431 Lab 3 Instructions

Fall 2025 - deadline in Course Calendar

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> **!** Important
>
> - This Lab contains 5 tasks for you to complete.
> - The deadline for completing this Lab is posted in the Course Calendar.

0.1 Getting Started

Although it won't be necessary to prepare any R code to respond to Lab 3, we think it will be good practice for you to prepare your response in Quarto anyway. There is no template for Lab 3.

0.2 Getting Help

You may discuss each Lab with Professor Love, the teaching assistants or your colleagues, but your answer must be prepared by **you working alone**. Don't be afraid to ask questions, using any of the methods described on our Contact Us page.

0.3 Using AI / ChatGPT, etc.

If you decide to get help from a large language model (like ChatGPT) to help with your phrasing of ideas, or building code, OK, but you need to describe what you did carefully in the designated **AI Help** section (just before the Session Information) of your submission.

0.4 Learning Objectives for this Lab

1. Critically evaluate a news story on scientific literature, incorporating the principles of probability and odds.
2. Reflect meaningfully on how the PPDAC cycle might be used in scientific or other practical work.

Background for Tasks 1-4

Find a headline from the internet related to health or medicine that describes the findings of a study published on January 1, 2018 or later. Then find the study being referred to in PUBMED. Use the formula for updating your opinions about health news developed in this article by Jeff Leek, along with the abstract and full contents of the published study to complete Tasks 1-4.

> **Note**
>
> The full title of Leek's article is "Finally, a Formula For Decoding Health News" and the link is https://fivethirtyeight.com/features/a-formula-for-decoding-health-news/

1 Task 1 (5 points)

Specify the URL where we can see the headline and news story describing the findings of the study. Feel free to use `bit.ly` or a related tool online to produce a shortened URL for this purpose. Specify the reference completely, including the names of the author(s) of the news story, and its full title, and source.

Then specify a URL where we can see at least the abstract of the complete study. Again, shortened URLs are fine. Give the complete reference to the study, as well, including the authors, full title, journal name and so forth.

2 Task 2 (10 points)

Describe, in a few sentences, your original opinion (gut feeling) related to the conclusions of the study as summarized in the headline and news article, first in terms of a probability statement, and then calculate the appropriate odds, remembering to convert statements about probabilities to statements about odds. Provide some motivation for your internal prior probability, describing your relevant personal experiences or other factors that drove your gut feeling.

> **Tip**
>
> If X is an event, and `Pr(X)` is the probability that X occurs, and `odds(X)` are the odds that X occurs, then `Pr(X) = odds(x) / (1 + odds(x))` and `odds(X) = Pr(X) / (1 - Pr(X))`.

3 Task 3 (15 points)

Evaluate the study in terms of the six specifications proposed by Jeff Leek in this article at FiveThirtyEight when evaluating study support. Be sure to specify your conclusion about **each** of the six specifications, and provide direct quotes and summarize the evidence from the abstract or paper to address the issues raised and justify your conclusions.

We want to see a clear, motivated conclusion about each of the six specifications, as well as direct quotes and evidence summaries to address the issues raised and justify conclusions. We suggest you use a different subheading for each of the six specifications so it's easy for us to see your conclusions in each case.

4 Task 4 (10 points)

Incorporate the study support assessment into a Bayes' Rule calculation to obtain the final odds you should now be willing to give to the headline, and specify this value in terms of a probability statement, as well. Then react to the final conclusion specified by this approach in a few sentences. How does your subjective posterior probability that the headline is true match up with the formula's conclusions? Do you feel that the formulaic approach has yielded an appropriate conclusion for you in this case? Why or why not?

5 Task 5 (10 points)

Write a short essay (of 100-200 words, please) describing how the PPDAC problem solving cycle (first described by Spiegelhalter in his introduction) might be helpful to you in the context of some "problem" you are interested in solving.

Please feel free to draw on your own experience solving problems in a systematic way, and don't feel obliged to write about a "problem" that is related to biology or medicine or health or science. Anything you can explain briefly and that you are interested in could work well here.

Your response should be written using clear and complete English sentences and minimizing jargon.

6 Additional Notes and Instructions

6.1 Submitting this Lab

Submit this Lab via Canvas, using the Lab 3 assignment. Be sure to submit both files:

1. Your Quarto file (.qmd).
2. The HTML file you obtain by knitting the Quarto file (.html)

6.2 Grading this Lab

This Lab will be graded by the TAs and then reviewed by Dr. Love. Your grades will be available one week after the Lab deadline.

The maximum score on this Lab is 50 points.

As each Lab passes its deadline (as listed in the Course Calendar), we will:

- post the answer sketch (48 hours after the deadline) and draft grading rubric to our Shared Google Drive, and then
- post grades and any revisions to the grading rubric or answer sketch one week after the deadline to a location we will provide to you.

6.3 Emergencies and Late Policy

We do not grant extensions on Lab deadlines.

- To receive full credit on a Lab, it must be received on Canvas no later than 59 minutes after the posted deadline. (This allows for small issues with uploading to Canvas to occur without penalty.)
  - Labs that are turned in 1-48 hours after the deadline will lose 10 points for late work.
- No extensions to Lab deadlines will be made this semester. Labs turned in more than 48 hours after the deadline will receive no credit, since by then the Lab Sketch will be posted.
- Your lowest lab score (out of Labs 1-6) over the course of the semester will be dropped before we calculate your lab grade.

If you have an emergency that will keep you from submitting the Lab by even the late deadline of Friday at noon, please let Dr. Love know that (as soon as possible) via email and he will consider excusing you from the Lab.

6.4 Lab Regrade Requests

If, after your Lab is graded, you want Dr. Love to review the grading or correct a grading error, please follow the Lab Regrade Request policy posted on our Labs page.

6.5 AI Help and Session Information

Since there is no R code in these instructions, and there will be no R code (I assume) for most of you in your response, there's no need to include Session Information for Lab 3. You do need to include the usual AI Help section - see instructions for Labs 1 or 2 for details.