



## EDX.MED.3 Medicine in Britain, c1700-c1900: Vaccination, Germ Theory and Public Health

EDEXCEL 1HI0 · Calculators not allowed · about 65 minutes

Total Marks

Name: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

**Answer ALL questions. Write in full sentences for Questions 15, 16 and 17. You are advised to spend about 65 minutes on this pack.**

- 1** Name the English doctor who developed an effective vaccination against smallpox in 1796.

(Total for Question 1 is 1 mark)

- 2** Name the disease that Jenner used to give patients protection against smallpox.

(Total for Question 2 is 1 mark)

- 3** Give the year in which an Act of Parliament first made smallpox vaccination compulsory for infants in England.

(Total for Question 3 is 1 mark)

- 4** Name the French scientist who published the Germ Theory of disease in 1861.

(Total for Question 4 is 1 mark)

- 5** Name the German scientist who identified the specific bacteria responsible for anthrax, tuberculosis and cholera.

(Total for Question 5 is 1 mark)

**6** Give the year in which Robert Koch identified the bacterium that causes tuberculosis (TB).

(Total for Question 6 is 2 marks)

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**7** Name the London doctor who investigated the 1854 cholera outbreak in Soho, centred on the Broad Street water pump.

(Total for Question 7 is 1 mark)

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**8** State the action John Snow took in 1854 that helped bring the Broad Street cholera outbreak to an end, and how he identified where to take it.

(Total for Question 8 is 2 marks)

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**9** Give the year of Edwin Chadwick's Report on the Sanitary Condition of the Labouring Population, which linked poor living conditions to high rates of disease and death.

(Total for Question 9 is 1 mark)

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**10** Name the surgeon who pioneered the use of carbolic acid as an antiseptic spray during operations from 1865.

(Total for Question 10 is 1 mark)

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**11** Name the two anaesthetics that were introduced into British surgery during the 1840s to reduce patients' pain.

(Total for Question 11 is 2 marks)

- 12** Name the nurse whose reforms improved hospital hygiene during the Crimean War (1854-56), and who founded a training school for nurses in London in 1860.

(Total for Question 12 is 1 mark)

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- 13** Explain two ways in which the ideas of Louis Pasteur and Robert Koch about the causes of disease were similar.

(Total for Question 13 is 4 marks)

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- 14** Describe two problems faced by surgeons before the widespread use of anaesthetics and antiseptics in the mid-nineteenth century.

(Total for Question 14 is 4 marks)

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- 15** Explain why some people opposed vaccination against smallpox in nineteenth-century Britain.

(Total for Question 15 is 8 marks)

**16** Explain why the government passed the Public Health Act of 1875.

(Total for Question 16 is 8 marks)

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**17** 'Germ theory was the main turning point in the fight against disease in Britain in the years c1700-1900.' How far do you agree with this statement? Explain your answer.

(Total for Question 17 is 16 marks)

# Mark scheme · EDX.MED.3 Medicine in Britain, c1700-c1900: Vaccination, Germ Theory and Public Health

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## Question 1

- **B1** Edward Jenner
- **Answer: Edward Jenner**

## Question 2

- **B1** cowpox
- **Answer: Cowpox**

## Question 3

- **B1** 1853 (the Vaccination Act 1853; accept 1867 for the later Act adding penalties for non-compliance)
- **Answer: 1853**

## Question 4

- **B1** Louis Pasteur
- **Answer: Louis Pasteur**

## Question 5

- **B1** Robert Koch
- **Answer: Robert Koch**

## Question 6

- **B1** 1882
- **B1** correctly names tuberculosis (TB) as the disease
- **Answer: 1882 (tuberculosis)**

## Question 7

- **B1** John Snow
- **Answer: John Snow**

## Question 8

- **B1** he mapped the cholera cases in the area and traced most of them to people who had drunk water from the Broad Street pump
- **B1** he persuaded the local council to remove the handle of the pump, stopping people from drawing water from it
- **Answer: Snow mapped cases back to the Broad Street pump, then had the pump handle removed.**

## Question 9

- **B1** 1842
- **Answer: 1842**

## Question 10

- **B1** Joseph Lister
- **Answer: Joseph Lister**

## Question 11

- **B1** ether (first used in a British operation in December 1846)
- **B1** chloroform (introduced by James Simpson in 1847)
- **Answer: Ether and chloroform.**

## Question 12

- **B1** Florence Nightingale
- **Answer: Florence Nightingale**

### Question 13

- **B2** both rejected the idea of spontaneous generation and showed that specific microorganisms (germs) cause specific diseases, forming the basis of germ theory
- **B2** both used careful, methodical laboratory experiments (e.g. Pasteur's swan-necked flask experiments; Koch's use of solid culture media and staining to identify individual bacteria) to provide scientific evidence for their theories
- **Answer: Both proved specific germs cause specific diseases, and both used careful laboratory experiments to prove it.**

### Question 14

- **B2** pain: patients undergoing surgery were fully conscious and had to be restrained, so operations had to be performed as fast as possible, which limited what surgeons could safely attempt
- **B2** infection: surgeons operated without understanding that germs caused wound infections, so many patients who survived an operation later died from post-operative infections such as sepsis or gangrene
- **Answer: Pain (patients were conscious, so speed was essential) and infection (no understanding of germs led to fatal post-operative infections).**

### Question 15

- **Level 1** (1-2): Identifies one or two general reasons for opposition to vaccination, with little or no supporting detail or explanation.
- **Level 2** (3-4): Identifies and begins to explain one reason for opposition, supported by accurate detail.
- **Level 3** (5-6): Explains two reasons for opposition, each supported by accurate and relevant detail.
- **Level 4** (7-8): Explains two or more reasons for opposition in a well-developed, logically structured way, supported throughout by precise and accurate detail, showing how the reasons connect.
- **Indicative content:**
  - There was no understanding of germ theory at this time (Jenner's vaccination pre-dated Pasteur's germ theory by over sixty years), so many people, including some doctors, did not understand why vaccination worked and were suspicious of a treatment using material from a diseased animal.
  - Some people had religious objections, believing that injecting material from a diseased cow went against God's design of the human body.
  - There was public distrust of compulsory vaccination once it was required by law (the Vaccination Acts of 1853 and 1867 made infant vaccination compulsory), which some people saw as unacceptable interference by the government in family life.
  - Poor or careless vaccination practice sometimes carried real risks, such as using material from an already-infected arm rather than a controlled source, which led to some genuine cases of infection and fed public fears, even though vaccination itself was fundamentally sound.
  - Anti-vaccination societies and pamphlets spread exaggerated or inaccurate claims about the dangers of vaccination, reinforcing public fear and resistance, especially among the poor who faced fines or imprisonment under compulsory vaccination laws.

### Question 16

- **Level 1** (1-2): Identifies one or two general reasons for the 1875 Act, with little or no supporting detail or explanation.
- **Level 2** (3-4): Identifies and begins to explain one reason, supported by accurate detail.
- **Level 3** (5-6): Explains two reasons for the 1875 Act, each supported by accurate and relevant detail.
- **Level 4** (7-8): Explains two or more reasons in a well-developed, logically structured way, supported throughout by precise and accurate detail, showing how the reasons connect.
- **Indicative content:**
  - By the 1870s, germ theory was widely accepted following the work of Pasteur and Koch, giving the government a scientific basis for believing that public health measures such as clean water and sewage disposal could genuinely prevent disease.
  - Earlier legislation had shown the limits of a voluntary approach: the Public Health Act of 1848 only allowed, rather than required, local authorities to improve sanitation, and its Central Board of Health was abolished in 1858, leaving conditions in many towns unimproved.
  - Edwin Chadwick's 1842 Report on the Sanitary Condition of the Labouring Population had already shown a clear link between poor living conditions and disease and death rates, building pressure for government action over several decades.
  - Recurring cholera epidemics, including outbreaks in 1848-49 and 1854, and John Snow's 1854 investigation of the Broad Street pump, had strengthened the case that contaminated water spread disease, adding urgency to calls for reform.
  - By the 1870s, growing acceptance that the state had a duty to protect public health, alongside a wealthier and more organised system of local government, made a compulsory national law more practical and more widely supported than it would have been earlier in the century.

### Question 17

- **Level 1** (1-4): Shows limited relevant knowledge of medical developments in the period, and offers only a simple, unsupported opinion on the statement.
- **Level 2** (5-8): Shows some relevant knowledge and identifies relevant factors, but the argument is only partly supported and lacks a developed judgement on how far the statement is accurate.
- **Level 3** (9-12): Shows good relevant knowledge and explains a range of factors, reaching a supported judgement on how far the statement is accurate, with some links made between factors.
- **Level 4** (13-16): Shows precise, well-selected knowledge and explains a range of factors in a balanced way, reaching a fully supported and sustained judgement on how far the statement is accurate, with clear analytical links between factors and consistently accurate use of specialist historical terminology.
- **Indicative content:**
  - Supporting: Pasteur's germ theory (published 1861) provided the first scientifically accurate explanation of the cause of infectious disease, replacing older ideas such as miasma and spontaneous generation, and directly enabled further breakthroughs, such as Koch's identification of specific disease-causing bacteria and Lister's use of carbolic acid as an antiseptic in surgery from 1865.
  - Supporting: germ theory gave public health reform a firm scientific foundation, helping to explain why the compulsory Public Health Act of 1875 was more effective than the earlier, voluntary 1848 Act.
  - Against: significant progress had already been made before 1861, such as Jenner's smallpox vaccination in 1796 (developed decades before germ theory, through observation rather than an understanding of viruses) and the introduction of anaesthetics (ether and chloroform) in the 1840s, which solved the separate problem of surgical pain.
  - Against: government attitudes and public health reform, such as Chadwick's 1842 report and the 1848 Public Health Act, were also crucial, and some of this pressure for reform existed before germ theory was accepted.
  - Against: Florence Nightingale improved hospital hygiene and nursing during the Crimean War (1854-56) based on an inaccurate belief in miasma, yet still achieved real reductions in death rates, showing progress was possible even without a correct theory of disease.
  - A balanced judgement might argue that germ theory was the single most significant turning point because it explained why earlier practical improvements (cleanliness, isolation, vaccination) worked, and because it directly caused later developments in surgery and public health, even though important progress had already begun before 1861.