PHW250B Journal Club Assignment 4
Bias and confounding

Questions about Reingold et al., 1989

Problem 1. The authors describe one potential source of bias as follows on page S40: "It is possible that, despite all of our educational efforts and publicity, medical care providers were more likely to diagnose and/or report a case of menstrual TSS if the patient was a tampon user. " What kind of bias would this be? Be as specific as possible. (1-2 sentences)

Problem 2. In the 2x2 table below, which cell would be overinflated and/or underinflated compared to their true value if this type of bias occurred? (1 sentence)

	TSS	No TSS
Tampon user	a	b
Non tampon user	c	d

Problem 3. Would this type of bias have biased results towards the null, away from the null, or in an known direction? Provide an explanation of your answer in 1-2 sentences.

<u>Questions about Arnold et al., 2017</u>

Problem 4. Review the description of the negative control analysis done in the Surfer Health Study in Web Appendix 5 and Web Table 5. Describe the negative control used in this study. State whether it was a negative control outcome, exposure, or time period. (2-3 sentences)

Problem 5. What justification did the authors provide for this choice of negative control? (1-2 sentences)

Problem 6. Review the results of the negative control analysis done in Web Table 5. Did the authors find evidence of residual confounding? (2-3 sentences)

Problem 7. Describe how the use of self-reported symptoms could have introduced information bias in this study. Which type of information bias? Be as specific as possible. (2-3 sentences)

Problem 8. How did the survey design in this study attempt to reduce the chance of information bias? (2-3 sentences)

Problem 9. At the time the WASH Benefits papers were published, the journal received commentaries on the papers. In the response to the commentaries by Arnold et al., the investigators performed an observational analysis using only the data from the trials' control groups. Briefly describe what they found (see the Table below) and explain what the implications of these results are in using observational vs. randomized studies for this research question. (3-4 sentences)

	Population (n)	Mean LAZ (SD)	Difference (95% CI)	p value	Adjusted* difference (95% CI)	p value
Kenya trial control group†						
No improved latrine	1737	–1·58 (1·08)	ref		ref	
Access to improved latrine	364	–1·33 (1·08)	0·25 (0·12–0·37)	<0·001	0·15 (0·02–0·28)	0·02
Bangladesh trial control group†						
No latrine	513	–1·89 (0·98)	ref		ref	
Latrine with no water seal	391	–1·86 (1·00)	..		..	
Latrine has functional water seal	199	–1·37 (1·01)	0·52 (0·34–0·70)	<0·001	0·22 (0·03–0·40)	0·02

Median age 25 months for Kenya trial and 22 months for Bangladesh trial. LAZ=length-for-age z-scores. *Adjusted by use of ensemble machine learning with double-robust, targeted maximum likelihood estimation following the same methods from the prespecified adjusted analyses in the trials. Prespecified, baseline covariates included: child age, child sex, household food insecurity, birth order, maternal age, maternal education, maternal height, number of children and total individuals living in the compound, distance to water, and a broad set of household characteristics and assets. The computational notebook that created the table includes additional analysis details, plus adjusted effects using generalised linear models that resulted in similar estimates (https://osf.io/qkgp8). Data used to make the table are available on the Open Science Framework website for Bangladesh (https://osf.io/wvyn4) and Kenya (https://osf.io/uept9). †In the Kenya trial, improved sanitation was defined as the presence of a latrine with a slab following the standard WHO/UNICEF Joint Monitoring Program definition. In the Bangladesh trial, improved sanitation was defined as a toilet with a functional water seal. These definitions mirrored those reported in the original trials.

Table: **LAZ among children in the control groups of the WASH Benefits trials in Kenya and Bangladesh, stratified by whether the child's household had improved sanitation at enrolment**