

Pathogen transmission: paper case reasoning

Your goal: Classify six groups of infectious agents and use supplied fictional cases to explain how prevention can reduce a specific route of exposure.

One product: One notebook record: six case rows with a supported possibility, route, prevention choice and a mismatched choice with reasons; a three-item packing reflection on the same page or continued pages.

Question: How can an exposure clue help us choose prevention without pretending to know a diagnosis?

Start the work

Earlier work is not required. Today supplies the definitions, records and decision rule.

1. Read the agent and route reference. Distinguish cells from noncellular agents.
2. Study the complete worked example, then read the six supplied fictional records.
3. Complete one six-row table. Treat each disease match as a possibility, not a diagnosis.
4. Choose three supplied prevention items and explain the routes addressed and one remaining gap.
5. Check the same record and submit one readable photo or PDF in your confirmed section.

If access fails, keep the saved file and tell the teacher what failed.

Words you will use

pathogen

An infectious agent capable of causing disease.

infectious agent

A biological cause of an infection; it may be cellular or noncellular.

cell

A basic living unit enclosed by a membrane.

nucleus

The membrane-enclosed part of a cell that holds most of its DNA.

prion

An infectious misfolded protein; it is not a cell.

virus

A noncellular infectious agent that uses host cells to make more viruses.

host

An organism that an infectious agent lives in or uses.

bacterium

A single-celled organism without a membrane-enclosed nucleus. Bacteria is the plural.

protist

A member of a diverse group with a nucleus. The disease-causing examples here are single-celled parasites.

parasite

An organism that lives in or on a host and benefits at the host's expense.

fungus

An organism with nucleated cells, including single-celled yeasts and multicellular molds. Fungi is the plural.

helminth

A parasitic worm made of many cells with nuclei.

exposure

Contact with a possible source of an infectious agent; it does not prove infection.

transmission route

The path an infectious agent can take between a source and a new host.

direct contact

Spread through immediate contact with an infected person or animal.

indirect contact

Spread through an object or surface carrying an infectious agent.

respiratory particle

A small piece of fluid released into air during breathing, speaking, coughing or sneezing.

droplet

A respiratory particle that can deposit on nearby eyes, nose or mouth. Size and travel distance vary.

airborne spread

Transmission through inhaling infectious particles that remain suspended in air.

vector

A living carrier, such as a mosquito, that transmits an infectious agent.

ingestion

Taking something into the body through the mouth by eating or drinking.

blood exposure

Contact with infected blood that can reach broken skin, a needle injury or a mucous membrane.

prevention

An action that can reduce a risk; it does not guarantee that no infection occurs.

ventilation

Movement of air that can reduce the amount of infectious particles indoors.

vaccination

Use of a vaccine to prepare immune defenses against a specific infection.

hypothesis

A possible explanation that still needs evidence.

diagnosis

A clinical determination of the cause or identity of a health problem.

symptom

A change a person notices, such as pain or feeling tired.

jaundice

Yellowing of skin or eyes; it has several possible causes.

larva

An immature form of an animal such as a worm.

barrier

Something that separates a possible exposure from a person.

evidence limit

What a record cannot establish.

antiviral

A medicine that acts against particular viruses. No medicine is selected or tested here.

Plasmodium

A group of single-celled parasites that cause malaria.

Giardia

A single-celled parasite that can cause intestinal illness.

H1: One paper notebook record

Today is a paper and discussion lesson. Use only the printed fictional records. Do not exchange fluids, handle organisms, collect samples or carry out an experiment. No actual patient is being assessed.

Start with this rule: a prevention choice should address the possible path of exposure. An exposure clue does not tell us for certain which disease a person has. At 0-10, read H1 and A1. In the margin, list the two noncellular groups and explain why an exposure clue is not a diagnosis.

Your work is one notebook record, with short phrases in a six-row table and one packing reflection. There is no extra group submission. Work alone, or discuss with a partner while keeping your own record. If a teacher has already accepted equivalent work, follow that direction instead of duplicating it.

A1: Six groups in this lesson

Prions and viruses are not cells. A prion is an infectious misfolded protein. A virus depends on host cells to make more viruses.

Bacteria are single cells without a nucleus. The disease-causing protists used here are single cells with a nucleus. Protist is a broad grouping; not every protist is single-celled or causes disease.

Fungi have cells with nuclei. Yeasts are single-celled; molds have many cells. Helminths are multicellular parasitic worms. Many bacteria, protists and fungi do not cause human disease. These six teaching groups are not a claim that all life is harmful.

R1: Route reference, with its limits

Contact may be direct or indirect. Athlete's foot is a fungal infection that can spread through infected skin or contaminated surfaces. Damp conditions can favor it. Skin symptoms alone do not identify a fungus or prove how it arrived.

Respiratory particles can deposit on nearby eyes, nose or mouth, or be inhaled from the air. Influenza can spread through droplets and smaller airborne particles. There is no sharp two-meter boundary separating safe from unsafe air. Measles is caused by a virus that spreads efficiently through shared air.

A vector carries an agent between hosts. In the malaria example, infected *Anopheles* mosquitoes carry *Plasmodium* parasites. A symptom pattern and a possible exposure suggest possibilities; neither identifies the parasite species or confirms malaria.

Giardia can spread when a person swallows contaminated water or food, and through other fecal contamination routes. Symptoms often begin one to two weeks after infection. Diarrhea has many other possible causes.

Some human hookworm larvae can enter skin from contaminated soil. Bare-skin contact with such soil is a possible exposure. Symptoms alone do not prove hookworm; they only support considering that route.

Hepatitis B is a viral liver infection that can spread when infected blood or certain body fluids enter another person's body. Blood entering a break in the skin is a possible exposure. Symptoms alone are not enough to diagnose hepatitis B.

Prions differ from cells and viruses. Variant Creutzfeldt-Jakob disease has been linked to eating products from cattle infected with BSE, a prion disease of cattle. It is not spread by ordinary touching or sharing air. This example is background, not one of the six case diagnoses.

P1: Supplied prevention choices

Use these conceptual choices; this is not equipment training or personal medical advice. No choice guarantees protection. A choice can reduce one route while leaving another route open.

Mosquito net or insect repellent: can reduce mosquito bites. It does not make drinking water safe. Closed shoes: can reduce bare-skin contact with contaminated soil. They do not prevent inhaling respiratory particles.

Safe drinking-water supply or a suitable water-treatment method: can reduce ingestion of organisms such as Giardia. A generic filter does not remove every type of infectious agent. No filter specification, boiling procedure or experiment is assigned here.

Well-fitting mask: can reduce some respiratory-particle exposure. Ventilation and avoiding crowded shared air add protection. Neither is a guarantee, and a mask does not prevent a mosquito bite.

Protective gloves: can reduce direct blood contact when used correctly by a trained person. Vaccination can help prevent specific infections, including hepatitis B. Gloves do not replace training or prevent every injury; no first-aid practice is assigned here.

Clean, dry socks and footwear: support foot hygiene. Avoiding shared contaminated footwear or surfaces addresses indirect contact. Dry socks alone do not prove that a fungal infection has been prevented. Do not choose or apply a treatment.

Packing menu for the reflection: mosquito net, insect repellent, closed shoes, safe drinking-water supply, well-fitting masks, protective gloves, clean dry socks. Choose exactly three categories from this list. A remaining gap may be addressed by a behavior or a pre-trip discussion with a qualified clinician, rather than a fourth packed item.

C1-C6: Complete fictional expedition records

These six short records were supplied as classroom fiction. No test results, verified diagnoses, travel geography or actual patient outcomes are supplied. Do not add them. Use R1 and P1 to justify a possibility.

C1: Fever and chills every other day after nights sleeping without a net.

C2: Itchy, peeling skin between the toes after a week in wet boots.

C3: Cough and fever two days after sharing a crowded van with a sick driver.

C4: Itchy rash on the soles, then stomach pain weeks later, after walking barefoot near a latrine. A latrine is a toilet facility; contaminated soil is possible, not confirmed.

C5: A guide cut their hand while treating a bleeding client without gloves. Months later, the guide had yellow skin and fatigue.

C6: Cramping diarrhea one week after drinking from a stream.

T1: Table method and one paper trace

At 28-45, start C1-C3. At 45-58, complete C4-C6. Use six columns: case ID; possible agent group or example; exposure clue and route; prevention choice with reason; mismatched choice with reason; one limit. Keep each cell to a phrase or one short sentence.

For each row, read the exposure clue, choose a route using R1, then link a prevention choice from P1 to that route. Write a possibility such as “consistent with,” rather than “has.” Other causes remain possible.

On one chosen row, add a simple written arrow: supplied exposure clue → possible route → prevention that addresses it. This is a paper trace of reasoning, not a simulation of infection or a physical exchange. The arrow may fit in the route cell; no separate diagram is due.

Q1: Three-item reflection and check

At 58-70, choose exactly three categories from the P1 packing menu. For each, name a route it can reduce. Name one route or exposure your three choices leave open. Explain one non-item action or pre-trip question that could address that gap. There is no single perfect pack.

Check the same notebook record: six case IDs, six tentative matches, reasons for both choices, a limit in each row, one paper arrow and the reflection. Remove any certain diagnosis or guaranteed prevention claim. A partner can question one reason; alone, compare it directly with R1 and P1. Do not invent a partner comment.

S1: Save and submit the same record

At 70-80, save one readable photo or PDF of the notebook record, including any continued pages. Submit by the end of class on May 5. Use your confirmed section's "Wk16 Lab notebook: Pathogen transmission" assignment.

Section 1292: <https://clevelandmetro.schoology.com/assignment/8544598402> . Section 6792: <https://clevelandmetro.schoology.com/assignment/8544598417> . Choose only your own section. If access fails, keep the saved file and tell the teacher what failed. After uploading, check that Schoology shows Submitted.

This paper work does not certify completion of any separate myPLTW online task. If the teacher assigns that work, use the actual task and directions. Keep its completion separate from your notebook.

Check the record, its source reasons and the saved file. Open your own section's assignment, upload the file, check that Schoology shows Submitted and ask the teacher for feedback. Mark only what actually happened. Missing steps remain unfinished; do not repeat the full record just to fill this check.

M1: Distinct complete measles-reference example

This fictional model is different from C1-C6. A visitor shared indoor air with a person whose measles infection was already confirmed. No illness or test result is supplied for the visitor.

Worked row: possible agent group = virus; clue and route = shared air with a confirmed source, so airborne exposure is plausible; prevention = vaccination can reduce measles risk, with qualified health guidance; mismatch = dry socks do not address shared air; limit = exposure does not show that the visitor became infected.

Paper arrow: shared indoor air → possible inhaled particles → route-focused prevention. This explains reasoning form. It is not a diagnosis or a personal prevention plan. Use the same form with each supplied case's own clue.

Try the decision

A case contains an exposure clue but no diagnostic test. What is justified?

- Name a plausible route and explain prevention, keeping other causes possible.
- Call the suggested disease certain because the exposure clue fits, without diagnostic testing.
- Say the chosen prevention item guarantees no infection despite the case's limited evidence.

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

Your 80-minute flow

0–10 minutes	H1/A1 and opening margin note
10–28 minutes	R1/P1/M1, then set up the six-row table
28–45 minutes	C1-C3 with T1
45–58 minutes	C4-C6 and the one paper arrow
58–70 minutes	Q1 three-item reflection and record check
70–80 minutes	S1 save and section submission

Your response record

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

Two noncellular groups

Use H1/A1 to name both noncellular groups and state why a clue is not a diagnosis.

Use the named supplied reference. Short phrases are enough; keep this in the same notebook record.

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

Read the model and choices

Use R1/P1/M1 to identify how the model links an exposure to a prevention choice. Use this method in your table; no copied model row is due.

Use the named supplied reference. Short phrases are enough; keep this in the same notebook record.

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

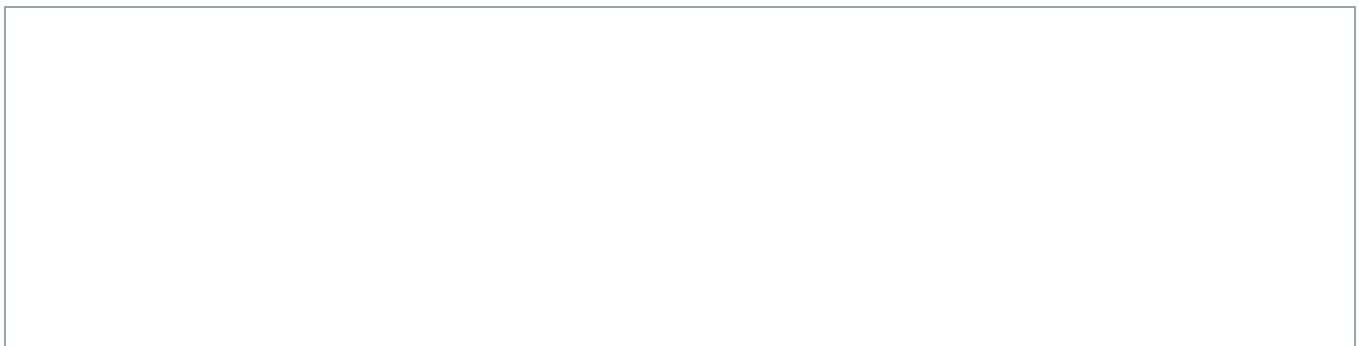


First three case rows

Use C1-C3, R1, P1 and T1 for the first three rows.

Use the named supplied reference. Short phrases are enough; keep this in the same notebook record.

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



Last three case rows and trace

Complete C4-C6 using T1. Add the one paper arrow to a chosen row.

Use the named supplied reference. Short phrases are enough; keep this in the same notebook record.

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



Three-item reflection

Use Q1 and the P1 menu for three choices, routes and one remaining gap with a non-item response.

Use the named supplied reference. Short phrases are enough; keep this in the same notebook record.

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



Check, save and submit

Use Q1/S1 to check the same record and submit to the confirmed section. After uploading, check that Schoology shows Submitted.

Use the named supplied reference. Short phrases are enough; keep this in the same notebook record.

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

A large, empty rectangular box with a thin black border, intended for a drawing, table, or graph.

Check your product

- I distinguish cellular from noncellular agents using A1.
- My six rows name exposure clues, plausible routes and reasons for matched and mismatched prevention choices.
- I keep the case matches tentative and identify missing evidence.
- My three-item reflection names one remaining gap and a response.
- I save the same record and report submission truthfully.

Keep the limit: Fictional exposure clues support route reasoning and possible agent matches. They cannot establish diagnoses, actual transmission, guaranteed prevention or official task completion.

Turn in your work

Submit one readable photo or PDF by the end of May 5 class using the correct section link in S1. If access fails, keep your file and tell the teacher. After uploading, check that Schoology shows Submitted.

If access fails, keep the saved file and tell the teacher what failed.

[Section 1292: Wk16 Lab notebook: Pathogen transmission](#)

[Section 6792: Wk16 Lab notebook: Pathogen transmission](#)

Carry forward

Match prevention to a plausible route; exposure clues alone do not prove a diagnosis.

The next class is Friday May 7. It supplies its own paper records and eye reference; this lesson does not authorize laboratory work. How will you keep the count record separate from the eye-anatomy reference?

Sources and resources

[Open today's page](#)

CDC-FLU · Infection Prevention and Control Strategies for Seasonal Influenza

CDC

<https://www.cdc.gov/flu/hcp/infection-control/healthcare-settings.html>

CDC-GIARDIA · About Giardia Infection

CDC

<https://www.cdc.gov/giardia/about/>

CDC-RINGWORM · Clinical Overview of Ringworm

CDC

<https://www.cdc.gov/ringworm/hcp/clinical-overview/>

CDC-HOOKWORM · About Hookworm

CDC

<https://www.cdc.gov/sth/about/hookworm.html>

CDC-HBV · Hepatitis B Basics

CDC

<https://www.cdc.gov/hepatitis-b/about/index.html>

CDC-MALARIA · Clinical Testing and Diagnosis for Malaria

CDC

<https://www.cdc.gov/malaria/hcp/diagnosis-testing/index.html>

CDC-MEASLES · About Measles

CDC

<https://www.cdc.gov/measles/about/>

CDC-PRION · Clinical Overview of Variant Creutzfeldt-Jakob Disease

CDC

<https://www.cdc.gov/variant-creutzfeldt-jakob/hcp/clinical-overview/index.html>

OPENSTAX · Types of Microorganisms

OpenStax

<https://openstax.org/books/microbiology/pages/1-3-types-of-microorganisms>