Critiquing a Paper

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.

1. What is the purpose of the research? Is there a specific hypothesis being tested?

You should be able to provide a one-sentence, test-able statement of the specific purpose of the study. You should be able to pull out and note the primary hypothesis [If X then Z will occur; or if *what is done* then *what will happen*] and secondary hypothesis to the article.

2. What do the authors say the study design is?

You may need to read carefully. Sometimes the "design" is only given in the abstract, but typically the methods, or approximately the last line of the introduction or first line of the discussion specifically state the study design. Without properly identifying the study design, you will have no way of knowing whether the appropriate analysis approach was used.

Many of you continue to have problems recognizing the different types of study designs, using the appropriate terminology for study design aspects, and understanding the advantages and disadvantages of the various design types.

"Prospective" means assessments are taken at point A in time (can be repeated) and outcomes occur hours/days/months/years following the assessments. If death is the outcome – unless you exhume a body – you cannot go back and measure a physical attribute. (As Captain Jack would say "dead men tell no tales…" – they cannot "recall" information).

"Retrospective" means asking someone to "recall" what they ate or what they did hours/days/months/years before (such as "how many sunburns did you have as a child?...as a teen?" "How often did your family go out for fast food when you were a child?"). This is a common approach in case-control studies in which one is trying to determine whether something like "sunburns" or "eating a high fat diet" or "use of antidepressants" appears to alter risk of a specific disease such as melanoma or breast cancer etc..

By this time, you should have a good understanding of the different study designs. This list is a very simplified guide:

- Ecological or correlational studies
    - Compare disease rates with per capita consumption of specific food components or something similar
- Cross-sectional or prevalence studies
    - "Snapshot" of a population – comparing physical activity, dietary intake, disease, other variables in a population at one time
- Cohort studies
    - A group of people are followed over time to see who develops a particular disease or condition and what risks they have been exposed to
- Case-control studies
    - Comparing a group with a disease with a group that does not have it
- Controlled trials
    - Compare intervention group with or "usual care" (or comparison) group

3. What do you say the study design is?

Did the authors really carry out the study in a way that meets the design that was stated.

4. What are the details of the methodology that support your answer to question 3?

Note the question – "details" - What clued you in that the study was a prospective cohort or randomized controlled intervention trial or case control? You need to state what was done that makes the study design what you identified as the study design.
Your terminology should also be appropriate for clarity. (Note: If a population was selected to be randomly assigned to an intervention, you don't suddenly have "cases" vs "controls". You should have two different "arms" – an "intervention" vs a "comparison" or "usual care" group.)

5. Is the design appropriate for the research purpose? Why?

Again, why was the design chosen – what is the study design's advantages that made the investigators select this study design. What are the disadvantages of the design? You should be aware that a randomized, controlled intervention trial is considered the "gold standard" (best approach) to determine if a particular intervention has efficacy. If it is possible to complete a randomized controlled trial, you would not want to substitute a "lessor" study design (one more subject to bias and in which the statistical approaches are not considered as reliable).

6. Describe the target population?

To whom will the study results be generalizable? Again, you need to be specific unless the authors really did study the "general population". Factors such as health, free-living, cognition, residence, age, are important to note if related to those who may benefit from knowing results.

7. What are the inclusion/exclusion criteria for subjects?

Details are important as they alter the generalizability along with how important (relevant) you may feel are the results of the study. If investigators studied the effects of texting while driving but only included adults over the age of 65 years, you may not think those results would be very important to publish as you may have severe doubts that a significant proportion of adults older than 65 years actually text – or that any potential "impairment" found in this group's driving is simply due to the texting – and not other issues such as declining reflexes, eyesight, attention, focus, skills, etc.. However, if the study examined 20 to 40 year olds you may feel the results are highly important to publish quickly. Again, in your careers you are going to be asked to review articles and grant proposals and provide an estimate of how "innovative" and "important" the investigation is to your field.

8. How are subjects recruited?

Details are important as they provide the indication that the study appropriately reflects the target community and generalizability. If one is selecting "cases" – how was "case" (disease) defined and the diagnosis confirmed (or was it?). How were "matches" determined – and did the matching appear to work (table 1 study population characteristics)? Most physicians do not typically sit down and write letters to recruit participants. Other study staff review records and then give a "potential list" to the Physician, who is asked to indicate whether or not each individual can be contacted. And yes, many potential participants are lost at this point because some physicians don't get the time to review the records so their patients aren't recruited. But for those that do indicate specific patients can be recruited, study staff write a letter (approved by IRB) that the physician then signs so it can be sent. Yes, participation might be greater if Physicians directly asked patients to participate during annual physicals but the physician may have limited time, often does not remember to ask (even when provided brochures), and some appropriate patients may not get their annual physical during the recruitment period. Every approach has its challenges.

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

What are the investigators examining, specifically?

10. What are the definitions of exposure?

What factor (exposure) are the investigators examining that they expect to change the outcome?

11. What are potential sources of bias in this study?

Review chapter 10 if you are still having problems. Don't just make up a name for the bias, but be specific as to what kind of bias it is. You need to state how this bias might be occurring in the

study. You need to say how the bias might alter the measure of association i.e. does it shift it towards the null – showing no association, or shift it away from null – making the association seem stronger than it really is.

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

Measures of associations are the statistical approaches one is using to determine the strength (if any) of the relationship being examined.

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

What is it about the study design that make the measures of association used appropriate (or not) ?

14. What were the results of the study?

Be specific giving the details of the findings. Just saying "confidence interval" is not the same as providing the 95% confidence interval such as 0.98 to 1.41 in your answer. Also note that if you see a confidence interval that looks like that (0.98, 1.41) – this interval passes through 1.0 meaning you can't say it is different than 1.0 so not significant.

15. Are there alternate explanations for the results?

Again, need to be specific about any factors that may alter effects that the authors may not have considered. However, if used sub-analyses and other approaches to try and show that these other factors did not effect results, then you should mention these.

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

Again, you should be able to provide specific elements that make the study strong, appropriate etc. (this goes along with knowing what are the advantages and disadvantages of the different study designs).
Likewise, should be able to state what were the weaknesses – drawbacks of the approach.

17. Are the conclusions justified by the data presented?

Give specific details as to why you feel the authors came to the correct conclusion(s).

Five points were given for correctly putting your name and the topic on your project and keeping to the 3-page maximum. Many of you did not keep to the page limit and font size requirement. Choosing to ignore the instructions will hurt your score.