

Exercise walk-through

6.1

Injury evidence: compare exposure as well as counts

6.1 Injury evidence: compare exposure as well as counts

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS incidence rate • overuse injury

Objective

Injury evidence: compare exposure as well as counts. Supported HL concept preparation; original classroom practice, not an official IB paper or assessed learner work.

1 Key knowledge and worked examples

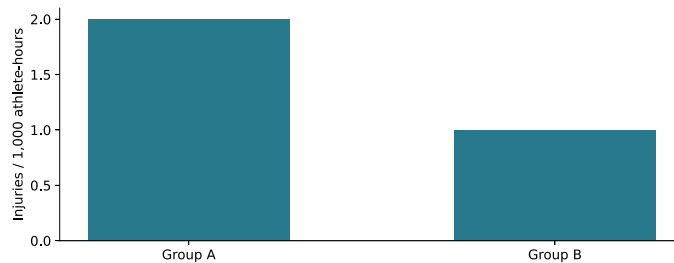
■ What would explain this observation?

- A team records more injuries after adding training sessions. A larger count does not necessarily mean a larger risk per hour of exposure.
- Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

■ Build the model

- Injury surveillance requires an explicit injury definition, consistent recording and an exposure denominator. Acute injuries follow a particular event; overuse injuries can develop through repeated loading. Mechanism, tissue capacity, previous injury, equipment and environment can contribute, so one observed association rarely establishes a single cause.

- **incidence rate** : New events divided by a specified exposure measure; **overuse**
injury : Injury associated with repeated loading over time.
-



■ **Choose evidence that can test it**

- An incidence rate divides new injury events by exposure time, often expressed per 1,000 athlete-hours. Use the same case definition and exposure method in comparisons. Severity, recurrence and missing records also matter; two groups with equal incidence can have different time lost or different injury types.
- Use anonymized fictional surveillance tables. Identify what counts as an injury and how training or match exposure was recorded. Calculate comparable rates, check sample sizes and reporting changes, and propose prevention hypotheses for qualified staff to evaluate. Students do not induce injuries, diagnose peers or decide return-to-play clearance.

■ **Work from known quantities**

- State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution.
- Known: group A has 6 injuries in 3,000 athlete-hours, rate 2 per 1,000 hours. Group B has 8 injuries in 8,000 athlete-hours, rate 1 per 1,000 hours. Group B has the larger count but the smaller recorded exposure-normalized rate. Different reporting systems or injury severity could still make the comparison misleading.

Example:

A fictional group records 9 injuries in 4,500 athlete-hours. Calculate injuries per 1,000 hours. Use the same sequence: known quantities $\rightarrow$ model $\rightarrow$ relation $\rightarrow$ substitution $\rightarrow$ unit and interpretation.

■ **Check the conclusion and its limits**

- A rate estimate from a small number of events is uncertain. A low recorded rate can reflect under-reporting, and exposure-normalized association is not proof of a prevention intervention's causal effect.
 - Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.
-

Warn:

The group with more recorded injuries necessarily has a greater injury rate per hour. This claim is false: A rate estimate from a small number of events is uncertain. A low recorded rate can reflect under-reporting, and exposure-normalized association is not proof of a prevention intervention's causal effect.

Key:

Injury evidence: compare exposure as well as counts: An incidence rate divides new injury events by exposure time, often expressed per 1,000 athlete-hours. Use the same case definition and exposure method in comparisons. Severity, recurrence and missing records also matter; two groups with equal incidence can have different time lost or different injury types.

Exercises 2.1·2.2

2.1 Why use athlete-hours when comparing injury counts? Choose one answer.

- **A** To account for unequal recorded exposure
- **B** To prove every injury has one cause
- **C** To remove all reporting bias automatically

[1]

2.2 A fictional group records 9 injuries in 4,500 athlete-hours. Calculate injuries per 1,000 hours. Show the relation, substitution and units.

[2]

Exercises 2.1·2.2

2.1 Why use athlete-hours when comparing injury counts? Choose one answer.

- **A** To account for unequal recorded exposure
- **B** To prove every injury has one cause
- **C** To remove all reporting bias automatically

[1]

2.1 A An incidence rate divides new injury events by exposure time, often expressed per 1,000 athlete-hours. Use the same case definition and exposure method in comparisons. Severity, recurrence and missing records also matter; two groups with equal incidence can have different time lost or different injury types.

2.2 A fictional group records 9 injuries in 4,500 athlete-hours. Calculate injuries per 1,000 hours. Show the relation, substitution and units. [2]

2.2 $\text{Rate} = 9 / 4,500 \times 1,000 = 2$ per 1,000 athlete-hours.

Exercises 2.3-3.1

2.3 Decide whether this claim is true and justify: The group with more recorded injuries necessarily has a greater injury rate per hour. [2]

2.4 New events divided by a specified exposure measure: write the technical term. [1]

3 Exam-style questions

3.1 Fictional groups report 4 injuries in 2,000 hours and 6 in 6,000 hours. Compare rates and state a limitation before claiming one programme is safer. [4]

Exercises 2.3-3.1

2.3 Decide whether this claim is true and justify: The group with more recorded injuries necessarily has a greater injury rate per hour. [2]

2.3 False. A rate estimate from a small number of events is uncertain. A low recorded rate can reflect under-reporting, and exposure-normalized association is not proof of a prevention intervention's causal effect.

2.4 New events divided by a specified exposure measure: write the technical term. [1]

3 Exam-style questions

2.4 incidence rate. incidence rate means New events divided by a specified exposure measure.

3.1 Fictional groups report 4 injuries in 2,000 hours and 6 in 6,000 hours. Compare rates and state a limitation before claiming one programme is safer. [4]

3.1 Rates are 2 and 1 per 1,000 hours. Definitions, severity, reporting, exposure mix and uncertainty affect comparisons. Observed rates alone cannot establish causation.