

# The effect of lifestyle on some non-communicable diseases

4.2.2.6 · Biology · revision notes

How risk factors such as diet, smoking, lack of exercise and alcohol affect the incidence of non-communicable diseases, why a correlation is not the same as causation, and the human and financial costs of these diseases. Expect scatter-graph data questions, 'explain' questions on particular risk factors and 'discuss' questions on costs.

## Key facts

- Risk factor = linked to an increased rate of a disease
- Obesity → type 2 diabetes
- Smoking → lung disease and lung cancer
- Carcinogens (including ionising radiation) → cancer
- Diet, smoking and lack of exercise → cardiovascular disease
- Alcohol → liver disease and effects on brain function
- Smoking and alcohol in pregnancy → harm to the unborn baby
- Correlation does not prove causation: a causal mechanism is needed

## Notes

### Risk factors

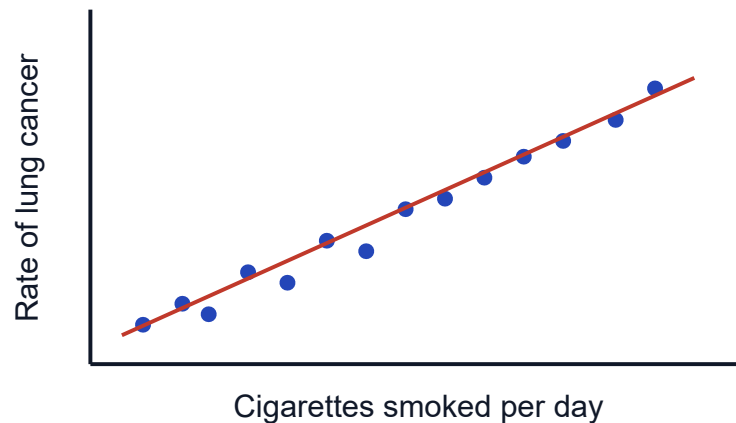
- A **risk factor** is linked to an increased rate of a disease. It can be an aspect of a person's **lifestyle** (e.g. smoking) or a **substance** in the person's body or environment (e.g. ionising radiation).
- A risk factor increases the chance of getting a disease. It does not mean the person will definitely get it.
- For some risk factors a **causal mechanism** has been proven, e.g. chemicals in tobacco smoke cause mutations that lead to lung cancer. For others only a correlation has been found so far.
- Many diseases are caused by the **interaction** of a number of factors.

### Lifestyle factors and their effects

- **Cardiovascular disease**: a diet high in saturated fat raises blood cholesterol, and smoking damages blood vessels and raises blood pressure. Regular exercise lowers the risk.
- **Obesity** is a major risk factor for **type 2 diabetes**.
- **Alcohol** damages liver cells (leading to liver disease) and affects brain function; heavy drinking over a long time can permanently damage the brain.
- **Smoking** causes lung diseases, such as bronchitis and emphysema, and lung cancer.
- In pregnancy, **smoking** reduces the oxygen reaching the fetus, which can cause low birth weight and premature birth. **Alcohol** can damage the baby's brain and growth.
- **Carcinogens**, including ionising radiation (e.g. X-rays and gamma rays), are risk factors for cancer.

## Correlation, causation and costs

- A **scatter diagram** can show a correlation, e.g. as the number of cigarettes smoked per day increases, the rate of lung cancer increases (a positive correlation).



A positive correlation. It shows a link, but on its own it does not prove cause.

- A correlation does **not** prove that one factor causes the other: another factor could be responsible. Scientists need large, representative samples and a mechanism that explains the link.
- Human cost:** pain, suffering, reduced quality of life and early death, which also affect families.
- Financial cost:** to the individual (lost income), the community and nation (healthcare costs, lost working days) and globally, as these diseases become more common in many countries.

### Don't lose marks

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- ✗ Saying a risk factor 'causes' a disease. It increases the chance (rate) of the disease.
- ✗ Saying a correlation proves that one thing causes another.
- ✗ Mixing up the targets, e.g. saying alcohol damages the lungs.
- ✗ Saying obesity is a risk factor for type 1 diabetes. It is a risk factor for type 2 diabetes.
- ✗ Describing a graph with no numbers when the question says 'use data'.

## More tips

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### Memory tricks

- Link each factor to its target: smoking → lungs and heart; alcohol → liver and brain; obesity → type 2 diabetes; carcinogens → cancer; diet and exercise → heart and blood vessels.
- Correlation is not causation: ice cream sales and sunburn both rise in summer, but ice cream does not cause sunburn.
- Costs, 'Person, Place, Purse': the person and their family, the community and nation, and the money.

### Exam technique

- 'Discuss' means give points about different aspects (human and financial; individual and national), not just one.
- When describing a scatter diagram, name the type of correlation and quote values.
- When asked whether data prove a cause, explain why not: other factors, sample size, the need for a mechanism.
- Link lifestyle factors to specific biology, e.g. saturated fat → cholesterol → fatty material in arteries, not just 'unhealthy'.

## What each grade needs

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

### Grade 3

#### Define a risk factor

A factor linked to an increased rate of a disease, such as part of a person's lifestyle or a substance in their body or environment.

### Grade 4

#### Match risk factors to the diseases they affect

Diet, smoking and lack of exercise → cardiovascular disease; obesity → type 2 diabetes; alcohol → liver and brain; smoking → lung disease and lung cancer; carcinogens → cancer.

### Grade 5

#### Describe effects of smoking and alcohol in pregnancy

Both can harm the unborn baby, e.g. smoking can cause low birth weight and alcohol can damage the baby's brain development.

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