

Study Guide — BI Problem 1: Emergency Room (Pretest)

Biomedical Innovations · Problem 1 — Emergency Room · Modeled on the PLTW Guided Review format

Vocabulary to know cold

Term	Definition
Patient identifier	Information (full name, date of birth, ID number) used to confirm a specimen belongs to the correct patient.
Sharps container	A rigid, puncture-resistant container for disposing of needles, lancets, and other sharp items.
Biohazard waste	Material contaminated with blood or body fluids that must be disposed of in red bags or approved containers.
PPE	Personal protective equipment such as gloves, gown/lab coat, and eye protection used to protect against exposure.
Triage	The process of sorting patients by urgency so the most critical are treated first.
Vital signs	Basic body measurements — heart rate, blood pressure, respiratory rate, temperature, oxygen saturation.
Tachycardia	A resting heart rate that is faster than normal (above about 100 bpm in adults).
Independent variable	The one factor an experimenter deliberately changes to test its effect.
Dependent variable	The outcome that is measured and may respond to changes in the independent variable.
Control line	A built-in indicator on a rapid test that confirms the test ran correctly and the result is valid.
Replication	Repeating measurements or trials to reduce random error and increase reliability.
Pre-analytical error	A mistake that happens before testing — such as mislabeling, wrong tube, or improper storage.

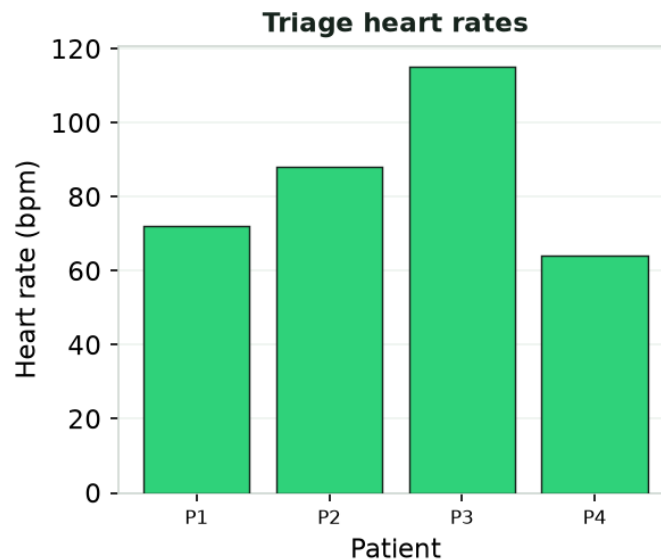
Worked examples (follow the reasoning)

Example 1. A blood tube arrives at the lab with the patient's name but no date or time of collection. Should the lab run the test? Explain.

- Recall that complete labeling requires patient identifiers AND collection date/time.
- A missing collection time is a pre-analytical error: time-sensitive tests cannot be interpreted without it.
- Standard policy is to reject incompletely labeled specimens rather than risk an unsafe result.
- Request a properly labeled recollection.

Answer: No — reject the specimen and request a recollection because the labeling is incomplete (pre-analytical error).

Example 2. Triage records four patients' heart rates. Using a bar graph, identify which patient is tachycardic.



- Recall normal resting heart rate is about 60-100 bpm.
- Read each bar: P1=72, P2=88, P3=115, P4=64.
- Find the value above 100 bpm.
- P3 at 115 bpm exceeds the normal range.

Answer: Patient P3 (115 bpm) is tachycardic.

Practice questions (with reasoning)

1. Which item belongs in a red biohazard bag rather than the regular trash?

- A. A blood-soaked gauze pad
- B. A clean paper towel
- C. An empty cardboard box
- D. A pencil

Answer: A. Items contaminated with blood or body fluids are biohazard waste.

2. An experiment compares a new glucose meter to the lab standard. The dependent (measured) variable is:

- A. Which meter is used
- B. The glucose value each meter reports
- C. The brand name of the meter
- D. The room temperature

Answer: B. The dependent variable is the outcome measured — the reported glucose value.

3. A rapid test shows a result line but NO control line. The correct interpretation is:

- A. The result is valid and positive
- B. The test is invalid and must be repeated
- C. The patient is healthy
- D. The sample was too cold

Answer: B. No control line means the test did not run properly; the result is invalid.