



General Certificate of Education
Advanced Level Examination
June 2015

Science in Society

SCIS4

Unit 4 Case Study of a Scientific Issue

Monday 22 June 2015 9.00 am to 10.30 am

For this paper you must have:

- an AQA 12-page answer book
- a copy of the Case Study Source Material (Sources A–E).

Time allowed

- 1 hour 30 minutes

Instructions

- Use black ink or black ball-point pen.
- Write the information required on the front of your answer book. The **Paper Reference** is SCIS4.
- Answer **all** questions.
- Write your answers in continuous prose.
- Use your own words, rather than simply repeating those used in the sources, to show your understanding of the points being made.

Information

- The additional source material (**Source F**) is printed on page 6 of this booklet.
- The maximum mark for this paper is 60 (36 marks for Section A, 24 marks for Section B).
- You may use a calculator.
- You will be marked on your ability to:
 - use good English
 - organise information clearly
 - use specialist vocabulary where appropriate.

Advice

- **Section A:** Questions testing your appreciation and understanding of the Case Study Source Material on the subject of antibiotics.
- **Section B:** Questions that ask you to demonstrate your ability to construct an appropriate explanation for a given audience, and seek your argued opinion on an issue raised by the Case Study Source Material.

Section A

Answer **all** of the questions.

Source A

0 1 Explain why the rise of antibiotic resistance might reduce the number of routine operations performed by hospitals. **[2 marks]**

0 2 In **Source A** Professor Dame Sally Davies uses language to emphasise the seriousness of antibiotic resistance.
Give **two** examples of how she does this. **[2 marks]**

Source B

0 3 **Source B** identifies financial factors as partly responsible for the decline in development of new antibiotics by the pharmaceutical companies.
Summarise these financial factors. **[2 marks]**

0 4 New antibiotics are patented.
Suggest how 'an additional five years of patent protection' would increase the likelihood of companies investing in antibiotic development. **[2 marks]**

0 5 IDSA and pharmaceutical companies are asking for changes to clinical trials of potential antibiotics.
Discuss the advantages and disadvantages of changing the structure of clinical trials, in the ways mentioned in **Source B**. **[4 marks]**

Source C

Source C is a publication from the Parliamentary Office of Science and Technology. These publications are produced for Members of Parliament (MPs) to help them understand the science behind the issues that they may legislate about.

0 6 Why is it important to have an independent organisation in Parliament that can brief MPs about key scientific issues? **[2 marks]**

0 7 The current rise in antibiotic-resistant bacteria is a global problem that needs to be dealt with by international action and not by individual governments working alone.
State and explain **two** reasons why. **[2 marks]**

Source D

0 8 Explain why the Soil Association thinks that legislation is essential if farmers are to change their practice and reduce the use of antibiotics with farm animals. **[4 marks]**

0 9 **Source D** is a press release. Suggest why an organisation, such as the Soil Association, provides press releases on scientific issues to the media. **[2 marks]**

Source E

1 0 From the section **Feed additives**, identify **two** problems with the design and interpretation of experiments to investigate animal feed additives. Suggest why each of these problems makes it difficult to come to definite conclusions about the potential of alternatives to antibiotics. **[4 marks]**

Turn over for the next question

Turn over ▶

1	1
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The section on **Phage therapy** identifies phages as viruses that infect bacteria.

Using your knowledge of viruses, describe how phages multiply, and suggest how this explains why 'the...phage only persisted in the gut as long as *Salmonella* remained abundant' in chickens and pigs.

[4 marks]

1	2
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Using the section about **Vaccines**, explain briefly how vaccination of farm animals could lead to a reduction in the use of antibiotics.

[2 marks]

Source F

1	3
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The Food Standards Agency (FSA) stated that the risk to the public from MRSA in poultry was very low.

Suggest what evidence FSA staff would have required before stating this.

[2 marks]

1	4
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Should people have been allowed to buy and eat the turkeys with MRSA? Use information from the article to support your answer.

[2 marks]

Section B

Answer **both** questions.

1	5
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Write a brief text for a page on a website giving health information to the general public, with the title 'The causes of antibiotic resistance in humans and animals'.

You may find **Source C** and **Source D** helpful in planning your answer.

[12 marks]

1	6
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In **Source A**, the UK Government's Chief Medical Officer states that:

'Antimicrobial resistance poses a catastrophic threat.'

Do you agree with this statement?

Explain your answer using information from the sources, as well as knowledge from your study of Science in Society.

[12 marks]

END OF QUESTIONS

Source F: from The Telegraph, 26 November 2013

MRSA found at poultry farm

MRSA variant detected at poultry farm in East Anglia, but experts say risk to public “very low”

By Nick Collins, Science Correspondent

The first case of MRSA in poultry in the UK has been identified in turkeys and chickens at a farm in East Anglia.

Two thirds of the turkeys at the farm, which has not been named, were found to be infected and hundreds have already entered the food chain via local retail outlets or farm gate sales.

The Food Standards Agency said the risk to the public was very low and infected meat is safe to eat provided it is thoroughly and hygienically cooked to kill any bacteria.

It can also be contracted through direct contact with infected birds or through dust in the animals' housing, meaning poultry workers would be most at risk.

The variant of Livestock-Associated MRSA is common in Europe but is different to the infections contracted by patients on hospital wards and has “rarely caused disease in humans”.

Anyone who was affected would only develop a mild skin infection and the bacteria usually clear within 24 hours, they said.

The birds will still be allowed to enter the food chain, but after they have been slaughtered the farmer will disinfect their housing to prevent other birds becoming infected.

Prof Angela Kearns, Head of the Staphylococcus Reference Unit at Public Health England said: “There are many different strains of MRSA that cause illness in people but this is not one of the strains that we are overly concerned about given the very low number of clinical infections that have been seen in people.”

Steve Wearne, Director of Policy at the Food Standards Agency, said: “Any risk of contracting MRSA through meat from animals with these bacteria is very low when usual good hygiene and thorough cooking practices are observed.”

Prof Peter Borriello, Chief Executive of the Veterinary Medicines Directorate, added: “LA-MRSA has been identified in livestock in a number of countries and is not considered to represent a significant risk to animal health and welfare.”

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Source F: Telegraph Media Group 2013

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