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. Original classroom practice for IB HL; not an official IB paper.

1 Key knowledge and worked examples

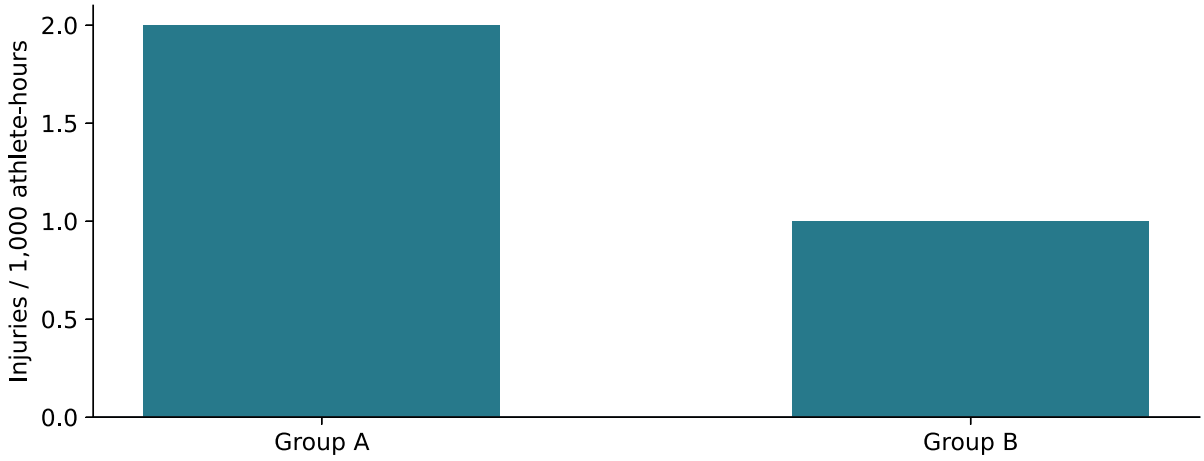
What would explain this observation?

- A team records more injuries after adding training sessions. A larger count does not necessarily mean a larger risk per hour of exposure.

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.

exercises.lol exercises.com.cn



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.

In the lab: 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

- 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.

Your turn: A fictional group records 9 injuries in 4,500 athlete-hours. Calculate injuries per 1,000 hours.

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.

Not true: The group with more recorded injuries necessarily has a greater injury rate per hour. Rate = count / exposure. More injuries with much more exposure can be a LOWER rate per hour - as the worked case shows, 8 injuries in 8,000 hours (1 per 1,000)

has a lower recorded rate than 6 in 3,000 (2 per 1,000). This alone does not establish greater safety.

Key:

- Injury surveillance requires an explicit injury definition, consistent recording and an exposure denominator.
- An incidence rate divides new injury events by exposure time, often expressed per 1,000 athlete-hours.
- Watch for: A rate estimate from a small number of events is uncertain.

Write from 3 injuries per 1,000 hours

- A fictional group records 3 injuries in 1,000 athlete-hours.
- Find the injury rate. A smaller count can still be a higher rate.

2 Practice

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

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

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.lol exercises.com.cn

Solutions

2.1 A Counts are comparable only against equal exposure: a group that trains twice as many hours is expected to have more injuries without being more dangerous. Athlete-hours normalise the exposure.

2.2 Rate=9/4,500×1,000=2 per 1,000 athlete-hours.

2.3 False. Rate = count / exposure. More injuries with much more exposure can be a LOWER rate per hour - as the worked case shows, 8 injuries in 8,000 hours (1 per 1,000) has a lower recorded rate than 6 in 3,000 (2 per 1,000). This alone does not establish greater safety.

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

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.