 pts)  
**People who stayed certain periods of time in the U.K. or Europe are disqualified as blood donors.**
12. What is the **normal function** of PrP<sup>C</sup>? (2 pts)  
**unknown**
13. Compare the **mode of transmission** of BSE with that of CWD. (3 pts)  
**BSE is transmitted to cattle by ingestion of risk materials from other cattle, whereas CWD is apparently transmitted via soil contaminated with feces of infected cervids.**
14. Name two ways in which disease agents may be **transmitted by air**. (2 pts)  
**spores, in aerosols, on dust**
15. Name two bacteria, potentially foodborne pathogens that **persist in soil as spores**. (4 pts)  
*Bacillus anthracis, Clostridium botulinum*
16. What is the principal control measure used to prevent trichinellosis in **commercially reared U.S. swine**? (2 pts)  
**cooking garbage that is fed to swine**
17. Name two zoonoses that are particularly associated with **poultry on the farm**. (2 pts each)  
*Campylobacter jejuni, Salmonella enterica*
18. True or False (1pt each):  
    **F**     Most infectious agents are not adapted to body temperature (~37°C).  
    **T**     Psychrotrophic bacteria can grow at refrigeration temperatures.  
    **F**     The minimum water activity ( $a_w$ ) for molds is higher than that for bacteria.  
  
    **T**     Mold growth can *raise* pH of acid food.  
    **F**     *Clostridium botulinum* is a strict aerobe.
19. How does *Staphylococcus aureus* compare with *Clostridium botulinum* in terms of competing with other microflora that co-exist in an ecosystem? (2 pts)  
  
***Staphylococcus aureus* is a poor competitor with background flora. *Clostridium botulinum* does not seem to be subject to this constraint (i.e., indigenous bacteria are not known to prevent botulinum toxin formation, assuming that conditions are anaerobic).**
20. What term is applied to *E. coli* O157:H7 detected in raw ground beef in the U.S.? (2 pts)  
**illegal adulterant**
21. Why might the term “EHEC” be preferred to just *E. coli* O157:H7? (2 pts)  
**Other serotypes of *E. coli* can cause enterohemorrhagic disease.**

22. Why can the term *E. coli* not be substituted for EHEC? (2 pts)  
**The vast majority of *E. coli* are normal flora (rather than disease agents) in the intestines of warm-blooded animals.**
23. Which foodborne disease agents are typically killed by **freezing**? (2 pts)  
**parasites, protozoa**
24. Why is the **internal temperature of food** higher in retorting than in baking, even though chamber temperature is higher in baking? (4 pts)  
**Baked goods undergo evaporative cooling, whereas a retort contains steam under pressure, which prevents evaporation from the product.**
25. What process is used to make **raisins** from California grapes? (2 pts)  
**air drying (in the open)**
26. List the types of foods for which the following two agencies mandate HACCP. (2pts)  
a. USDA: **Meat and poultry products**  
b. FDA: **Seafood and fruit juices**
27. How is the basis of HACCP different from that of traditional inspection (2 pts).  
**The basis of HACCP is “process control” rather than inspection of the final product or “product control.”**
28. Risk analysis has three phases. HACCP is part of which phase? (1pt)  
**Risk management**
29. What is the purpose of a risk assessment? (2 pts)  
**Decide on the likelihood (probability) of occurrence of a hazard and its severity.**
30. FDA and USDA generally require that food processors use “**potable water**”; what agency defines that term? (2 pts)  
**Environmental Protection Agency, EPA**
31. Which federal agency controls **shell eggs** (but not egg products)? (2 pts)  
**Food and Drug Administration, FDA**
32. Which federal guide addresses regulation of **food service and retailing**? (3 pts)  
**FDA Food Code**
33. What is the likelihood that milk will contain an **allergen**? (2 pts)  
**100% (casein)**
34. Name two zoonotic bacteria that present a significant risk in **raw cow's milk** at this time. (4 pts)  
**Campylobacter spp., EHEC, Salmonella spp.**

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**SUBSTITUTE Second Quiz (20 total points)**

2. Name two zoonotic agents that have been known to contaminate food via food animal **manure**. (2 pts)  
*Campylobacter, Cryptosporidium, E. coli O157, Salmonella, Yersinia, etc.*
2. Name a **human-specific** agent that has contaminated food via feces in water. (2 pts)  
*Cryptosporidium hominis, Cyclospora cayetanensis, hepatitis A virus, norovirus, Shigella, etc.*
3. What two potentially foodborne zoonoses have been almost completely controlled at the **farm level**? (2 pts)  
*Brucella spp., Mycobacterium bovis*
4. What system that is intended to control the **intestinal microflora** is represented by Nurmi feeding fecal extracts to chicks or by people taking *Lactobacillus* cultures? (2 pts)  
**competitive exclusion**
5. List two factors that impact the **fates of bacteria in foods**. (2pts)  
**temperature, water activity, pH, E<sub>h</sub>, nutrient availability, competing microorganisms, antimicrobial substances, etc.**
6. Name one **psychrotrophic** pathogen that was considered in this course. (2 pts)  
*Listeria monocytogenes, Yersinia enterocolitica, nonproteolytic Clostridium botulinum*
7. At what stage of their lives are cattle most likely to shed large quantities of *Cryptosporidium parvum* oocysts? (2 pts)  
**as young calves**
8. To what **pathogenic group** does *E. coli* O157:H7 belong? (2 pts)  
**EHEC**
9. Name a food, **not of animal origin**, that has served as a vehicle in an *E. coli* O157:H7 outbreak. (2 pts)  
**apple juice, lettuce, salad sprouts**
10. What syndrome, sometimes caused by *E. coli* O157:H7, is especially likely to affect **young children**? (2 pts)  
**HUS, hemolytic uremic syndrome**