

CPH573A Project 2
Critical review of an Epidemiological Paper
Instructions

Completing an appropriate paper critique is emphasized in Epi573A because it is **applying** all the information you are supposed to be learning in this course. Additionally as Healthcare and Public Health Professionals, you will be put into situations in which:

- (1) you must determine whether new information is to be believed (our field is not static but constantly being updated with new information – does this information have credence?), and
- (2) you will be asked to review journal submissions to determine if the material is appropriate for publishing, or
- (3) reviewing grant applications and determining whether the study as written is appropriate to fund.

The questions you are being asked are the same questions you should be asking yourself each time you read a published article in your field. The responses provide the criteria you can use to determine if you “believe” the results.

IMPORTANT: You actually need to answer the question(s) asked.

Sometimes you write a lot – but never get around to giving specific answers to the question asked.

Sometimes you write too much. You start out correctly stating the response but then keep writing statements that are not correct. This approach hurts your score.

Project #2 is your OWN work; your work is your gain.

Plagiarism software is enabled in the D2L dropbox, and scores will be detrimentally affected.

CPH573A

Project 2: **Critical review of an epidemiological paper**

Due Date: **Sunday, November 1st, 2015; 10:59 pm AZ time**

% of final grade: 10% (100 points of 1,000)

Assignment: Write a critique of one of the following epidemiological research articles.

- Inflammatory potential of diet and risk of colorectal cancer: a case-control study from Italy (**Inflammatory Diet**)
- Effect of Tai Chi on Physical Function, Fall Rates and Quality of Life Among Older Stroke Survivors (**Tai Chi**)
- Association of Nut consumption with Total and Cause-Specific Mortality (**Nuts**)
- The Association between Dietary Intake of Folate and Physical Activity with Psychological Dimensions of Depressive Symptoms among Students from Iran (**Folate & Activity**)

A copy of each paper is available on the D2L course site in the Project 2 module. Please pick the one that sounds the most interesting to you.

Instructions:

- **Critique may be no more than 3 pages. Font size must be at least 11 point. Page margins must be at least 5 point.**
- **Each of the following items/questions listed below should be addressed in the critique.**
- **Use a question/answer format, numbering the answers without including the questions** – (In other words, *do not use an essay format in which you write an overall critique and we may or may not be able to discern where the answers to the questions are within the various paragraphs*).

Specific questions to address and point distribution:

a. Following directions: (5 points) Name your file: YourLastName First Initial Project 2 Topic.doc (e.g. FooteJ Project 2 Nuts.doc) and include your name and the topic of the paper as a header.

Each of the following items/questions should be addressed in the critique:

1. **What is the purpose of the research? Is there a specific hypothesis being tested? 6 pts**
[Hint 1: your answer should include a sentence that begins "The purpose of this research was " and/or one that begins "The specific hypothesis tested by this research was... "]
[Hint 2: if a measure of association was calculated, the authors were testing a hypothesis whether it was stated or not]
2. **What do the authors say the study design is? 4 pts**
3. **What do you say the study design is? 4 pts**
4. **What are the details of the methodology that support your answer to question 3? 6 pts**
5. **Is the design appropriate for the research purpose? Why? 6 pts**
[Hint 1: go back to the study design lectures. Which types of designs are good for which situations?]
[Hint 2: just because a study design is well suited to a particular situation (i.e. case control for rare outcomes) does not mean that it is necessarily a poor choice when that situation does not apply (i.e. the outcome is common)]
6. **Describe the target population. 6 pts**
[Hint: Target population refers to the general group from which the study subjects are drawn, and are meant to represent. In other words, to which group can you generalize the results?] [Hint: If this was done in a particular location include that as part of the description of the target population only if you think that the relationship between exposure and outcome in this group is likely to be different from the relationship you would see in other locations. Explain why you think this.]
7. **What are the inclusion/exclusion criteria for subjects? 6 pts**
[Hint: Be very specific. I should be able to reconstruct correctly who would or would not be in the study group from your answer]
[Hint: If this was a case-control study was there matching? and if so what characteristics were matched?]
8. **How are subjects recruited? 5 pts**
[Hint: where did the subjects come from (clinic, community, etc) and how were they asked to be in the study (during a doctor visit, radio ads, etc.)]

9. What are the definitions of disease (or outcome)? 5 pts

[Hint 1: if everyone in the study has a particular disease then that disease is neither the outcome nor is it the exposure.]

[Hint 2: discuss the methods that were used to determine whether the potential cases should be included, e.g. histologic confirmation or standardized diagnostic criteria.]

10. What are the definitions of exposure? 5 pts

[Hint: be sure to include what the exposure(s) were and how they were measured]

11. What are potential sources of bias in this study? 9 pts For each bias, name the bias, describe how this bias would happen in this particular study, describe how the bias would affect the measure of association (towards the null, away from the null, or that it could go either way). If the bias could affect the measure of association in either direction, describe what determines which way it will go. You can give a scenario that will drive the measure of association toward the null and another that will move it away from the null. For each bias, describe whether the authors address this issue and how. It is typically to be able to identify a couple of potential biases (authors often note) and it is important to indicate clearly how the bias you note may affect the study findings. Use the format shown in this example:

Bias name: Recall bias

How it takes place in this study: Because the cases were interviewed immediately after the outcome and the controls were interviewed ten years later, the cases would be better able to recall the exposure than the controls.

Effect on the measure of association: Recall bias will make the exposure and outcome appear to be more strongly related than they are - the measure of association will be higher than it should be.

Why: The exposed cases will be more likely to remember that they had been exposed than the exposed controls.

Authors response: The authors did not address the issue of recall bias.

[Hint: go back and look at where the study subjects came from and the exclusion criteria did these introduce bias? Note that issues of generalizability don't belong in this section see Question 16 for those]

12. What are the measures of association discussed in this paper? 5 pts

[Hint: "measure of association" is in the course glossary]

13. Were these measures of association appropriate to this study design? 6 pts

[Hint: when they looked at whether the exposure was associated with the disease, how did they measure that? Also, if this was a matched case-control study, did they use matched analysis? Cox proportional hazards and hazard ratios are similar to Risk Ratios but are accounting for the effect of time or survival in the models along with any included covariates. Depending on how the study was set up, the interpretation for HRs are similar to RR, where greater than 1 is increasing risk and less than 1 is protective.]

14. What were the results of the study? 6 pts

[Hint: give a succinct summary of the findings of the study – the abstract will be useful for this]

[Hint: you should include in your answer the measure of association they found - with confidence intervals, if any]

15. Are there alternate explanations for the results? 5 pts

[Hint: go back and consider whether bias could explain the results or, if a lack of results, how about sample size?]

16. What do you think are the strengths and weaknesses of this paper? 8 pts

[Hint: Think about the material covered in the lectures on interpreting results. Think about

generalizability. You should be able to note both strengths and weaknesses, we all have them].

17. Are the conclusions justified by the data presented? 3 pts

[Hint: think about your answers to questions 15 & 16. You need to clearly explain why you answered the way that you did].

Although *Basic Epidemiology* does not require that you have had Biostatistics, when completing critiques you are assessing the statistical approach used and whether the approach was suitable for the outcomes. Below is a brief overview of statistical tests that are not directly covered in this course:

A quick blurb from 222.whatisseries.co.uk:

A **Cox model** is a **statistical technique** for exploring the relationship between the **survival** of a patient and several explanatory variables.

Survival analysis is concerned with studying the time between entry to a study and a subsequent event (such as death).

A Cox model provides **an estimate of the treatment effect on survival** after **adjustment** for other explanatory variables. In addition, it allows us to estimate the hazard (or risk) of death for an individual, given their prognostic variables.

A Cox model must be fitted using an appropriate computer program (such as SAS, STATA or SPSS). The final model from a **Cox regression analysis** will yield an equation for the hazard as a function of several explanatory variables.

Interpreting the Cox model involves examining the coefficients for each explanatory variable. A **positive regression coefficient** for an explanatory variable means that the hazard is higher, and thus the prognosis worse. Conversely, a **negative regression coefficient** implies a better prognosis for patients with higher values of that variable.

Additional notes:

Regression analysis is a statistical approach to estimating relationship between an outcome (dependent variable) and one or more predictors/factors (independent variables). Typically the equation for the line of the association would be reported (including β of the constant where the line crosses the axis, a coefficient for each predictor/factor with a t statistic and subsequent probability of that predictor compared to the t statistic [p value] and the 95% confidence interval. There is also a probability given for the overall model which compares to an F statistic (Anova and regression analyses use F tests instead of t-tests as these are assessing the ratio of variance between two different population variances. For our purposes, it is sufficient to know that the probability is being compared to an appropriate statistic - F or t - to assess potential statistical significance.

ANOVA – analysis of variance, or MANOVA – multiple analysis of variance is a statistical approach to assessing whether means differ between groups. A probability is calculated and compared to an F-test (similar thinking as a t statistic as previously mentioned).