

A-level SCIENCE IN SOCIETY

Unit 4 Case Study of a Scientific Issue

Friday 24 June 2016

Afternoon

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- an AQA 12-page answer book
- a clean copy of the Preliminary Material (**Sources A–E**).

Instructions

- Use black ink or black ball-point pen.
- Write the information required on the front page 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 7 of this booklet.
- The marks for questions are shown in brackets.
- 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 Preliminary Material on the subject of personal health data (copy provided earlier) and additional material **Source F** provided with the paper.
- 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 Preliminary Material.

Section A

Answer **all** of the questions.

0 1 **Sources A–F** are all linked to the use of ‘big data’ in different ways.

What does the phrase **big data** mean?

[2 marks]

Source A

0 2 Some app users know that the personal data they enter into the health apps may be collected by other people or companies for commercial gain.

Suggest why these users are willing to allow apps to collect personal data about them.

[1 mark]

Source B

0 3 The Nuffield Council on Bioethics is an independent organisation that produces reports on ethical issues. **Source B** is a newspaper article about one report from the Nuffield Council on Bioethics with the title ‘The collection, linking and use of data in biomedical research and health care: ethical issues’. The report was written by 11 experts.

Give **two** benefits for researchers or decision makers of having an independent organisation which publishes reports about ethical issues in research.

[2 marks]

0 4 The author of **Source B** says that tens of thousands of people have chosen to opt out, and not have their information included in the care.data system. However, their choice has been ignored by NHS officials.

Suggest arguments for and against the decision to ignore patient choice.

[3 marks]

Sources A and B

0 5 Identify **two** reasons why ‘privacy cannot be guaranteed’ using **Source A** and **Source B**.
[2 marks]

Sources B and C**0 | 6**

Source C is a press release about the Avon Longitudinal Study of Parents and Children (ALSPAC).

Identify **two** similarities between ALSPAC and the proposed care.data system and **two** differences between them. Use **Source B** and **Source C** in your answer.

[4 marks]**0 | 7**

According to **Source C**, 'Teasing out the relationships and interactions between environmental factors and individual genotypes is extremely difficult...'

Explain why 'Teasing out the relationships and interactions between environmental factors and individual genotypes is extremely difficult'. You should use ideas from your study of Science in Society in your answer.

[3 marks]**Source D****0 | 8**

The following phrases are used in **Source D**:

- data exhaust (page 8, paragraph 1)
- theory-free analysis (page 8, paragraph 7)
- false positive (page 10, paragraph 8).

Suggest what is meant by each phrase.

[6 marks]**0 | 9**

Source D gives examples of sampling bias in politics and Twitter.

Suggest an example of sampling bias **not** given in **Source D** and explain why it might lead to results that do **not** accurately represent the population.

[3 marks]

Turn over for the next question

Turn over ►

Source E

1	0
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Source E mentions some improvements in monitoring and data technology that need to be made before 'found data' from Twitter or other sources can be useful to health departments.

Describe these improvements.

[2 marks]

Sources D and E

1	1
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Source D gives the example of a shop using data analysis of purchases to send coupons to women who might be pregnant.

Source E suggests that analysis of tweets could be used to identify people who may need interventions such as HIV testing kits.

Describe ethical issues raised by these two uses of the analysis of 'big data'.

[4 marks]

Source F

1	2
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Suggest why the director of the cancer charity in **Source F** thinks that health data should be available to researchers who do not work in a university.

[2 marks]

1	3
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Source F refers to a medical journal. Most medical journals require authors to declare whether or not they have 'competing interests'.

Suggest why.

[2 marks]

Section B

Answer **both** questions.

1	4
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In **Source D**, Tim Harford writes:

‘Google’s engineers weren’t trying to figure out what caused what. They were merely finding statistical patterns in the data. They cared about correlation rather than causation.’

Write a short passage about correlation and causation to explain what is meant by this quote. The passage should be suitable for a general reader and include examples of both correlation and causation.

[12 marks]

1	5
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The care.data scheme will gather together all the health records for a person and store the data in a centralised database. Currently the system is planned to be an opt-out system.

Would you opt out of a system such as care.data? Explain your answer by discussing the possible benefits and risks of the system. You should refer to the sources in your answer.

[12 marks]

END OF QUESTIONS

Turn over for Source F

Turn over ►

There are no questions printed on this page

Source F News article, October 2013

Cancer charity calls for access to patient data

In a letter to a top medical journal, a leading cancer charity has called for researchers from charities to be able to access patient data.

Access to patient data is a sensitive subject, and some researchers have suggested that such data should be restricted to universities.

However, the director of policy and research for the charity believes that it is possible to protect patient privacy, while still allowing data analysis by charities and other organisations. The charity has been collecting pseudonymised data from GPs and hospitals as part of their patient support programme. Using this data, they have shown what happens to people with cancer after diagnosis and used their findings to influence health policy.

The Wellcome Trust has recently found that many people were happy to share their health data if it would lead to better treatments, both for themselves and for others. However, some people did worry about sensitive information falling into the 'wrong hands'.

Writing to the journal, the director of the cancer charity highlights the breadth of experience that his charity has in working with patients with cancer. This experience allows cancer charities to provide a wider perspective on the needs of people with cancer than could be provided by university researchers on their own.

END OF SOURCE F

There are no questions printed on this page

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