Question 1  5 points
A cohort study of smoking and lung cancer was conducted in a small island population. There were a total of 1,000 people in the study, and the study was conducted over a ten year period. Four hundred were smokers and 600 were not. Of the smokers, fifty developed lung cancer. Of the non-smokers, 10 developed lung cancer. In order to measure the strength of association between smoking and lung cancer in this population, which measure of exposure-disease association would you use?

☐ A. Risk ratio
☐ B. Risk difference
☐ C. Odds ratio
☐ D. Attack rate

Question 2  5 points
In the previous cohort study examining the association between smoking and lung cancer, suppose the risk ratio = 17. How would you interpret this relative risk in words?

☐ A. There were 17 more cases of lung cancer in the smokers.
☐ B. Smokers had 17% more lung cancers compared to non-smokers.
☐ C. Smokers had 17 times the risk of lung cancer compared to non-smokers.
☐ D. 17% of the lung cancers in smokers were due to smoking.

Question 3  5 points
A cohort study of smoking and lung cancer was conducted in a small island population. There were a total of 1,000 people in the study, and the study was conducted over a ten year period. Four hundred were smokers and 600 were not. Of the smokers, fifty developed lung cancer. Of the non-smokers, 10 developed lung cancer.

Calculate the risk ratio in this study to one decimal place and enter your numeric answer.

Question 4  5 points
In this cohort study on the association between smoking and lung cancer, what measure of association would you use if you wanted to emphasize the public health impact of smoking?

☐ A. Risk ratio
☐ B. Risk difference (attributable risk)
☐ C. Cumulative incidence
☐ D. Prevalence
☐ E. Rate ratio
### Question 5
**Calculate the risk difference for the island study on smoking.**

- A. 7.5
- B. 108 per 1,000 population over a ten year period
- C. 0.108 per 1,000
- D. 0.125 per 1,000
- E. 0.017 per 1,000

### Question 6
**If the risk difference in the cohort study on smoking and lung cancer had been 69 per 1,000 population over a ten year period, how would you interpret this result in words?**

- A. If smoking is a cause of lung cancer, then 69 cases of lung cancer will occur in a ten-year period.
- B. If smoking is a cause of lung cancer, then 69 cases of lung cancer will occur in a ten-year period in a population of 1,000 smokers.
- C. Smokers have 69 times more cancer than non-smokers over a 10 year period.
- D. If smoking is a cause of lung cancer, then smoking caused 69 excess cases of lung cancer in a ten-year period in a population of 1,000 smokers.

### Question 7
**What is the attributable proportion among the exposed for the island study on smoking?**

Round your answer to the nearest whole % and enter just the number, e.g., if the answer is 14%, just enter 14.

### Question 8
**Suppose that in the cohort study on smoking and lung cancer, the attributable proportion among the exposed had been 79%. Which of the following would be the best interpretation of this result?**

- A. Smokers have 79% more lung cancer.
- B. Non-smokers have 79% less lung cancer.
- C. 79% of all lung cancers in the population are attributable to smoking.
- D. 79% of the lung cancers occurring in smokers can be attributed to their smoking.

### Question 9
**Using the information for the island study on smoking above, calculate the population attributable fraction. Express your answer as a percentage, and round off your answer to the nearest whole number (e.g. 0.17 = 17%, so enter 17).**

### Question 10
**A pharmacist noticed an increase in the sale of anti-diarrhea medications and contacted the local Department of Public Health. An investigation revealed that most of**
those who developed diarrhea had attended a wedding the previous weekend. After interviewing those who had attended the wedding, the investigators believed that a cream sauce used in the pasta may have been the source of the outbreak. There were 332 people at the wedding. Of the 285 who chose pasta, 197 became ill, while only 8 of those who did not eat pasta became ill. What is the value of the appropriate measure of association?

- A. 1.0
- B. 4.06
- C. 0.83
- D. None of the above

**Question 11**

A cohort study of alcohol use and academic performance was conducted in an undergraduate student population over 3 years. There were 2,000 students in the study. Of the 1,450 who drank alcohol, 872 displayed significantly reduced academic performance on standardized tests. Of the 550 students who didn't drink alcohol, 124 showed reduced academic performance on standardized tests. What is the risk ratio in this study for drinkers compared to non-drinkers?

- A. 2.67
- B. 1.0
- C. 1.77
- D. 0.37

**Question 12**

What is the risk difference for the above study?

- A. 0.376
- B. 376
- C. -0.376
- D. 376 per 1000
- E. 376 per 1000 over 3 years

**Question 13**

D'Souza et al. conducted a study on the association between human papillomavirus and oropharyngeal cancer (N Engl J Med 2007;356:1944-56). They identified 100 patients with newly diagnosed squamous-cell carcinomas of the head and neck in Baltimore from 2000 through 2005. The comparison group consisted of 200 patients without a history of cancer who were seen for benign conditions between 2000 and 2005 in the same clinic. All patients completed a computer-assisted self-administered interview that recorded information about demographic characteristics, past oral hygiene, medical history, family history of cancer, lifetime sexual behaviors, and lifetime history of marijuana, tobacco, and alcohol use. Part of their results focused on the association between oral hygiene and oropharyngeal cancer, as shown in the table.

To answer this question use the data table (DSouza_Table.JPG) from the article by D'Souza et al. (N Engl J Med 2007;356:1944-56) looking at a possible association.
between human papillomavirus and oropharyngeal cancer.

Why is the odds ratio for tooth loss 1.0 for subjects with no tooth loss?

A. On average, these subjects were missing one tooth.
B. This was the reference group against which the other two groups were compared.
C. The group that had no missing teeth had one subject with oropharyngeal cancer.
D. All categories had an increased risk of oropharyngeal cancer, but it was lowest for the group with no missing teeth.

Question 14 5 points
Using the same data table, which of the following is the best interpretation of the odds ratio of 5.4 for those who did not brush their teeth every day?

A. Oropharyngeal cancer occurred in 5.4% of those who did not brush their teeth daily.
B. The prevalence of not brushing among people with oropharyngeal cancer was 5.4%.
C. The prevalence of not brushing among people without oropharyngeal cancer was 5.4%.
D. Subjects who did not brush their teeth on a daily basis had 5.4 times the risk of oropharyngeal cancer compared to those who brushed daily.

Question 15 5 points

Aspirin and other non-steroidal anti-inflammatory drugs (NSAIDS) have been shown to be associated with a decreased risk of colorectal cancer, but their chronic use is associated with complications and side effects. The statins drugs reduce serum cholesterol levels and reduce the risk of cardiovascular disease, and they are now widely used. Some evidence suggested that statins might also be effective in reducing the risk of colorectal cancer, but the studies were small and inconclusive.

Health care coverage in Israel is mandated and is provided by four groups similar to HMOs. Their computerized records were used to identify all cases of colorectal cancer within a well defined geographic area in northern Israel for a six-year period from 1998 to 2004. Subjects without colorectal cancer were identified by the same mechanism, and they were matched to the colorectal cancer patients year of birth, gender, primary clinic location, and ethnic group (Jewish vs. non-Jewish). Potential subjects in the comparison group were excluded if they had a history of colorectal cancer.

“Participants were interviewed to obtain demographic information and information about their personal and family history of cancer, reproductive history, medical history, medication use, and health habits; they also completed a dietary questionnaire. Diagnoses of colorectal cancer were confirmed by means of a standardized pathological review by one pathologist.”
“Participants were asked to recall each medication they had used for at least five years, and statin use was determined on the basis of this list. The information gathered included dose, duration of use, and indication for use.”

The table (see link to Statin_Table. JPG) from the article on statins and colorectal cancer also suggests that there are differences in vegetable consumption between subjects with colorectal cancer and those who do not have cancer. Using subjects with low vegetable consumption as the reference group, what is the odds ratio for high vegetable consumption? Which number is closest to the odds ratio?

Statin_Table.jpg

- A. 0.68
- B. 1.47
- C. 0.82
- D. 1.22
- E. 0.28

Question 16 5 points

From the CDC’s MMWR (Morbidity and Mortality Weekly Report, Jan. 13, 2006): In May 2004 MA DPH investigated an outbreak of gastrointestinal illness among students in grades 1-6 who ate lunch at a school in Suffolk County. Symptoms included nausea, headache, abdominal cramps, fatigue, dizziness, and vomiting. The investigation focused on 187 students who ate in the school cafeteria, 36 of whom became ill shortly after lunch. Fajitas were among the suspected foods. Among the ill students, 17 had eaten fajitas. Among the students who did not become ill, 25 had eaten fajitas.

Calculate the appropriate measure of association that focuses on the strength of the association using the subjects who ate fajitas as the “exposed” group, and use the subjects who did not eat fajitas as the “unexposed group. Round your answer to the nearest tenth and submit the number.

Question 17 5 points


From 1994 to 1999 a study was conducted to identify nutritional and lifestyle behaviors associated with survival in Greek adults. A total of 28,572 participants, 20 to 86 years old, were recruited from all regions of Greece. One goal was to study the extent to which close adherence to a traditional Mediterranean (Greek) diet was associated with survival, but the investigators also examined a number of other potential risk factors. After enrollment (i.e. at the baseline or beginning of the study), subjects completed extensive questionnaires administered in person by specially trained interviewers. The dietary questionnaire documented food intake during the past year using a semi-
quantitative food-frequency questionnaire that included 150 foods and beverages commonly consumed in Greece. Adherence to the traditional Mediterranean diet was assessed by a 10-point Mediterranean-diet scale. Some of the results are shown in the table included here.

Low diet scores (0-3) indicated poor adherence to the Greek diet; scores of 4-5 indicated moderate adherence, and scores of 6-9 indicated close (high) adherence to the Greek diet. Using men with poor (low) diet scores as the reference group, calculate incidence rates to 5 decimal places, and then calculate the rate ratio for men with a high degree of adherence compared to men with low adherence. Round your answer to two decimal places and submit your numeric answer online in the quiz.

MediterraneanDiet_Table.jpg

Question 18 5 points
Based on the study above on the effects of adherence to a Mediterranean diet compute the rate difference per 10,000 person-yrs. of close (high) adherence to the Mediterranean diet versus poor (low) adherence. Over the course of one year, how many lives would be saved by convincing 10,000 Greek men with poor adherence to switch to a Mediterranean diet and adhere to it to a high degree? (Round your answer to the nearest whole number of men.)

Question 19 5 points
A stroke prevention task force is trying to identify risk factors that, if modified by public health prevention programs, would have the greatest impact on reducing the incidence of stroke in the study population. There is disagreement among the task force about whether the number of strokes in the overall population would be reduced more by eliminating alcohol or smoking. The following information is available to you about alcohol abuse and smoking as risk factors.

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Risk of stroke in exposed (/100000)</th>
<th>Risk of stroke in unexposed (/100000)</th>
<th>Proportion of cases exposed in the population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol abuse</td>
<td>107</td>
<td>43</td>
<td>0.21</td>
</tr>
<tr>
<td>Smoking</td>
<td>90</td>
<td>60</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Compute the population attributable fraction for alcohol abuse and also for smoking in order to determine which risk factor, if modified, would have the greatest impact on reducing stroke in the study population. Modification of which risk factor would have the greatest impact in preventing stroke?

☐ A. Elimination of alcohol would have the greatest impact
☐ B. Elimination of smoking would have the greatest impact
<table>
<thead>
<tr>
<th>Question 20</th>
<th>5 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>If a cohort study is conducted to assess the association between an exposure and an outcome, but there is no association at all, what would the value of the attributable proportion in the exposed be?</td>
<td></td>
</tr>
</tbody>
</table>

- C. The impact would be equal
- D. This can't be determined from the information given here.