Health issues

4.2.2.5 · Biology · revision notes

What health is, the difference between communicable and non-communicable diseases, how different diseases can interact, and how to handle disease data using tables, charts, histograms, scatter diagrams and samples. Questions are usually short explanations and calculations from data.

Key facts

- Health = the state of physical and mental well-being
- Non-communicable = cannot be passed from person to person
- Virus living in cells → can trigger cancer
- Severe physical illness → depression and other mental illness
- Good sample: large, random, representative
- Communicable = caused by pathogens, can spread
- Immune system defect → more infectious diseases
- Immune reaction to a pathogen → can trigger an allergy (rash, asthma)
- Rate per 1000 = number of cases ÷ population × 1000

Notes

Health and disease

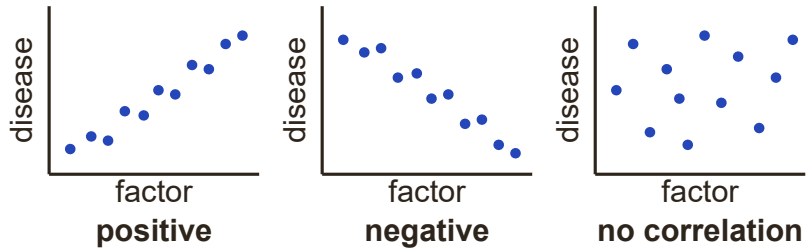
- **Health** is the state of physical and mental well-being.
- Diseases, both communicable and non-communicable, are major causes of ill health.
- **Communicable** (infectious) diseases are caused by pathogens and can spread, e.g. measles. **Non-communicable** diseases cannot be passed on, e.g. coronary heart disease and type 2 diabetes.
- Other factors, including diet, stress and life situations (such as poverty, poor housing or lack of access to healthcare), can have a profound effect on both physical and mental health.

How diseases interact

- Defects in the **immune system** make a person more likely to suffer from infectious diseases (e.g. people with HIV).
- **Viruses** living in cells can be the trigger for **cancers** (e.g. HPV infection can lead to cervical cancer).
- **Immune reactions** first caused by a pathogen can trigger **allergies**, such as skin rashes and asthma.
- Severe **physical** ill health can lead to **depression** and other mental illness.

Working with health data

- Disease incidence is often given as a rate, e.g. cases per 1000 or per 100 000 people, so that populations of different sizes can be compared.
- Use a bar chart (with gaps) for categories, e.g. different diseases. Use a histogram (bars touching) for continuous data in classes, e.g. age groups.
- Plot one variable against the other on a **scatter diagram** to see whether they are correlated (positive, negative or no correlation).



Scatter diagrams showing positive, negative and no correlation

- Scientists usually study a **sample** rather than a whole population. A good sample is large, random and representative (a range of ages, sexes and backgrounds), so the conclusions apply to the whole population.

How to answer each type of question

Explain how diseases can interact

2 marks **Grade 5**

1. Say what the first condition does.
2. Link it to the second condition with 'so' or 'because'.

Example. People with a defect in their immune system often get more infectious diseases than other people.
Explain why.

Model answer. Their immune system / white blood cells cannot destroy pathogens as effectively (1), so pathogens are more likely to reproduce in the body and cause disease (1).

Calculate from disease data

2 to 4 marks | Grade 6

1. Read values carefully, checking the scale and the units (e.g. 'per 1000').
2. Write out the calculation, e.g. rate = cases ÷ population × 1000.
3. Round sensibly and check the answer is reasonable.

Example. In a town of 48 000 people, 1920 people have asthma.
(a) Calculate the number of people with asthma per 1000 people.
(b) In a second town, 35 people per 1000 have asthma. This town has a population of 60 000. Calculate how many people in the second town have asthma.

Model answer.

(a) 1920 ÷ 48 000 × 1000 (1) = 40 per 1000 (1)
(b) 35 ÷ 1000 × 60 000 (1) = 2100 (1)

Evaluate a sample or study

2 to 3 marks | Grade 7

1. Sample size: is it large enough?
2. Is it random and representative (ages, sexes, places, times of year)?
3. Were other variables that might affect the results considered?

Example. A scientist wanted to find out whether stress affects how many colds people catch. She studied 20 office workers from one company for one month.
Give **two** reasons why her conclusion may not be valid.

Model answer. The sample is too small (1). The sample is not representative, e.g. everyone is from one company / one type of job / the study only covered one month (1).

Suggest how other factors affect health

2 marks | Grade 5

1. Think about both physical and mental health.
2. Give a specific link, not just 'it is bad for you'.

Example. Suggest how long-term stress at work could affect a person's health.

Model answer. It could affect mental health, e.g. cause anxiety or depression (1). It could affect physical health, e.g. poor sleep or a poor diet, making illness more likely (1).

Don't lose marks

- Defining health as 'not having a disease'. It is the state of physical and mental well-being.
- Saying non-communicable means 'not serious' or 'not caused by anything'. It means it cannot be passed from person to person.
- Misreading a graph scale, or forgetting 'per 1000' when working out a total number of people.

- ✗ Drawing bar charts with touching bars for categories, or histograms with gaps for continuous data.
- ✗ Saying a small sample 'is not accurate'. Say it may not be representative, so the conclusion may not be valid.

More tips

Memory tricks

- Four disease interactions, 'Immune, Virus, Allergy, Mind': immune defect → infection; virus → cancer; immune reaction → allergy; physical illness → mental illness.
- Per 1000: divide the cases by the population, then multiply by 1000. The answer must be less than 1000.
- Sampling checklist: Big, Random, Representative.

Exam technique

- When a question gives a table or graph, use numbers from it in your answer.
- Use the words 'random' and 'representative' when commenting on samples.
- In 'suggest' questions on disease interactions, apply the idea to the example in the question rather than just repeating a rule.

What each grade needs

What you need to be able to do, from the first marks up to the top grade.

Grade 3 — **Define health**
Health is the state of physical and mental well-being.

Grade 4 — **Tell communicable and non-communicable diseases apart**
Communicable diseases are caused by pathogens and can spread; non-communicable diseases cannot be passed from one person to another.

Grade 5 — **Give factors other than disease affecting health**
Diet, stress and life situations can have a big effect on both physical and mental health.

Grade 5 — **Describe how different diseases can interact**
Immune defects increase infections, viruses can trigger cancers, immune reactions can trigger allergies, and severe physical illness can lead to depression.

Grade 6 — **Calculate and interpret values from disease data**
Read values from tables and graphs, calculate rates per 1000 people or percentages, and describe trends.

Grade 7 — **Evaluate how representative a sample is**
Large, random samples that include a range of people give data you can apply to the whole population.

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