Homework 2 (Unit 2)

This week, we discussed a 2000 study in the New England Journal of Medicine (NEJM) that compared patients with rheumatoid arthritis who were randomly assigned to take either Vioxx or a conventional pain reliever, naproxen. In 2005, it came to the attention of the editors of the NEJM that three heart attacks from the Vioxx group were deliberately omitted from the data published in the paper (the authors truncated the study early to avoid inclusion of these three late events). The corrected data are shown below:

The revised numbers including the three additional heart attacks.

	Number per group	**Person-years of exposure***	**Number of heart attacks**
Vioxx group	4047	2698	20
Naproxen group	4029	2699	4

Reference: Curfman GD, Morrissey S, Drazen JM. Expression of concern: Bombardier et a., "Comparison of upper gastronintestinal toxicity of rofecoxib and naproxen in patients with reeumatoid arthritis," N Engle J Med 2000;343:1520-8. *N Engl J Med* 2005; 353:2813-4.

Question 1.

What is the absolute difference in the incidence rates of heart attacks for Vioxx versus Naproxen? Please calculate as events per 1000 person-years and round to the nearest tenth (e.g., x.x); do not write the units when entering your answer.

Question 2.

What is the absolute difference in the risk of heart attacks for Vioxx versus Naproxen? Please report as a percentage, rounded to the nearest hundredth (e.g., .xx). Do not include the % sign.

Question 3.

What is the rate ratio comparing Vioxx with Naproxen? Please round to the nearest tenth (e.g., x.x).

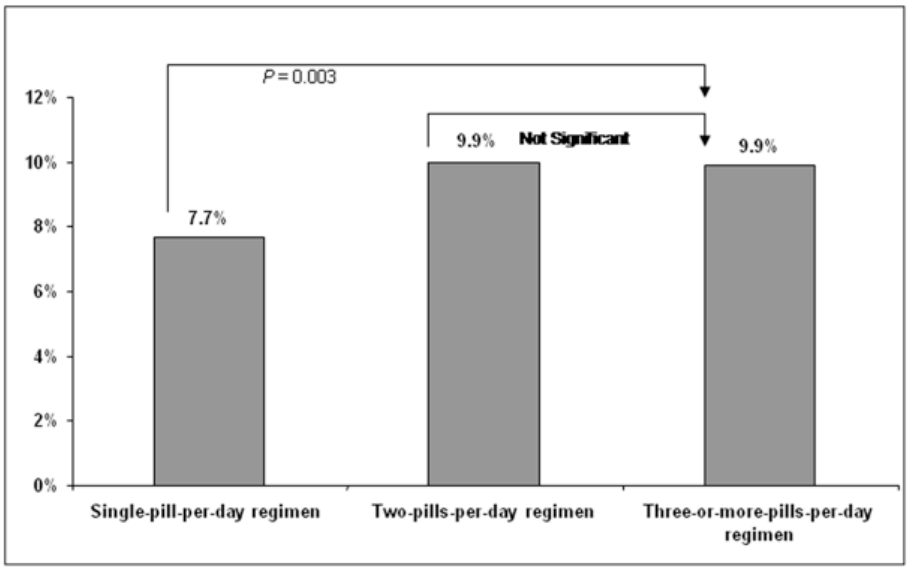
Question 4.

What is the number needed to harm? Round to the nearest whole number.

Question 5.

The following figure comes from a retrospective cohort study in which researchers compared HIV patients on three different anti-retroviral treatment regiments—one pill per day, two pills per day, and three or more pills per day—in terms of adherence to treatment and hospitalization.

Figure 3. Adjusted risk of hospitalization, by cohort.



Source: Sax et al. Adherence to ART and Correlation with Risk of Hospitalization among Commercially Insured HIV Patients in the United States. *PLoS ONE* 2012; 7: e31591.

What percent of single-pill users were hospitalized during follow-up? (do not include the % sign)

Question 6.

What percent of three-or-more-pill users were hospitalized during follow-up? (eg. x.x, do not include the % sign)

Question 7.

Calculate the risk ratio comparing the risk of hospitalization in single-pill users versus three-or-more-pill users. Round to the nearest hundredth (e.g., .xx).

Question 8.

Calculate the odds ratio comparing the odds of hospitalization in single-pill users versus three-or-more-pill users. Round to the nearest hundredth (e.g., .xx).

The following table displays the results of a double-blind randomized weight-loss trial that compared three doses of the drug tesofensine (0.25 mg, 0.5mg, and 1.0mg) with a placebo pill. The authors reported the percentage of patients in each group that achieved a weight loss of 5kg or more and the percentage who achieved a weight loss of 10kg or more.

	Placebo	**Tesofensine**			**Odds ratio (95% Cl)**		
		0.25mg	0.5mg	1.0mg	0.25mg tesofensine	0.5mg tesofensine	1.0mg tesofensine
Weight reduction of 5kg or more							
<5kg	32 (71%)	20 (41%)	6 (13%)	4 (9%)	4.0 (1.6-9.9; p=0.0023)	20.9 (6.8-64.3; p<0.0001)	31.5 (9.0-111.0; p<0.0001)
≥5kg	13 (29%)	29 (59%)	41 (87%)	42 (91%)			
Weight reduction of 10kg or more							
<10kg	42 (93%)	32 (65%)	22 (47%)	12 (26%)	9.5 (2.4-37.4; p=0.0013)	23.0 (5.8-42.0; p<0.0001)	57.7 (13.7-242.0; p<0.0001)
≥10kg	3 (7%)	17 (35%)	25 (53%)	34 (74%)			

Question 9.

What is the likely reason that the authors have reported odds ratios rather than risk ratios or rate ratios for these data?

1. The data come from a case-control study.
2. They analyzed the data with logistic regression.
3. They cannot calculate rates or risks from their data.
4. Odds ratios are the preferred measure of relative risk.

Question 10.

The adjusted odds ratio comparing the1.0 mg tesofensine group with the placebo group for the outcome of a weight loss of 5kg or more was 31.5. Calculate the unadjusted risk ratio for this comparison (using the percentages given in the table). Round to the nearest tenth (e.g., x.x).

Question 11.

The adjusted odds ratio comparing the1.0 mg tesofensine group with the placebo group for the outcome of a weight loss of 5kg or more was 31.5. Calculate the adjusted risk ratio for this comparison using the conversion formula below. Round to the nearest tenth (e.g., x.x).

$$RR=OR/[(1-p_{ref})+(P_{ref} \times OR)\ ]$$

Question 12.

Which of the following is the best way for the authors to interpret the odds ratio of 57.7 (comparing the1.0 mg tesofensine group with the placebo group for the outcome of a weight loss of 10kg or more) for their readers?

1. The drug increases a persons' chance of losing at least 10kg by 57.7-fold.
2. The drug increases a person's odds of losing at least 10kg by 57.7-fold.
3. The odds ratio here is highly misleading; thus, the authors should only report the odds ratio if they additionally give the readers the unadjusted or adjusted risk ratio.