STATISTICAL LABORATORY #1 NOVEMBER 6, 2026

Group analysis guide

Your task. Use your group's pilot-study data to identify what happens overall, what happens within age groups, and why the results may differ. You will then advise a stakeholder who is considering whether to stop use of the drug.

Analyse the pilot study

1. **Estimate the crude effect of the drug.** Using the whole sample, calculate the mortality risk among participants taking and not taking the drug. Then calculate the crude or overall effect on the absolute risk scale:

$$RD_{\text{overall}} = P(Y = 1 \mid X = 1) - P(Y = 1 \mid X = 0).$$

2. **Examine the conditional effect of the drug.** Let

$$p_{xz} = P(Y = 1 \mid X = x, Z = z),$$

where the first subscript gives the value of (X) and the second gives the value of (Z). Using the stratified tables, calculate

$$RD_{XY|Z=0} = p_{10} - p_{00}, \qquad RD_{XY|Z=1} = p_{11} - p_{01}.$$

These are the conditional effects of the drug within the younger and older age groups, respectively. Within each age group, subtract the mortality risk without the drug ($X = 0$) from the mortality risk with the drug ($X = 1$).

Compare their signs with the sign of RD_{overall}. Does the overall risk difference have the opposite sign from both age-specific risk differences? Is there a reversal?

3. **Examine the composition of the drug groups.** Calculate the proportion of older participants among those taking and not taking the drug:

$$q_1 = P(Z = 1 \mid X = 1), \qquad q_0 = P(Z = 1 \mid X = 0).$$

Which drug group has the larger proportion of older participants?

4. **Examine the conditional effect of age.** Within each drug group, calculate the difference in mortality risk between older and younger participants:

$$RD_{ZY|X=0} = p_{01} - p_{00}, \qquad RD_{ZY|X=1} = p_{11} - p_{10}.$$

These are the conditional effects of age among participants not taking and taking the drug, respectively. In each calculation, subtract the mortality risk among younger participants ($Z = 0$) from that among older participants ($Z = 1$).

5. **Explain the pattern in words.** Consider both questions:
   - Is age distributed differently between the two drug groups?
   - Is mortality different between older and younger participants?

   Use these observations to explain why the overall result differs from the age-specific results.
6. **Make a recommendation.** Should the stakeholder stop the drug on the basis of this pilot study? State what the data show, what remains uncertain, and what further information you would want.

Prepare the wall sheet

On the large sheet of paper, write **only the selected quantities and your conclusions—do not copy the tables of counts**. Make the numbers large enough to read from a distance.

On the wall	Include
Heading	Group number and sample size
Overall	RD_{overall}
Conditional effect of drug	$RD_{XY\|Z=0}$ and $RD_{XY\|Z=1}$
Age composition	q_1 and q_0
Conditional effect of age	$RD_{ZY\|X=0}$ and $RD_{ZY\|X=1}$
Reversal	Yes or no, followed by one sentence describing the pattern
Conclusion	A brief explanation and your recommendation to the stakeholder