

Working with a Statistician

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Outline

- Statisticians at JHSOM
- Finding a Statistician
- Involvement (roles and tasks)
- The case for early involvement
- Statistician Roles
- Compensation
- Negotiations and Relationships
- Researcher's Responsibilities
- Statistician's Responsibilities
- Ethical Issues



"Statistics say that religious people live longer, so I practice a different religion every day of the week to be sure I'm covered."

Statisticians at JHSOM

- In 2008: JHSOM awarded 962 NIH grants for a total of \$426,863,323
- 3,860 faculty at JHSOM
- JHED search for statisticians: 89 staff, 45 faculty, 46 students
- ~30:1 ratio

Do you need a statistician?

Grants: yes

Data analysis:
maybe/probably



Finding a Statistician

- Biostatistics Consulting Center
- GCRC (Downtown and Bayview)
- BPDC
- Word of Mouth
- Non-Hopkins Affiliated Consultants

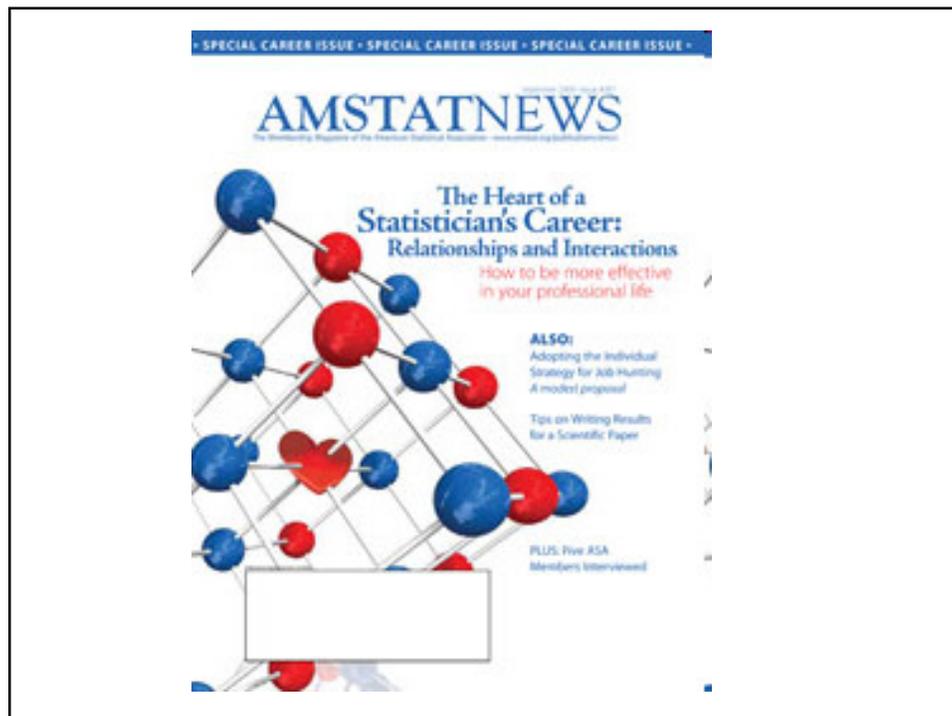
Statistician Tasks

- Study Planning
- Grant Writing
- Database design, maintenance
- Data analysis, direction or action
- Preparation of manuscripts/presentations



The Case for Early Involvement

- Pros:
 - No surprises, framing testable hypotheses, potential biases with study designs. Stopping rules. Collected/formatted data necessary for hypothesis, sample size considerations. Accountability.
- Cons:
 - Loss of control, expense (fees/salary support), authorship (?), lack of substantive knowledge.

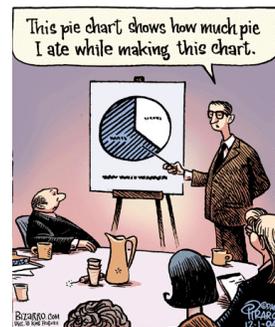


Statistician Roles

- Helper: technician; responds to questions. Accountability problems.
- Leader: lack of substantive expertise.
- Data-Blessor: curb-side advice.
- Collaborator: involvement throughout the project.
- Teacher: should be mutual, integrative.
- Archaeologist: my other statistician stopped returning my e-mails...

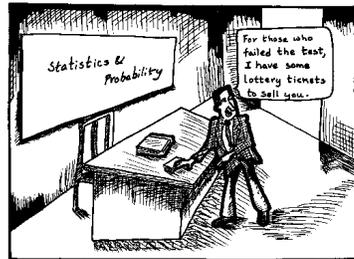
Kirk RE. (1991) Statistical consulting in a university: dealing with people and other challenges. *American Statistician* 45(1):28-34.

Compensation



- Biostatistical faculty are promoted largely on the basis of their contributions to *biostatistics*.
- Fees
- Salary support from grants
- Authorship, esp. on methods-slanted papers
- Acknowledgements (papers and talks)

Power Analyses (a priori)



- Not my favorite thing to do
- Work done “on spec”.
- Based on untestable assumptions.
 - Result can vary widely based on assumptions made about effect size, standard deviation of outcome, and particularly, within-person correlation and correlation structure.
- The recommended N is almost always bad news.

Authorship

- International Committee of Medical Journal Editors:
 - A) substantial contribution to a) conception and design or b) analysis and interpretation of data.
 - B) drafting the article or revising it critically for important intellectual content.
 - C) final approval of the version to be published.

Parker RA, Berman NG (1998). Criteria for authorship for statisticians in medical papers. *Statistics in Medicine* 17:2289-2299.

Accepting payment does not waive one's right to authorship.

Table 3. Frequency of Recognition of Contribution of Methodologist as Author or Acknowledged

	No. (%)			Total
	Biostatistician	Epidemiologist	Other	
All Papers				
Author	176 (65)	141 (88)	65 (82)	382 (75)
Acknowledgment	40 (15)	6 (4)	8 (10)	54 (11)
Neither	53 (20)	13 (8)	6 (8)	72 (14)
Total	269 (100)	160 (100)	79 (100)	508 (100)*
Papers for Which the Methodologist Had Made a Significant Contribution at Some Stage				
Author	158 (78)	128 (96)	61 (90)	347 (86)
Acknowledgment	17 (8)	2 (1)	7 (10)	26 (6)
Neither	28 (14%)	4 (3)	0	32 (8)
Total	203 (100)	134 (100)	68 (100)	405 (100)
Papers for Which the Methodologist Made First Moderate or Significant Contribution at the Analysis Stage				
Author	37 (46)	14 (56)	8 (50)	59 (48)
Acknowledgment	20 (25)	5 (20)	5 (31)	30 (25)
Neither	24 (30)	6 (24)	3 (19)	33 (27)
Total	81 (100)	25 (100)	16 (100)	122 (100)

*Six outcomes were not known.

Altman DG, Goodman SN, Schroter S. (2002). How statistical expertise is used in medical research. *JAMA* 287(21):2817-2820.

Caveats

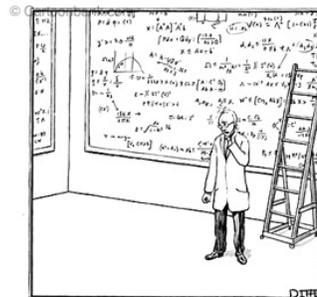
- Get permission before including someone as an author or acknowledgement.
- At any stage.
- Using someone's name implies endorsement of the paper/talk/poster.
- Mentioning that you spoke to Dr. X for advice on how to do Y implies that you actually took their advice on how to do Y.
- If they waive acknowledgement or authorship, try to find out why, this could be a red flag.

Negotiating the Relationship

- Doing this badly (or not at all) can lead to *disaster*.
- Be very frank about expectations, roles, compensation, timetables/deadlines.
- Put it in writing (e-mail).
- Ask about policies, how and when they can be contacted, etc.
- A particular statistician may not be a good fit.
- Needs to occur at first (preferably in-person) meeting.

Awkward Interactions

- Condescension, or fear of condescension
- Social ineptitude
- Hesitancy about negotiating money, etc.
- Power differential
- Negative preconceptions



"I just figured out why we've never had girlfriends."

Researcher's Responsibilities

- Frank negotiation of the relationship
- Substantive teaching, methodological learning
- Setting and meeting deadlines
- Compensation, including appropriate attribution
- Provision of accurate data*, answers to all questions about study design, codebook, etc.
- Accurate reporting of results

Statistician's Responsibilities

- Frank negotiation of the relationship
- Methodological teaching, substantive learning
- Clear explanation of methods and results.
- Setting and meeting deadlines
- Sufficient documentation such that an independent statistician could *exactly* replicate results.
- Accurate reporting of results.

Documentation

- Statisticians should be able to provide details about the analysis: I used this equation on p. 417 of thus and such article.
- “I used proc mix.” is not sufficient.
- What software they used, and relevant log files and/or computing code*.
- Failing to provide documentation is irresponsible, wastes time, and exposes both parties to accusations of ethical violations.
- www.reproducibleresearch.net

Ethical Issues



- Publication biases.
- Importance of statistician independence.
- Agree on an analysis plan before data is collected, or at least, looked at.
- Agree on stopping rules (clinical trials).
- No explicit or implied reward for desired results.