# Health issues

4.2.2.5 · Organisation · 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

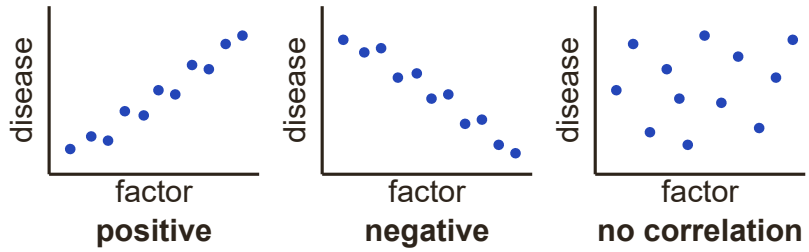
- **Health** is the state of physical and mental well-being.
- Diseases, both communicable and non-communicable, are major causes of ill health.
- **Communicable** (infectious) diseases are caused by pathogens and can spread, e.g. measles. **Non-communicable** diseases cannot be passed on, e.g. coronary 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.

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**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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