

Journalism in a Journal Club: The Art of Writing About Science

Presenter 4 in *Journal clubs as a teaching venue for health sciences students*

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Introduction

Some research questions of interest to epidemiology grad students:

- Does a mother's obesity during pregnancy lead to her child dying of a heart attack in adulthood?
- Do cancer patients fare better if they're married?
- Are saturated fats harmless after all?

More subtle but equally important questions:

- Does the [published journal article](#) suggest a well-designed study, with careful statistical analysis and stated conclusions that accurately reflect the outcome?
- Does the associated [media article](#) present the study's findings clearly and correctly?

Introduction (continued)

Co-advisors from Statistics (Nancy Pfenning) and Journalism (Cindy Skrzycki) guided club members to scrutinize articles' statistical analysis as well as the language used to describe a study and its results.

Each month featured a new eye-opening experience for participants and advisors alike. This talk describes the club's format and some highlights, in terms of discoveries made and lessons learned.

Relevance of Media Reports

- Researchers must take care in writing journal articles, so their results won't be misconstrued by readers (including reporters).
- Researchers often work with journalists to write press releases.
- We rely on both media and journal articles for information about science research.
- Less accountability by media reporters warrants vigilant scrutiny.

Outline

- How the club evolved
- Some highlights of (monthly) presentations
- Compiling list of common pitfalls in research/reporting
- Subtext:
 - Students/professors learning from one another (Nancy about journalism, Cindy about statistics...)
 - Students/professors getting to know one another

E-mail message #1

Hi Dr. Pfenning,

I am currently a doctoral student in Epidemiology at Pitt. My advisor read about your statistics in journalism class* in an article in the Chronicle**. She thought it sounded like a beneficial class for me to take and I agree based on the article's description. However, I could not find the class on courseweb so I was wondering if you were going to offer it again? Also, would you allow me to take the class as a graduate student? Thank you and I look forward to hearing from you,
Sarah

**Honors Stats in Journalism Seminar, co-taught spring 2013 with Cindy Skrzycki, Journalism Professor from English Dept.*

*****Just the Facts** published in Chronicle of Higher Ed, June 2013*

E-mail messages #2-#5

- Cindy, How about making it a club instead of a class? Nancy
- maybe *[from Cindy]*
- Sarah, I appreciate your interest. Prof. Skrzycki and I would have trouble fitting the course into our schedules next year. We might consider turning it into something more informal, along the lines of a journal club...Nancy
- Hi Nancy, A journal club would make it more appealing actually because I like the informality of it and the discussion you get from journal clubs...Sarah

E-mail messages #6-#7

- Sarah, Maybe you should consider serving as the organizer of a journal-club-type seminar with other grad students, plus myself and possibly Prof. Skrzycki as advisor(s)...Nancy
- Hi Nancy, I would love to serve as the journal-club organizer. I would like to start in the fall...Sarah

Plan suggested in e-mail #8

- Sarah serves as first presenter:
 - Finds a media report about published research in her area of interest
(or vice versa: identify recently published research that has also been covered by the press);
 - prepares by assessing strengths and weaknesses of the underlying research and of the media report about it;
 - shares findings with other club members via PowerPoint or handout.
- Subsequently feature one presentation each month until all members have had a turn.

E-mail messages #9-37

Who?

When?

Where?

(Flexibility needed to establish optimal parameters)

Journal Article for Presentation #1 (Sarah)

Maternal obesity during pregnancy and premature mortality from cardiovascular event in adult offspring: follow-up of 1,323,275 person years [R Reynolds et al BMJ 14 August 2013]

“The effect of maternal obesity on outcomes in offspring was tested with time to event analysis...All cause mortality was increased in offspring of obese mothers...after adjustment for **maternal age of delivery, socioeconomic status, sex of offspring, current age, birth weight, gestation at delivery, and gestation at measurement of BMI** (hazard ratio 1.35, 95% CI 1.17 to 1.55)...

Note: hazard ratio is instantaneous; relative risk is cumulative.

“Conclusions: As one in five women in the U.K. is obese at antenatal booking, strategies to optimize weight before pregnancy are urgently required.”

(What’s missing here?)

Media article about maternal obesity

theguardian

Obese mothers' babies face bigger risk of early death, says report

Study finds overweight mums' children 35% more likely to die of heart disease than offspring of average-weight parents



Cindy Skrzycki on media article

The lede* on the story is alarmist and unsupported...

** the introductory section of a news story that is intended to entice the reader to read the full story*

Excerpt from Sarah's first draft

3. How the article was presented in the media

The comprehensive study looked at nearly 30,000 women who gave birth in Aberdeen between 1950 and 1976 and who were weighed and measured in early pregnancy. When the researchers then searched for death certificates among the nearly 38,000 children – by then aged 34 to 61 – they found that those whose mothers had been obese had a 35% higher chance of dying as a result of cardiovascular disease than the children of normal-weight mothers. Health records showed that they also had a 42% higher risk of being treated in hospital for heart problems.

35% comes from table in the article under death of offspring of all women. They do not mention the significant finding in the overweight individuals too.

42% comes from table, the unadjusted RR for Angina. Angina does not represent all heart problems, especially since others were studied in the paper. Additionally, this finding is not significant and the adjusted RR would be more informative.

At the time that the mothers in the study gave birth, only 21% were overweight and 4% were obese. Now 20% are obese.

They mislead the readers into thinking that the 4% originally obese are now 20% obese.

E-mail message #40

Sarah, You're off to a promising start. I applaud your efforts to match up percentages cited in the media article with those presented in the research paper...

I think you need to stress the most important potential **confounder, obesity of offspring**. For a modern study to leave out this variable is inexcusable. Quite possibly they realized this, at least to some extent, but went ahead because that information wasn't available and they wanted to publish something that sounded interesting.

Can you separately address how well or badly the media article and the research report address the issue of that confounding variable?

Major points from Sarah's doc: #1

Major points

1. The lack of control of offspring BMI is a huge problem with this study because BMI is directly related to risk of cardiovascular disease. The article barely addressed this issue in the "strengths and weaknesses" section and further diverted attention by saying "As obesity in offspring is closely correlated to maternal obesity, however, further adjustment for offspring obesity might not be informative." This statement seems naive because a relationship exists between obesity and cardiovascular events, which may be independent of maternal obesity. Additionally, I think offspring BMI is more than a confounder. Instead, it most likely mediates the relationship.



Journal Article for Sarah's Presentation

Maternal obesity during pregnancy and premature mortality from cardiovascular event in adult offspring: follow-up of 1,323,275 person years [R Reynolds et al BMJ 14 August 2013]

"The effect of maternal obesity on outcomes in offspring was tested with time to event analysis...All cause mortality was increased in offspring of obese mothers...after adjustment for [maternal age of delivery, socioeconomic status, sex of offspring, current age, birth weight, gestation at delivery, and gestation at measurement of BMI](#) (hazard ratio 1.35, 95% CI 1.17 to 1.55)...

"Conclusions: Maternal obesity is associated with an increased risk of premature death in adult offspring. As one in five women in the U.K. is obese at antenatal booking, strategies to optimize weight before pregnancy are urgently required."

Media article (continued)

Quote from Dr. Ozanne (last 3 of 19 paragraphs):

Dr Susan Ozanne, reader in developmental endocrinology at the University of Cambridge and British Heart Foundation senior fellow, said: "Although these [findings are interesting and important, until the confounding effects of other factors such as obesity in the offspring themselves can be accounted for, we cannot assume a causal relationship between obesity in pregnancy and heart problems in adult children of these women - more research is needed to establish this.](#)"

She and other experts warned that pregnant women should not embark on a diet that could possibly do more harm to their unborn child.

"It is a complex issue which definitely needs more research. Until we have the results of further research, it would be unwise for any pregnant woman to drastically change their diet as this may be harmful in both the short and long term to both mother and child," she said.

Common Pitfalls in Drawing Conclusions from Scientific Studies

- Overlooking confounding variables; interpreting association as causation
- Too much focus on counter-intuitive findings (sensationalizing versus common sense)

Journal Article for Presentation #2 (Tamala)

Marital Status and Survival in Patients with Cancer [A. Aizer et al Journal of Clinical Oncology September 2013]

“Married patients were less likely to present with metastatic disease (*adjusted odds ratio [OR], 0.83; 95% CI, 0.82 to 0.84; P<.001*),

more likely to receive definitive therapy (*adjusted OR, 1.53; 95% CI, 1.51 to 1.56; P<.001*).”

[odds ratio (OR) is ratio of occurrence to non-occurrence]

Media Article for Presentation #2 (Tamala)

Married Cancer Patients Live Longer

By TARA PARKER-POPE SEPTEMBER 24, 2013 12:44 PM 39 Comments

The New York Times

Married cancer patients live longer than single people who have the disease, suggesting that logistical and emotional support from a loved one may be far more critical to cancer care than previously recognized.

Numerous studies have suggested that married people have better overall health than single people, but those data likely are skewed by the fact that healthy people are more likely to have opportunities to marry. However, the latest study did not look at overall health, and instead focused on what happens to married and single people who become ill with cancer. The findings offer a glimpse into the crushing logistical burden that cancer treatments impose on patients, particularly those who are single.



Stuart Bradford

Media Article (continued)

The study, [published in The Journal of Clinical Oncology](#), found that single patients were 53 percent less likely to receive appropriate therapy than married patients. The finding suggests that maintaining grueling chemotherapy and radiation schedules and taking medication as prescribed is easier for people who have help from a spouse compared with single people who must manage the logistics of cancer treatment on their own.

Unmarried cancer patients also were 17 percent more likely to have late-stage cancer at the time of diagnosis, compared with married patients. That suggests that spouses play a role in encouraging patients to see a doctor, while single people may put off doctor visits, resulting in a more advanced cancer by the time they finally seek a diagnosis. Married patients were 20 percent less likely to die of their disease than single patients.

Journal Article for Presentation #2 (Tamala)

Marital Status and Survival in Patients with Cancer [A. Aizer et al Journal of Clinical Oncology September 2013]

“Married patients were less likely to present with metastatic disease (adjusted odds ratio [OR], 0.83; 95% CI, 0.82 to 0.84; $P < .001$),

more likely to receive definitive therapy (adjusted OR, 1.53; 95% CI, 1.51 to 1.56; $P < .001$).”

Note: Media article says unmarried cancer patients were 17% more likely to have late-stage cancer...

Single patients were 53% less likely to receive appropriate therapy...

Series of emails about OR and RR, resulting in this email from Tamala:

Dr. Pfenning,

Thank you for breaking it down clearly, I was starting to confuse myself!

I think the discussion on interpretation of risk estimates in research journals and in the media will be really useful for all of us, and most likely the other Epi students will find your ‘Odds Ratio, Relative Risk’ [handout](#) helpful...

Regards,

Tamala

Odds Ratio vs Relative Risk

Example 1: RR and OR approximately equal

1. Table 1 classifies individuals in two groups according to whether or not they have a disease. Note that the occurrence of this disease is relatively rare (1% in Group A, 2% in Group B).

Table 1	Disease	No Disease	Total	Risk
Group A	1	99	100	0.01
Group B	2	98	100	0.02
Total	3	197	200	0.015

(a) The **relative risk** of having the disease is $\frac{0.01}{0.02} = 0.5$: Those in Group A are half as likely to have it as those in Group B.

(b) The **odds ratio** is the ratio of odds (occurrence to non-occurrence) for the two groups: $\frac{1/99}{2/98} = \frac{1}{2} \times \frac{98}{99} = 0.5(0.9898 \dots) = 0.4949\dots$

The odds ratio is quite close to the relative risk in this case because dividing 1 and 2, respectively, by 99 and 98 is so close to dividing 1 and 2, respectively, by 100 and 100. In general, the odds ratio and relative risk are fairly close *if a relatively small percentage have the disease*.

Odds Ratio vs Relative Risk

Example 2: RR and OR very different

2. Table 2 classifies individuals in two groups according to whether or not they have a disease. Note that the occurrence of this disease is very common (25% in Group A, 50% in Group B).

Table 2	Disease	No Disease	Total	Risk
Group A	25	75	100	0.25
Group B	50	50	100	0.50
Total	75	125	200	0.375

(a) The **relative risk** of having the disease is $\frac{0.25}{0.50} = 0.5$: As in Table 1, those in Group A are half as likely to have it as those in Group B.

(b) The **odds ratio** is the ratio of odds (occurrence to non-occurrence) for the two groups: $\frac{25/75}{50/50} = \frac{25}{50} \times \frac{50}{75} = 0.5(0.66 \dots) = 0.33\dots$

The odds ratio is quite different from the relative risk in this case because dividing 25 and 50, respectively, by 50 and 75 is very different from dividing 25 and 50, respectively, by 100 and 100. In general, the odds ratio and relative risk are *not* close if a relatively large percentage have the disease.

Errors in NYT Journalist's Report

A respected New York Times journalist committed two errors when she interpreted the odds ratio of 1.53 as follows: "single patients were 53 percent less likely to receive appropriate therapy than married patients."

First Error: Let's define A as the proportion benefitting in Group A and B as the proportion benefitting in Group B. Even if the relative risk was almost identical to the odds ratio, 1.53, this would mean $\frac{A}{B} = 1.53$ so $A = 1.53B$, so $B = A/1.53 = 0.65A$. Thus, B is 35% less than A , not 53%. *confusing increased and decreased risk*

Second Error: Most likely the relative risk is much lower than the odds ratio, as in Table 3 where the odds ratio is 1.53 and the relative risk is 1.20. Then $\frac{A}{B} = 1.20$ so $A = 1.20B$, so $B = A/1.20 = 0.83A$. Thus, B is 17% less than A , not 53%. *confusing odds ratio and relative risk*

Table 3	Benefit	No Benefit	Total	Proportion
Group A	300	180	480	0.625
Group B	125	115	240	0.521
Total	425	295	720	0.590

Excerpt 1 from Tamala's Presentation

- o Married with non-metastatic cancer were **more likely** to undergo definitive surgical and/or radiation therapy than unmarried, **overall OR)1.53** (95% CI 1.51-1.56, $P < 0.001$)
 >< Adjusted OR for each cancer favored treatment OR range from 1.42-1.76 for 9 of the cancers, all significant CI

How it was reported in NYT:

The study, published in The Journal of Clinical Oncology, found that single patients were 53 percent less likely to receive appropriate therapy than married patients. The finding suggests that maintaining grueling chemotherapy and radiation schedules and taking

- o *Correct OR interpretation: (The odds of receipt of definitive therapy were 1.53 times higher in the married cancer patients compared to the unmarried cancer patients.)*
- o *Interpretation as an RR: (Overall, married cancer patients were 53% more likely to have received definitive therapy than unmarried cancer patients.)*

Excerpt 2 from Tamala's Presentation

- o Married **less likely** to present with metastatic disease than unmarried , **overall odds ratio 0.83** (95% CI 0.82-0.84, P <0.001)
 - ✂ Adjusted OR for each cancer favored localized malignancy, OR range from 0.52-0.93 for the 10 cancers, all significant CI

- How it was reported in NYT:

Unmarried cancer patients also were 17 percent more likely to have late-stage cancer at the time of diagnosis, compared with married patients. That suggests that spouses play a role in encouraging patients to see a doctor, while single people may put off doctor visits, resulting

- o *Correct OR interpretation: (The odds of development of metastatic cancer were 0.83 times lower in the married cancer patients compared to the unmarried cancer patients.)*
- o *Interpretation as an RR: (Overall, married cancer patients were 17% less likely than unmarried cancer patients to have metastatic cancer.)*

Common Pitfalls in Drawing Conclusions from Scientific Studies

- overlooking confounding variables Presence or absence of medical insurance
- sensationalizing versus common sense
- confusing odds ratio & relative risk
- increased vs. decreased risk

Articles for Presentation #3 (Sylvia)

Depression and the Risk of Cancer: A 15-year Follow-up Study of the GAZEL Cohort [C. Lemogne et al American Journal Epidemiology August 2013]

ScienceDaily [Depression Does Not Expose Someone to a Greater Risk of Cancer](#)

Reuters [No link between depression and cancer risk: study](#)

Psychcentral.com [Study Finds No Link Found Between Depression, Cancer Risk](#)

Note: We learned from Cindy that typically one reporter writes body of article, another composes the headline.

Common Pitfalls in Drawing Conclusions from Scientific Studies

- overlooking confounding variables
- sensationalizing versus common sense
- confusing odds ratio & relative risk
- increased vs. decreased risk
- failing to report base rates
- publication bias (“file-drawer” problem, etc.) (avoided by reporting non-result)
- failing to adjust for multiple tests (avoided by using Bonferroni)
- careless mistake: *Sickness Absence for Depression* (by reporters, confused with *Seasonal Affective Disorder* not researchers)

Very impressive detective work---and Sylvia (Hsinghua) isn't even a native English speaker!

Articles for Presentation #4 (Mary)

The racial disparity in breast cancer mortality in the 25 largest cities in the United States [S. Whitman et al Cancer Epidemiology October 2011]

The New York Times

Tackling a Racial Gap in Breast Cancer Survival

By TARA PARKER-POPE

Common Pitfalls in Drawing Conclusions from Scientific Studies

- overlooking confounding variables
- sensationalizing versus common sense
- confusing odds ratio & relative risk
- increased vs. decreased risk
- failing to report base rates
- publication bias
- failing to adjust for multiple tests
- careless mistakes
- anecdotal evidence *Was this an asset or a liability?*

Articles for Presentation #5 (Kasia)

First trimester fetal growth restriction and cardiovascular risk factors in school age children: population based cohort study [V. Jaddoe et al British Medical Journal 2014]

Baby Heart Disease Risk ‘Shaped Early in Pregnancy’
by Helen Briggs, BBC News

Common Pitfalls in Drawing Conclusions from Scientific Studies

- overlooking confounding variables; interpreting association as causation (especially common in observational studies)
- too much focus on counter-intuitive findings (sensationalizing versus common sense)
- confusing odds ratio & relative risk
- increased vs. decreased risk
- failing to report base rates
- publication bias
- failing to adjust for multiple tests
- **careless mistakes** (by researchers as well as reporters)
- anecdotal evidence

Articles for Presentation #6 (Beth)

Association of Dietary, Circulating, and Supplement Fatty Acids With Coronary Risk: A Systematic Review and Meta-Analysis [R. Chowdhury et al* *Annals of Internal Medicine* March 2014]

Note: One of the authors has a grant from Nestlé! Clearly they'd be happy to de-stigmatize saturated fats...

Butter Is Back! by Mark Bittman *The New York Times*

Common Pitfalls in Drawing Conclusions from Scientific Studies

- overlooking confounding variables; interpreting association as causation (especially common in observational studies)
- too much focus on counter-intuitive findings (sensationalizing versus common sense)
- confusing odds ratio & relative risk
- increased vs. decreased risk
- failing to report base rates
- publication bias
- failing to adjust for multiple tests
- careless mistakes
- anecdotal evidence
- conflict of interest/source of funding
- reporter should have solicited quotes from researchers

Conclusions

A group of especially dedicated students let us be a part of their efforts to “uncrunch” the numbers—and words—in a broad array of current epidemiology articles, as well as the accompanying media reports.

Through this journal club, we all greatly increased our awareness of flaws and strengths in both the underlying research and the journalists’ communication of results to the public.

We also formed meaningful connections across levels (undergrad, grad, and faculty) and disciplines (epidemiology, statistics, [journalism](#)).

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