

2027-05-10 · 80 minutes

Antiviral count comparison: paper CER

Your goal: Paper interpretation only. Use supplied count records; do not perform, plan or optimize an assay, biological treatment or experiment. No actual lab completion is assumed. Today's objective: Analyze plaque-assay data and write a CER about antiviral effectiveness.

One product: Written CER analyzing plaque-assay data: claim naming the most effective antiviral, two specific plaque-count evidence entries with percent reduction, reasoning linking lower count to viral inhibition, and one limitation of the assay.

Question: How far can a count reduction support an antiviral claim?

Start the work

Keep count arithmetic, reference anatomy and actual laboratory evidence distinct.

1. Use the teacher-provided printed plaque diagrams prepared in advance for Friday May 7, or their complete D1 text counts. They are invented practice evidence, not observations from cultured plates. No live plaque kit is approved. Do not relabel the counts as an actual Friday assay. The paper route has no incubation step because no cultures are produced. Graph the four supplied counts; retain their diagram IDs.
2. Interpret most effective only as largest reduction among D1 candidates under its assumption, not best treatment. Actual route: use genuine rubric and limits. Step: Make a claim about which antiviral was most effective.
3. Use two identified count entries and their percent reductions against the stated reference. Actual route: use the actual assigned evidence. Step: Cite two data points as evidence.
4. Reason conditionally: lower counts can be consistent with inhibition but do not isolate a cause or unique mechanism. Step: Add reasoning connecting plaque count to viral inhibition.
5. State an actual evidence gap and explain the conclusion it prevents; do not design an experiment. Step: Note one limitation of the assay.

Paper interpretation only. Use supplied count records; do not perform, plan or optimize an assay, biological treatment or experiment. No actual lab completion is assumed. If access is blocked, save your work and tell the teacher what you need. After uploading, check that Schoology shows Submitted.

Words you will use

plaque count

Here, the supplied tally of localized affected areas in a cell-based test, not every virus particle.

assay

A test that produces a specified readout; no test procedure is assigned here.

antiviral

An agent intended to inhibit viral activity; a candidate label is not proof it works.

candidate

An option being compared, not an approved or effective treatment claim.

condition

The label identifying a record's comparison group.

reference

The record chosen as the comparison baseline.

control

A comparison used to interpret a result; its presence does not remove every uncertainty.

background comparison

The supplied no-virus-labeled record N; not a candidate or denominator.

count

A tally of discrete items or events.

unit

What the number counts or measures.

percent

Parts per hundred.

percent reduction

The decrease relative to a stated reference, expressed per hundred.

denominator

The quantity by which another quantity is divided.

undefined

No valid numerical result exists for that expression, such as division by zero.

bar graph

A display using bar heights or lengths to compare categories.

axis

A labeled line defining a graph's categories or numerical scale.

scale

The relationship between positions on an axis and values.

interval

The equal step between neighboring numbered ticks here.

error bar

A graphic showing a specified measure of variability or uncertainty.

variability

How values differ across records or repetitions.

uncertainty

What is not established by the available evidence.

CER

Claim, evidence and reasoning: an answer, supporting records and their logical connection.

claim

An answer limited to what the evidence supports.

evidence

Specific supplied records used to support a claim.

reasoning

An explanation linking evidence to the claim under stated assumptions.

assumption

A condition accepted for a comparison, not automatically verified.

inhibition

A reduction or restraint of activity; here, viral activity.

mechanism

The process explaining how a change occurs.

cell viability

Whether cells remain alive and functional.

cytotoxicity

Harm to cells.

causal attribution

Concluding that a particular factor produced the observed difference.

confound

Another factor that could offer an alternative explanation for a comparison.

clinical effectiveness

Benefit in people under actual conditions of use; not established by these counts.

limitation

A specific evidence gap and the conclusion it prevents.

provenance

Where a record came from and how that can be checked.

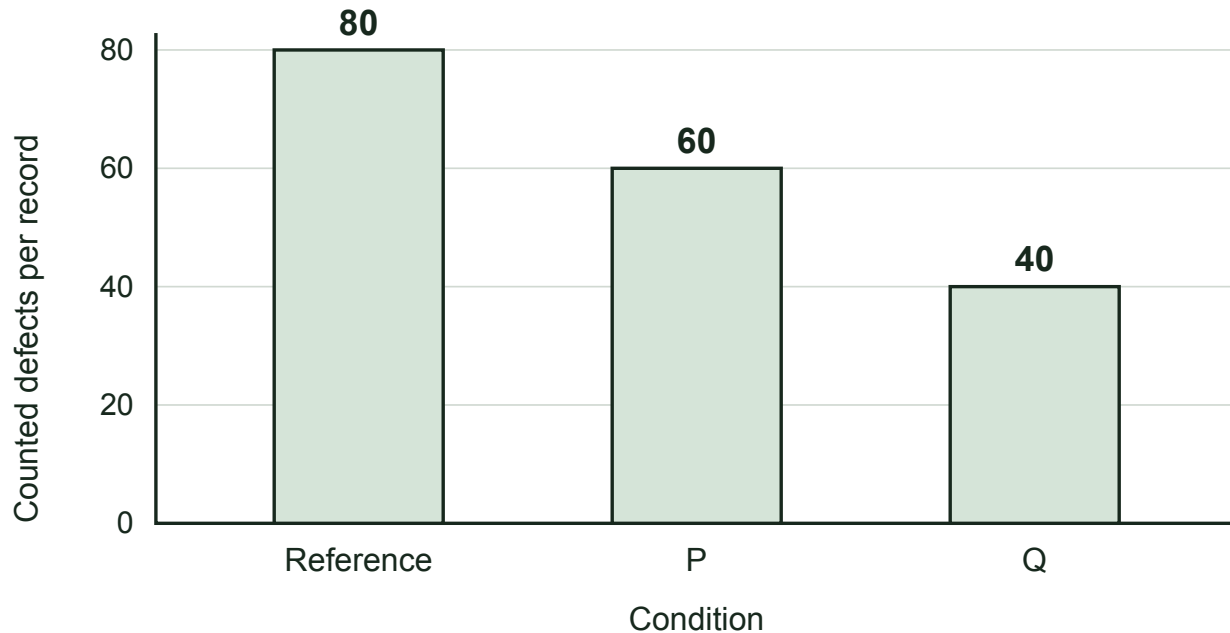
Submission check

After uploading, check that Schoology shows Submitted; ask for help if it does not.

M-G1: Worked printing-model graph

Invented print-defect counts

M-G1 | Optional non-biological worked model



Invented single-count records; no variability supplied.

No error bars. Full worked arithmetic and CER are in M1.

Optional non-biological worked model. Full data and CER appear in M1; use D1 for your one assigned graph. Actual assigned evidence replaces original practice.

Text description: Invented print-defect bars: Reference 80, P 60, Q 40. Vertical count axis 0 to 80 by 20. No error bars; no variability supplied.

H1: Start from supplied evidence

Use the teacher-provided printed plaque diagrams prepared in advance for Friday May 7, or their complete D1 text counts. They are invented practice evidence, not observations from cultured plates. No live plaque kit is approved. Do not relabel the counts as an actual Friday assay. The paper route has no incubation step because no cultures are produced.

Today is Monday May 10. The prior class was Friday May 7. Use the supplied record without assuming anything about earlier work. This packet supplies every input needed for original paper interpretation; no previous notebook, lab record or outside lookup is required.

Opening input: an invented record says one option has fewer counted events than a reference. It supplies no information about why. Original route: name one claim the count can support and one it cannot. Use the rule: a count comparison describes a difference; it does not by itself identify its cause. Actual route: use the genuine assigned opening instead, or mark missing input. Answer once.

Read D1/G1 during the first interval to begin the graph. Use the word guide as needed. Start S1's brief checks and next actions during work and update only changes at the end.

D1: Complete invented count record

D1 is an author-invented classroom record, not a measurement, patient result or published dataset. A and B are generic candidate labels, not real drug identities. No biological identity, preparation method, treatment amount, timing or other operational parameter is supplied.

For this exercise, a plaque count is the supplied tally of localized affected areas in a cell-based test. It is not a direct count of every virus particle or a measure of illness in a person. You are interpreting the numbers, not producing them.

Columns: record ID | condition label | role | supplied plaque count. R | Reference | positive count used as the comparison denominator | 100. A | Candidate A | candidate comparison | 70. B | Candidate B | candidate comparison | 40. N | Background comparison | no-virus label in this fiction | 0.

Each row contains one invented count, not a mean, repeated-trial set or rate. Unit: counted plaques per supplied record. All four counts must stay visible in the graph. R and N are references, not antiviral candidates; rank only A and B.

For the arithmetic exercise, treat the count definition as the same across R, A and B and use R as the reference. This is a declared comparison assumption, not evidence that an actual assay was comparable.

No repeated counts, variability measure, counting-quality record or cell-viability evidence is supplied. These remain unknown. N=0 does not prove the absence of cell harm, measurement error or every other explanation. No control here proves a unique mechanism.

The condition names identify roles only. Do not infer experimental steps from them. If the assigned records are absent, use the labeled practice and ask the teacher for the actual records. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

G1: One fully specified count graph

Original route: make one vertical bar graph titled Invented plaque counts by condition. Horizontal axis: Condition. Use four equal-width bars labeled R Reference, A Candidate A, B Candidate B and N Background.

Vertical axis: Counted plaques per supplied record. Begin at 0 and mark equal steps of 20 through 100. Bar heights use D1: R 100, A 70, B 40, N 0. Place A 70 halfway between 60 and 80. Label the zero-count category 0 at the baseline; do not omit N.

Bars compare separate categories; do not join them into a time-series line. Add the caption Invented single-count records; no variability supplied. Error bars show a defined variability or uncertainty measure. None is supplied here, so do not invent error bars or treat a single count as repeated evidence.

Use the complete D1 text if no graph image is available. Paper and pencil or an editable graph are sufficient. The optional M1 model demonstrates the graph form with different non-biological data. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

P1: Percent reduction with a declared denominator

For each candidate, percent reduction = (reference count minus candidate count) divided by reference count, multiplied by 100. The denominator is R's count, not the candidate's count. Counts use the same unit, which cancels in the percentage.

A percent means parts per 100. Use R=100 and calculate once for A and once for B. Keep the subtraction and division visible beside the graph or in the evidence notes. Round only the final percentage to one decimal place for this practice.

The reference must be greater than 0 for this formula. If a genuine reference is 0, this percent reduction is undefined; do not divide by 0 or call the result 100%. A negative result would mean an increase relative to the reference, not a reduction.

At 12–28, rank only A and B by their calculated reductions. In this task, most effective means largest reduction in these supplied fictional counts under the comparison assumption. It does not mean safest drug or best patient treatment. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

R1: From counts to bounded reasoning

Antiviral inhibition means reduced viral activity; a mechanism explains how such a change occurs. With an appropriate comparison and supporting controls, fewer plaques can be consistent with reduced infection-related activity. That is a conditional interpretation, not proof from these fictional counts.

A lower count alone cannot distinguish antiviral action from harmed cells, differences in measurement, or other unmeasured causes. Cell viability means whether cells remain alive and functional; cytotoxicity means harm to cells. D1 supplies neither viability nor cytotoxicity results.

FDA treats mechanism, cell-based activity, cytotoxicity and clinical evidence as distinct evidence domains (FDA-DAV; FDA-GUIDANCE). Their distinction supports a limit here: a count ranking does not establish all of these. No clinical evidence or unique molecular mechanism is supplied.

CER means claim, evidence and reasoning. At 28–48, write a concise draft using C, E and R labels or one paragraph. Claim: identify the larger candidate reduction within D1 and state the comparison's limited scope.

Evidence: cite A's count and percent reduction versus R, then B's count and percent reduction versus R. Identify the reference count and units. These are the two required numeric entries; N is background context, not a winning antiviral.

Reasoning: explain why fewer plaques would be consistent with inhibition under appropriate comparison assumptions, then state that D1 cannot isolate the cause. Do not name a molecular target or claim the candidate proved safe. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

L1: Explain one real evidence limit

At 48–60, add one explained limitation to the same CER. Choose a gap that D1 actually has and explain which conclusion it prevents. Do not merely write more data needed.

Permitted examples: absent viability evidence prevents separating lower counts from cell harm; absent repeated counts prevents describing repeat-to-repeat variation. The records have not been shown to be comparable, which limits causal attribution; without patient evidence, they cannot support a clinical-effectiveness claim.

You need only one explained limitation. These examples identify missing evidence; they do not request an experiment or instructions to obtain it. Do not invent a verified control or claim that $N=0$ removes all confounds. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

Q1: Review and revise the same work

At 60–72, check the four graph categories, count axis and scale, zero marker, invented label and absence of invented error bars. Check both percent calculations against P1. Then check that the CER includes a bounded candidate claim, two numerical evidence entries, reasoning and one explained limit.

Reasoning must link the count pattern to a conditional interpretation; repeating the counts is not enough. A particular biological mechanism is not established here. The peer check does not demand one.

If a peer really comments, record one brief deidentified comment as peer review. Otherwise, use the same checks and label the record self review. Ask the teacher how to join any required peer activity.

Correct a real discrepancy on the same graph/CER, or record one verified match if no discrepancy is found. Do not invent a mistake or feedback. At 72–80, make the final revision and save or submit the same work. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

S1: Check your evidence and next actions

Use ten separate checks: obtain the assigned dataset and its source; ask whether the practice alternative is authorized; obtain the teacher rubric; open the official task; identify evidence from any actual prior lab work. Also check how to join required peer work; the grading or extra-credit directions; your section and deadline; the saved chosen-route document; and that Schoology shows Submitted after uploading.

Note a short evidence pointer for a check you performed or a specific next action. Update an existing record where available. The CER is written practice, not an actual lab result. Follow the official task separately and check Schoology after uploading.

The course plan names Activity 3.2.3 Going Un-Viral, Lesson 3.2 Body Guards. Ask the teacher to confirm the assigned task and stopping point; do not assume any prior lab was completed.

Assignment title: Wk17 CER: Antiviral data CER analysis. Section 1292:

<https://clevelandmetro.schoology.com/assignment/8544600111> . Section 6792:

<https://clevelandmetro.schoology.com/assignment/8544600148> . Use only your confirmed section. Ask the teacher whether the alternative is accepted and check access and the current deadline. Check Schoology after uploading.

If access is blocked, save the labeled graph and CER together and tell the teacher what you need. Check Schoology after uploading. May 11 moves to nephron and filtration; use only evidence from laboratory work actually performed. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

M1: Complete non-biological defect-count model

Optional invented printing example, not a second assignment. One record per option gives counted print defects: Reference 80, Option P 60, Option Q 40. Each record is declared comparable for this arithmetic exercise. No actual print run or repeated counts exist.

Model graph M-G1 is supplied. Title: Invented print-defect counts. Horizontal axis: Condition, with Reference, P and Q. Vertical axis: Counted defects per record, ticks 0, 20, 40, 60, 80. Three bar heights are 80, 60, 40. Caption: Invented single-count records; no variability supplied. No error bars.

$P \text{ reduction} = (80 - 60) / 80 \times 100 = 25.0\%$. $Q \text{ reduction} = (80 - 40) / 80 \times 100 = 50.0\%$. The reference denominator is 80 in both calculations. Zero reference would make the formula undefined. These are reductions in counts, not proof of why they differ.

Worked CER: Claim: Q has the largest reduction among these two fictional options. Evidence: P has 60 counted defects versus 80, a 25.0% reduction; Q has 40 versus 80, a 50.0% reduction. Reasoning: under the declared comparable-record assumption, fewer counted defects indicates a lower defect count for that record. It does not identify the cause. Limitation: single records provide no repeat-to-repeat variability, so they cannot establish consistent performance.

Worked self-check: all three bars match the record and both percentages use 80. No error bars or causal mechanism are claimed. I retained the draft because these checks match. This is a model check, not a fabricated peer reply. Use the method for D1; do not submit the model. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

Try the decision

Original route: N has zero counts and is labeled background, not a candidate. Does $N=0$ settle the cause of A/B reductions? Actual route: use genuine evidence/rubric instead.

- No; N does not supply missing viability, comparability or mechanism evidence.
- Yes; zero proves all cell harm and measurement issues are absent.
- Rank N as the best antiviral because its count is lowest.

Explain your choice using the reading. Discuss it or say it to yourself. This practice does not add another submission.

Your 80-minute flow

0–12 minutes	Use the teacher-provided printed plaque diagrams prepared in advance for Friday May 7, or their complete D1 text counts. They are invented practice evidence, not observations from cultured plates. No live plaque kit is approved. Do not relabel the counts as an actual Friday assay. The paper route has no incubation step because no cultures are produced. Start the one count graph.
12–28 minutes	Use P1 to compute A/B reductions and choose the bounded candidate claim. M1 is optional support. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.
28–48 minutes	Use R1 to draft one CER with two count/percentage entries and conditional reasoning. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.
48–60 minutes	Use L1 to add one explained limitation to the same CER. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.
60–72 minutes	Use Q1 for honest peer/self review of the completed graph and CER. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.
72–80 minutes	Revise the same graph/CER; use S1 to save or submit and update changed checks and next actions. Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

Your response record

Use these labels on paper or in your document. The space below also works when this page is printed.

One bounded opening

Original route: answer H1 using its local input. Actual route: use the genuine assigned opening or mark missing input.

Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.

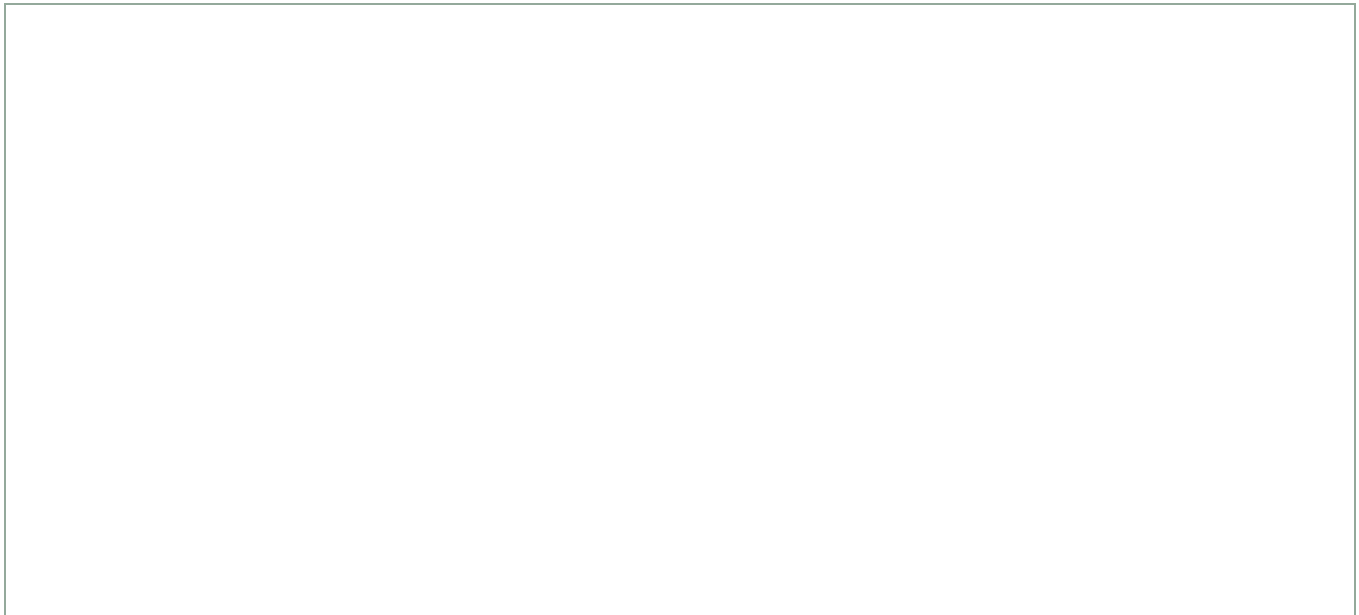


One count graph

Original route: use D1/G1 for four categories, stated scale, units and zero marker. Keep the invented label and no-error-bar limit.

Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.

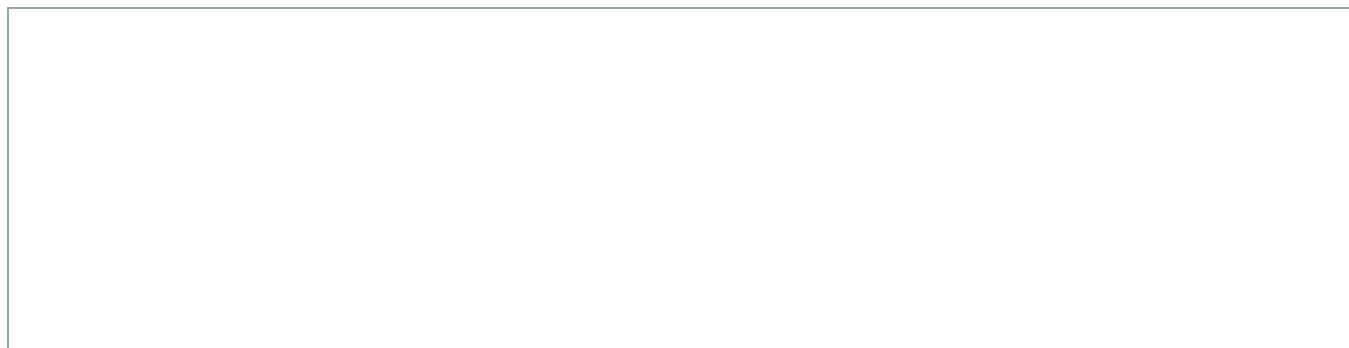


Two reductions and a bounded rank

Original route: use P1 for A and B relative to R. Keep the calculations visible; rank candidates only.

Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.

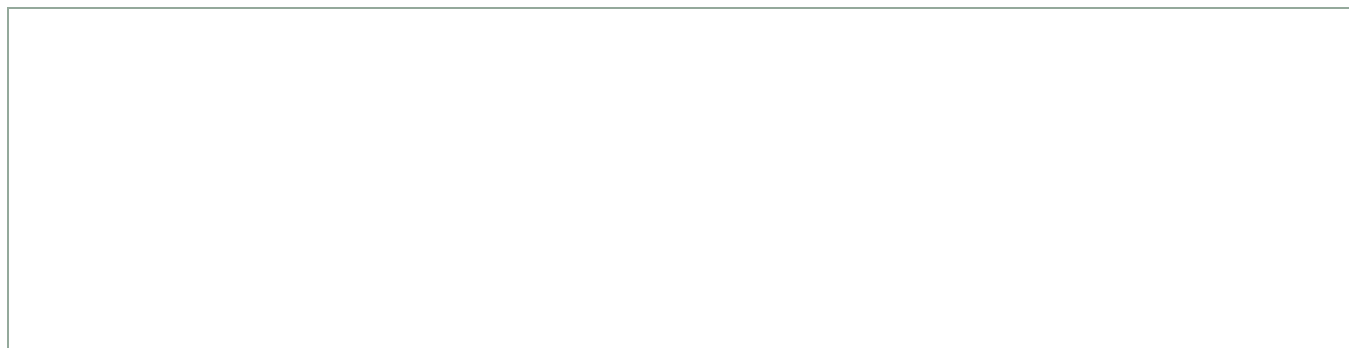


Draft the same CER

Original route: use R1 for claim, two count/percentage entries and conditional reasoning. Do not infer a molecular mechanism.

Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.



One explained evidence limit

Original route: use L1 to add one actual gap and its consequence to the same CER.

Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.

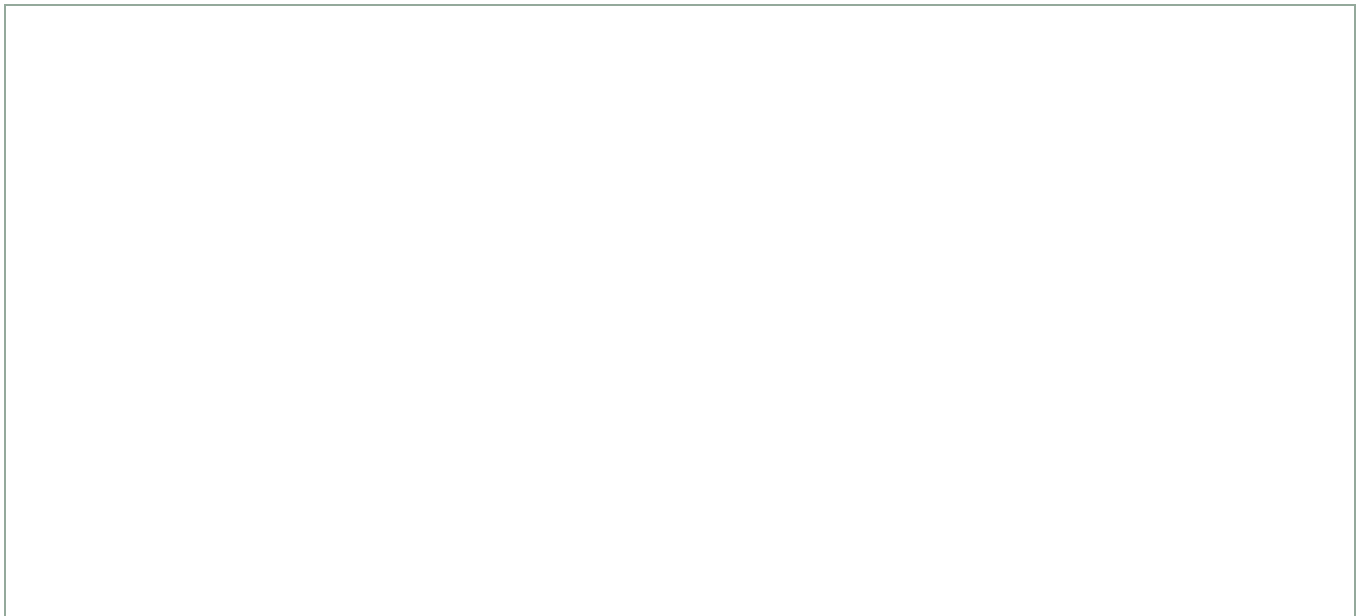


Honest review and revision

Original route: use Q1 to check the same graph/CER and record one real correction or verified match. Label peer/self honestly.

Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.



Save or submit the same work

Both routes: use S1 to note your checks and next actions, then save or submit through your section's assignment.

Actual route: genuine teacher-assigned data and rubric replace these fictional counts, graph choices and calculation conventions. Complete one graph and one CER only. Ask the teacher for any missing assigned materials before using them.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.

Check your product

- Original route: one labeled graph includes all four D1 counts, a zero baseline and no invented error bars.
- Original route: one CER names the candidate with the largest supplied reduction and cites A and B counts with percent reductions versus R.
- Chosen route: reasoning links lower count to a conditional inhibition interpretation and avoids unique-mechanism or clinical claims.
- Chosen route: one explained limitation identifies an evidence gap and the conclusion it prevents.
- Actual route: genuine data and rubric replace original counts, graph rules and checks; no duplicate product.
- Both routes: include only peer contributions and actual-work evidence that exist, follow official-task directions and check Schoology after uploading.

Keep the limit: Counts alone cannot establish clinical effectiveness, a unique antiviral mechanism, equal cell viability or that a candidate caused the difference.

Turn in your work

Save the graph and CER together. Submit only to your confirmed section. Section 1292:

<https://clevelandmetro.schoology.com/assignment/8544600111> . Section 6792:

<https://clevelandmetro.schoology.com/assignment/8544600148> . Confirm accepted preparation, rubric and current deadline. Paper interpretation only. Use supplied count records; do not perform, plan or optimize an assay, biological treatment or experiment. No actual lab completion is assumed.

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[Section 1292: Wk17 CER: Antiviral data CER analysis](#)

[Section 6792: Wk17 CER: Antiviral data CER analysis](#)

Carry forward

A numerical reduction can support a bounded comparison; a causal or clinical claim needs evidence the count alone does not supply.

Tuesday May 11 studies nephron and filtration. No actual assay completion, drug effect or patient result is assumed. How do blood and filtrate move through different parts of the nephron?

Sources and resources

[Open today's page](#)

FDA-GUIDANCE · Antiviral Product Development: Conducting and Submitting Virology Studies to the Agency

US Food and Drug Administration, guidance landing page (2006)

<https://www.fda.gov/regulatory-information/search-fda-guidance-documents/antiviral-product-development-conducting-and-submitting-virology-studies-agency>

FDA-DAV · Division of Antivirals: Information for Pre-IND Submissions

US Food and Drug Administration

<https://www.fda.gov/about-fda/cder-offices-and-divisions/division-antivirals-dav-information-pre-ind-submissions>