

## 2017 ACVPM Environmental Health Essay Questions

**Note:** For all answers, proper spelling, punctuation, and grammar is expected. Your responses must be clear and accurate using complete sentences. Answer each question as completely but as concisely as possible.

In 2009, The Lancet and University College London's Institute for Global Health named climate change the biggest global health threat of the 21<sup>st</sup> century, and an intergovernmental panel report in 2016 stated that climate change 'threatens to undermine the last half century of gains in development and global health.' According to the report and widespread scientific consensus, the burning of fossil fuels is directly linked to the observed increase in global temperatures observed over the past century.

### **Environmental Health Essay Question 1 (of 5) - 2 Points**

The World Health Organization estimates that 7 million people die annually from exposure to air pollution, of which pollution from fossil fuel combustion plays the largest role. In a sentence, list three of the top causes of death attributed to air pollution.

### **Environmental Health Essay Question 2 (of 5) - 3 Points**

Describe three indirect impacts of climate change on human health, and the populations expected to be most affected by each respective impact. Do not include the impacts mentioned in question 1.

### **Environmental Health Essay Question 3 (of 5) - 5 Points**

Extraction and transport of fossil fuels is also associated with risks to human, animal, and environmental health. Large losses of livestock have been reported from farms exposed to hydraulic fracturing operations, and the Environmental Protection Agency has identified five stages of the hydraulic fracturing process that can impact water resources. Concisely describe two effects of hydraulic fracturing processes and how they can adversely impact livestock health.

### **Environmental Health Essay Question 4 (of 5) - 6 Points**

Climate change impacts on wildlife have already been significant and well-documented. Choose one wildlife species or wildlife genus and briefly describe how it has been impacted by climate change. Include in your answer how changing temperature or carbon levels precipitated the impacts, and if the species is anticipated to adapt in any way.

### **Environmental Health Essay Question 5 (of 5) - 4 Points**

According to the Pipeline and Hazards Materials Safety Administration, over 9,000

'significant' oil spills and accidents have been reported in the United States in the last 30 years from oil pipelines. You are in charge of overseeing occupational health of volunteers assigned to oil spill clean-up. They will be directly handling and cleaning the crude oil off the wild ducks and raccoons that have been affected at the most recent spill of crude oil on the Yellowstone River. Write a **brief** statement to the team describing a physical, chemical and biological occupational hazard involved with their duties and an associated prevention strategy to mitigate each hazard.

## 2017 ACVPM Epidemiology and Biostatistics Essay Exam

**Note:** For all answers, proper spelling, punctuation, and grammar is expected. Your responses must be clear and accurate using complete sentences. Answer each question as completely but as concisely as possible. For questions that require short or numerical answers different guidance may be included with the specific question.

### Epidemiology and Biostatistics Essay Question 1 (of 12) - 1 Point

You're a veterinary epidemiologist and dairy farm specialist working with a large dairy farm client. On a routine visit, your client complains about mastitis in the herd, and claims that that his older cows don't seem to do well after calving. Your client has noticed that he treats older cows (2<sup>nd</sup> parity or greater) more frequently for mastitis in the first 3 weeks post-calving compared to first-calf heifers (1<sup>st</sup> parity). He provides treatment records for 20 recent calvings with complete records through (at least) the first 3 weeks of the lactation (see attachment). The treatment date indicates the first day of the first episode of mastitis for the lactation. Name (no calculation necessary) the appropriate epidemiologic measure that quantifies the risk of mastitis within the first 3 weeks of lactation?

### Attachment - Epidemiology and Biostatistics Essay Questions 1 - 4 Background:

You're a veterinary epidemiologist and dairy farm specialist working with a large dairy farm. On a routine visit, your dairy farm client complains about mastitis in the herd, and claims that that his older cows don't seem to do well after calving. Your client has noticed that he treats older cows (2<sup>nd</sup> parity or greater) more frequently for mastitis in the first 3 weeks post-calving compared to cows. He provides treatment records for 20 recent calvings with complete records through (at least) the first 3 weeks of the lactation. The treatment date indicates the first day of the first episode of mastitis for the lactation.

Obs. No.	Cow ID	Calving date	Treated for Mastitis?	1 <sup>st</sup> Treatment date for Mastitis	No. Days lactating prior to treatment	Parity No.
1	3	1/3/2017	No			1
2	13	1/15/2017	Yes	1/21/2017	6	1
3	1	1/26/2017	No			1
4	5	2/14/2017	Yes	2/25/2017	11	1
5	11	3/4/2017	No			1
6	20	1/26/2017	Yes	3/2/2017	35	1
7	7	1/29/2017	No			2
8	2	2/15/2017	No			2
9	8	2/15/2017	No			2
10	4	2/22/2017	Yes	3/13/2017	19	2
11	17	2/23/2017	No			2
12	12	3/3/2017	Yes	3/13/2017	10	2
13	10	1/9/2017	Yes	1/29/2017	20	3
14	6	1/18/2017	No			3
15	19	1/23/2017	Yes	2/17/2017	25	3
16	18	1/29/2017	No			3
17	9	1/2/2017	Yes	1/20/2017	18	4
18	15	1/17/2017	No			4

19	16	2/18/2017	Yes	4/8/2017	49	5
20	14	3/3/2017	No			5

**Epidemiology and Biostatistics Essay Question 2 (of 12) - 1 Point**

Based on the dataset provided by your dairy farmer client, calculate the risk of mastitis within the first 21 days of lactation for all 20 cows in the dataset. Round to the nearest hundredth. The dataset and background from Question 1 are within the attachment.

**Epidemiology and Biostatistics Essay Question 3 (of 12) - 1 Point**

The same dairy producer is concerned that older cows (2<sup>nd</sup> lactation or greater) are more susceptible to mastitis relative to 1<sup>st</sup> lactation cows. Provide the name (no calculation) for the appropriate measure of association between the risk of mastitis in the first three weeks and lactation number (2nd lactation or greater vs. 1<sup>st</sup> lactation).

**Epidemiology and Biostatistics Essay Question 4 (of 12) - 1 Point**

Calculate the appropriate measure of association between the risk of mastitis in the first three weeks and lactation no. (older cows ( $\geq$  2nd lactation) vs. younger cows (1<sup>st</sup> lactation)). Then, use a single sentence to communicate the measure to the producer.

**Epidemiology and Biostatistics Essay Question 5 (of 12) - 1 Point**

Your dairy producer provides a snapshot of data on milk fat composition from a random selection of 7 cattle. The data are included below, with basic descriptive statistics. The upper and lower 95% confidence intervals are reported here. Please write a single sentence that appropriately interprets the meaning of the 95% confidence intervals for this population.

Milk Fat (raw values)		Descriptive Statistics	
3.2		Std. Deviation	0.60
3.5		Mean	3.99
3.5		Upper 95% CI	4.54
4		Lower 95% CI	3.43
4.4		Median	4
4.5			
4.8			

**Epidemiology and Biostatistics Essay Question 6 (of 12) - 1 Point**

The confidence intervals are interpreted appropriately only if the data follow a normal (Gaussian) distribution. Do the values appear to be normally distributed? In 1 or 2 sentences, identify the characteristics of the data values and/or descriptive

statistics that suggest that the data are/are not normally distributed.

Milk Fat (raw values)		Descriptive Statistics	
3.2		Std. Deviation	0.60
3.5		Mean	3.99
3.5		Upper 95% CI	4.54
4		Lower 95% CI	3.42
4.4		Median	4
4.5			
4.8			

### **Epidemiology and Biostatistics Essay Question 7 (of 12) - 1 Point**

In one or two sentences, identify two characteristics of a continuous normally distributed variable that influence the width of the 95% confidence intervals, and explain how changes in each increase or decrease the width of the confidence interval.

### **Epidemiology and Biostatistics Essay Question 8 (of 12) - 2 Points**

Your dairy farm client is considering a control program for Johne's disease, and you would like to estimate the prevalence of seropositivity for Johne's disease in this large herd without sampling the entire herd. You need to calculate the required number of cows to for a reasonable estimate of the prevalence. In 1-3 sentences, explain which two values, in general, influence the required sample size for prevalence estimation? In other words, if you were to use the standard equation to calculate the sample size to estimate a prevalence, what two assumed values would be necessary to complete the equation? For this question, assume an infinitely large population of dairy cows, and ignore the non-uniform distribution of disease and imperfect test sensitivity and specificity.)

### **Epidemiology and Biostatistics Essay Question 9 (of 12) - 2 Points**

Johne's seropositivity is not uniformly distributed across the herd; rather, age is an important risk factor. You want to ensure that all lactation (i.e. age) groups are equally represented in your sample. What type of random sampling would you use? Briefly (<4 sentences) describe the steps necessary to implement the identified type of random selection.

### **Epidemiology and Biostatistics Essay Question 10 (of 12) - 2 Points**

On your dairy farm, an intramammary ceftiofur product is used according to label to treat cases of mastitis, and a 72-hour milk withhold is required to avoid violative levels of residues. Shipment of milk contaminated with violative levels of residues carries severe financial penalties, so your producer wants to apply a cow-side test to determine if the milk from a cow that underwent treatment should be sold or

discarded.

A recent manuscript ((Journal of Dairy Science [2015, 98(9):6270-6277])) estimated the sensitivity and specificity of the Beta-Star plus assay for detecting ceftiofur residues. Liquid chromatography-tandem mass spectrometry analysis (LC-MS) with a FDA violative residue level threshold of  $\geq 100$  ppb was used as the gold standard. When dairy cows were tested at the first milking after the product-labeled milk withhold, the Beta-Star plus assay's sensitivity and specificity were 100% and 79.5%, respectively, for identifying violative levels of ceftiofur residues.

In 2-4 sentences, identify the diagnostic test characteristic that is most critical to reducing the risk of antimicrobial residues, explain how this test characteristic is calculated in this context, and explain why this test characteristic is more critical than other test characteristic(s).

### **Epidemiology and Biostatistics Essay Question 11 (of 12) - 2 Points**

False positives from the Beta-star test would result in unnecessary wastage of milk that could have been sold for human consumption. In the study mentioned in question 10, the proportion of cows with violative levels (based on the gold standard LC-MS) after the recommended milk withhold was 2.2%. Recall that the Beta-Star plus assay's sensitivity and specificity were 100% and 79.5%, respectively, for identifying violative levels of ceftiofur residues. Assuming cows are selected for testing in a similar manner and this proportion holds, what percentage of Beta-Star positive cows would unnecessarily have their milked milk dumped? Provide a brief explanation (2-3 sentences) of how this value is calculated.

### **Epidemiology and Biostatistics Essay Question 12 (of 12) - 5 Points**

You are the social media manager for the National Milk Producers Federation (NMPF). In an effort to highlight the safety of conventional milk, you've just posted on the NMPF Facebook page a link to the recent report from the National Milk Drug Residue Database. A page from this report is attached. This appears to have backfired, however, as a growing number of comments on your post express concern about the large number (429) of residue-positive tanker loads of milk arriving at commercial non-organic processing plants. Commenters on the site frequently advocate for the relative safety and nutritional value of raw milk. The number of comments demands a response to allay public fears.

Write a Facebook post that uses data from the report (attachment) and sound principles of risk communication to communicate the risks of raw and conventional milk to the commenters. The post should have an introduction, argument, and conclusion.

[Note: this essay has a limit of 1300 characters (including spaces) (~180 words)]

**Attachment - Epidemiology and Biostatistics Essay Question 12, Milk Residues Table:**

<b>TABLE 1 -- Sample Results October 1, 2013 to September 30, 2014</b>				
<b>Source of Sample</b>	<b>Total Samples</b>	<b>Number Positive</b>	<b>Percent Positive</b>	<b>Disposition per PMO (Pounds)</b>
<b>Bulk Milk Pickup Tanker</b>	3,147,302	429	0.014%	17,754,000
<b>Pasteurized Fluid Milk and Milk Products</b>	37,707	0	0.000%	0
<b>Producer</b>	445,223	266	0.060%	240,000
<b>Other</b>	49,953	8	0.016%	99,000
<b>TOTALS</b>	3,680,185	703	*	18,093,000

1. Bulk Milk Pickup Tanker - bulk raw milk from a dairy farm.
2. Pasteurized Fluid Milk and Milk Products - after pasteurization; finished product in package form or bulk. This term includes milk products such as milk, cream, condensed and dry milk and milk products, and condensed and dry whey and whey products.
3. Producer - raw milk obtained from the bulk tank/silo from a dairy farm. Samples are reported by the permitting State, rather than by the analyzing State.
4. Other - milk from milk plant tank/silos, milk transport tankers, etc.
5. The **DISPOSITION per PMO** column represents the amount of milk contained in the tank or lot found to be positive and disposed of in accordance with the PMO and/or applicable State regulations.

## 2017 ACVPM Food Safety Essay Questions

**Note:** For all answers, proper spelling, punctuation, and grammar is expected. Your responses must be clear and accurate using complete sentences. Answer each question as completely but as concisely as possible.

### **Food Safety Essay Question 1 (of 5) - 10 Points**

AquAdvantage Salmon, a Genetically Engineered (GE) Atlantic salmon that reaches market size faster than its non-GE Atlantic salmon counterpart, received Food and Drug Administration approval in November 2015. Consumers in your area have raised questions regarding the safety of genetically engineered (or genetically modified) animals. Prepare a fact sheet that addresses the following topics and questions: a) Define a genetically engineered or modified animal and identify which federal agency has regulatory authority over such animals; b) Describe two areas or issues that a pre-approval safety assessment would focus on before a genetically engineered food animal would be allowed to be marketed; and c) Describe one factor federal authorities use to determine that genetically engineered foods are safe to consume.

### **Food Safety Essay Question 2 (of 5) - 1 Point**

A recent food recall resulted from a bakery product potentially containing milk and soy not listed on the label. Define and discuss the potential health risk associated with undeclared ingredients.

### **Food Safety Essay Question 3 (of 5) - 3 Points**

Describe the difference between Food Safety, Food Defense, and Food Security and the role of the preventive medicine veterinarian in each one.

### **Food Safety Essay Question 4 (of 5) - 2 Points**

The Food and Drug Administration and Environmental Protection Agency provided recommendations for pregnant women eating fish and fish products. Discuss the primary food safety hazard of concern associated with pregnant women eating fish and fish products. Include information on the body system that is most at risk from this hazard.

### **Food Safety Essay Question 5 (of 5) - 4 Points**

In May 2016, the American Veterinary Medical Association published a Food and Drug Administration (FDA) update regarding the "Safety Alert on Jerky Treats for Pets", referencing issues first identified in 2007 with dogs consuming jerky treats made in China. An extensive investigation and testing of the products did not identify any toxins or contaminants, but sporadic cases continue to occur. A hallmark of the investigation has been the unexpected occurrence of cases of

acquired Fanconi syndrome (also called Fanconi-like syndrome). Describe (a) the occurrence and presentation (signs and symptoms) of acquired Fanconi syndrome; (b) one recommendation you could make to a concerned pet owner regarding jerky treats; and (c) what action you should take when, as an attending veterinarian, you are presented with a dog with a history of vomiting, lethargy and anorexia, coupled with a history of consumption of chicken jerky treats.

## **2017 ACVPM Infectious and Parasitic Diseases Essay Questions**

**Note:** For all answers, proper spelling, punctuation, and grammar is expected. Your responses must be clear and accurate using complete sentences. Answer each question as completely but as concisely as possible.

### **Infectious and Parasitic Diseases Essay Question 1 (of 7) - 3 Points**

The World Organization for Animal Health (OIE) serves several roles for infectious and parasitic disease management in member countries. Please describe three of the six OIE mission areas including one function that OIE performs for each.

### **Infectious and Parasitic Diseases Essay Question 2 (of 7) - 2 Points**

African swine fever outbreaks were reported by several eastern European countries in 2016. Describe two mechanisms of transmission for this disease.

### **Infectious and Parasitic Diseases Essay Question 3 (of 7) - 2 Points**

A Foot and Mouth Disease (FMD) outbreak was reported in Russia in the fall of 2016. Russia followed procedures commonly applied by most countries to control and contain the outbreak. Briefly describe four primary methods that are used to prevent spread of this disease.

### **Infectious and Parasitic Diseases Essay Question 4 (of 7) - 2 Points**

Bulgaria reported an outbreak of Exotic Newcastle Disease (END) to OIE in the winter of 2016. The causative agent is Avian paramyxovirus serotype 1 (APMV-1). To be diagnosed and reportable as END, APMV-1 must meet one of two virulence criteria. Describe the two criteria used in laboratory differentiation of END from less pathogenic strains.

### **Infectious and Parasitic Diseases Essay Question 5 (of 7) - 2 Points**

Bluetongue (BT) outbreaks were reported by Croatia and France. Both countries followed OIE immediate notification procedures in 2016. BT occurred in the United States, but the disease was reported semi-annually only as “present” or “absent”. Describe the difference in the European outbreaks that might explain why the U.S. did not need to immediately notify the international community of BT outbreaks in 2016. Describe the primary means of transmission in ruminants.

### **Infectious and Parasitic Diseases Essay Question 6 (of 7) - 2 Points**

African Horse Sickness was identified in Mozambique in 2016. Describe the primary control method for outbreaks of this disease, as well as one secondary method.

### **Infectious and Parasitic Diseases Essay Question 7 (of 7) - 7 Points**

Highly pathogenic avian influenza (HPAI) was reported in multiple countries in

2015-16, and the United States experienced outbreaks resulting in eradication of nearly 50 million birds. You have been asked to address HPAI at a community meeting where members of the poultry industry and public who own pet and back yard poultry are concerned about the news reports. Prepare a concise summary of your presentation to be distributed to the audience. In your summary, discuss four measures that can be implemented to prevent HPAI in back yard poultry and pet birds, and discuss four risks and mitigations related to the health of poultry owners and workers. Because you have a relatively short time on the agenda you will need to triage the most critical messages into a summary providing a clear introduction to the issue, accurate and unbiased information, and a concluding statement.

## **2017 ACVPM Public Health Administration and Education Essay Questions**

**Note:** For all answers, proper spelling, punctuation, and grammar is expected. Your responses must be clear and accurate using complete sentences. Answer each question as completely but as concisely as possible.

### **Attachment – Public Health Administration and Education Questions 1-7**

**Background:**

On September 29, 2016, a biologist at the National Key Deer Refuge contacted the Florida Department of Agriculture and Consumer Services, Division of Animal Industry regarding an increased incidence of myiasis in Key Deer on Big Pine Key. Key Deer are a subspecies of White-tailed deer, and are federally listed as endangered. The Division of Animal Industry immediately initiated a Foreign Animal Disease (FAD) Investigation. Deer were euthanized due to severe infestation and samples submitted as part of the FAD investigation. (Background for Questions 1-7)

**Public Health Administration and Education Essay Question 1 (of 9) - 1 Point**  
Name the federal laboratory that provides regulatory confirmation of this Foreign Animal Disease.

**Public Health Administration and Education Essay Question 2 (of 9) - 1 Point**  
The background from Question 1 is within the attachment.  
In what city and state do you find the federal laboratory that provides regulatory confirmation of this Foreign Animal Disease?

**Public Health Administration and Education Essay Question 3 (of 9) - 1 Point**  
The background from Question 1 is within the attachment.  
Name the federal agency that oversees the federal laboratory that provides regulatory confirmation of this Foreign Animal Disease.

**Public Health Administration and Education Essay Question 4 (of 9) - 1 Point**  
The background from Question 1 is within the attachment.  
Samples were confirmed as New World Screwworm. Name the genus and species of this organism.

**Public Health Administration and Education Essay Question 5 (of 9) - 1 Point**  
The background from Question 1 is within the attachment.  
Besides deer, what are the hosts for New World Screwworm? Is it a zoonotic disease?

**Public Health Administration and Education Essay Question 6 (of 9) - 3**

**Points**

The background from Question 1 is within the attachment.

Describe the life cycle of New World Screwworm. Include all stage and information about the host/parasite interaction.

**Public Health Administration and Education Essay Question 7 (of 9) - 7****Points**

The background from Question 1 is within the attachment.

You are the Florida State Veterinarian. As a result of confirming this Foreign Animal Disease, you direct an incident response. Your team develops an Incident Action Plan. Outline 5 incident objectives for the response.

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**Background for Public Health Administration and Education Questions 8-9:**

On Friday, July 29, 2016, the Florida Department of Health confirmed the country's first local transmissions of the Zika virus in four individuals in Miami-Dade and Broward counties.

**Public Health Administration and Education Essay Question 8 (of 9) - 2****Points**

What are the two known vectors of Zika virus in the Americas - provide genus and species?

**Public Health Administration and Education Essay Question 9 (of 9) - 3****Points**

You are a county public health official in Florida about to address a community who is concerned about vector control methods after hearing about the local transmissions of the Zika virus in Miami-Dade and Broward counties. Among the available tools for these two Zika virus vector species, prepare a statement that supports two specific mosquito control methods the county could use to prevent human cases.