Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson BTEC Level 3 Nationals Extended Certificate

Centre Number | | | | | | |

Learner Registration Number | | | | | | | | |

Thursday 14 January 2021

Supervised hours: 3 hours

Paper Reference **21327L**

Applied Human Biology

Unit 3: Human Biology and Health Issues

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** activities.
- Answer the activities in the spaces provided
  – *there may be more space than you need.*
- This booklet contains material for the completion of the set task under s upervised conditions.
- This booklet is specific to each series and this material must be issued only to learners who have been entered to undertake the set task in the relevant series.
- This booklet should be kept securely until the start of the 3 hour supervised assessment period.
- This set task should be undertaken in a session timetabled by Pearson.

Information

- The total mark for this paper is 60.
- The marks for **each** activity are shown in brackets
  – *use this as a guide as to how much time to spend on each activity.*

Advice

- Read each activity carefully before you start to answer it.
- Try to answer every activity.
- Check your answers if you have time at the end.

Turn over ▶

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Pearson

Instructions for teachers/tutors and/or invigilators

Centres must issue this booklet at the appropriate time and advise learners of the timetabled session.

All learner work must be completed independently and authenticated before being submitted to Pearson by the teacher/tutor or invigilator.

Learners are advised to spend 30–45 minutes reading through the stimulus material in the set task and annotate the material if they wish to do so.

Learners are required to use the stimulus material to complete the activities.

Learners must complete the set task using this task and answer booklet.

Teachers/tutors and/or invigilators should note that:

- learners must not be given any direct guidance or prepared materials
- all work must be completed independently by the learner
- learners must not bring anything into the supervised environment or take anything out without your approval.

Centres are responsible for putting in place appropriate checks to ensure that only permitted material is introduced into the supervised environment.

Maintaining security

- During the supervised assessment session, the assessment areas must only be accessible to the individual learners and to named members of staff.
- Learners can only access their work under supervision.
- Any work that learners produce under supervision must be kept securely.
- Only permitted materials for the set task can be brought into the supervised environment.
- During any permitted break, and at the end of the session, materials must be kept securely and no items removed from the supervised environment.
- Learners are not permitted to have access to the internet or other resources during the supervised assessment period.

After the session, the teacher/tutor or invigilator will confirm that all learner work has been completed independently as part of the authentication submitted to Pearson.

The set task is a formal external assessment and must be conducted with reference to the instructions in this task and answer booklet and to the BTEC Nationals *Instructions for Conducting External Assessments* (ICEA) document.

Outcomes for submission

This task and answer booklet must be submitted to Pearson.

Instructions for learners

Read the set task information carefully.

You are advised to spend 30–45 minutes reading the article in the set task.

You may add notes to the article before you start the activities.

Complete all your work in this task and answer booklet in the spaces provided.

This session is three hours. Your teacher/tutor or invigilator will tell you if there is a supervised break. Plan your time carefully.

In your response to the activities, you should consider information from the article and use your knowledge and understanding of applied human biology principles, procedures and techniques to support your answers.

You will complete this set task under supervision and your work will be kept securely during any breaks taken.

You must work independently throughout the supervised assessment period and you must not share your work with other learners.

You may ask your teacher/tutor or invigilator to explain any words or sentences you do not understand in the article or the activities. Your teacher/tutor or invigilator cannot help you complete the set task.

Outcomes for submission

This task and answer booklet must be submitted to Pearson.

Set task information

You are given the following article:

Should Genetic Screening be Part of the Pre-employment Process?

You need to read the article so that you get an understanding of the health issue involved.

You should be able to interpret, analyse and evaluate the article.

At the end of the article, there is a glossary giving the meanings of some of the words in bold that are used in the article.

Pre-employment Genetic Screening

Should Genetic Screening be Part of the Pre-employment Process?

Introduction

Globally, there is an increasing number of employers considering using **genetic screening**, as part of the pre-employment process, to decide whether to employ a person. The pre-employment process includes the procedures involved in deciding a person's suitability for a job. Genetic screening has now advanced to the stage that it has the potential to be a useful tool for employers when hiring new employees. In addition to checking references, employers may now begin checking a potential employee's **genetic profile** as part of the pre-employment checks the company carries out.

There are currently genetic tests for over 1300 diseases and advancing technology means that carrying out these tests is becoming quicker and cheaper. The results of a genetic test can determine a person's chance of developing a genetic disorder. Figure 1 shows the rate at which new tests for genetic screening were developed in just 12 years[1].

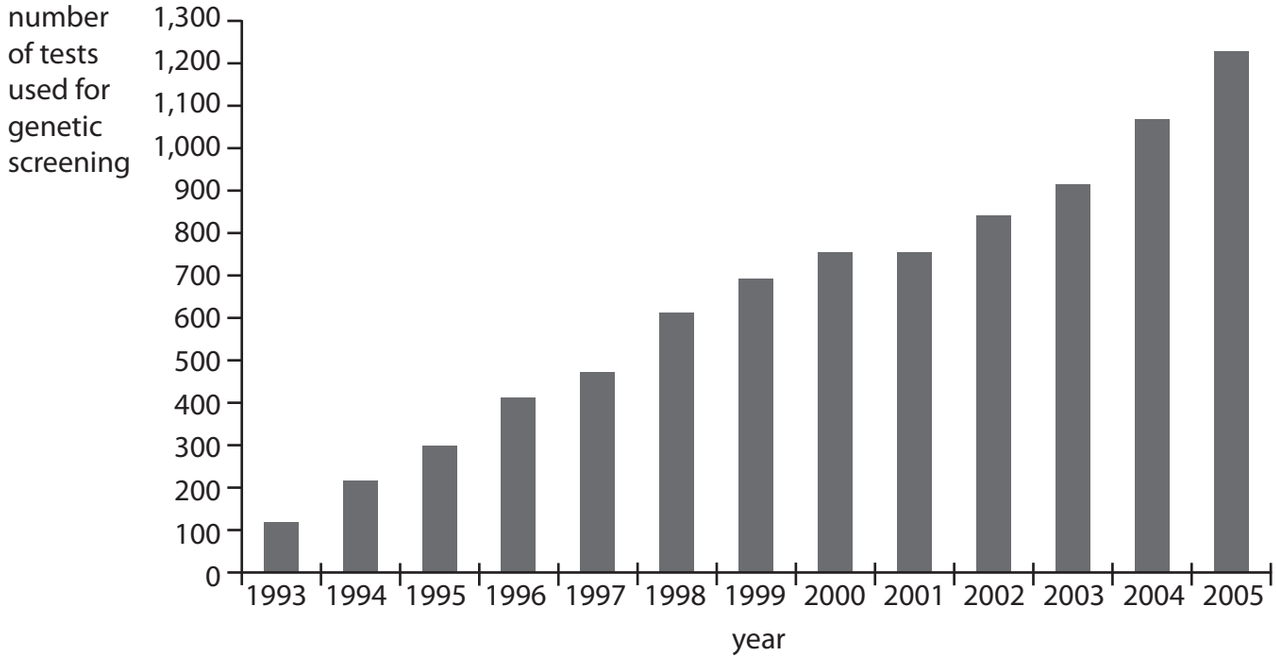

Figure 1

Nature or nurture?

The Wellcome Trust Case Control Consortium[2] (WTCCC) is a group of 50 research groups in the UK. Between 2007 and 2009, the WTCCC released the results of the largest ever study of the genetics behind some common diseases, such as diabetes, rheumatoid arthritis and coronary heart disease. The study has substantially increased the number of genes that we now know to play a role in the development of some of our most common diseases.

Published in Nature and Nature Genetics, the £9 million study was one of the UK's largest and most successful academic collaborations. The study brought together 200 scientists studying human genetics, from many UK institutions. They examined DNA samples from almost 120,000 people across the UK, analysing almost 10 billion pieces of genetic information.

"Many of the most common diseases are very complex, 'part nature and part **nurture**', with genes interacting with our environment and lifestyles," says Professor Peter Donnelly, Chair of the WTCCC, who is based at the University of Oxford. "By identifying the genes underlying these conditions, our study should enable scientists to understand better how disease occurs, which people are most at risk and, in time, to produce more effective, more personalised treatments."

Why is this of interest to employers?

There are three types of health-related genetic screening that could be considered useful in helping employers decide whether or not to hire a particular individual[3], by identifying whether a person:

- is likely to develop a genetic illness such as Huntington's disease
- is at increased risk of a common illness such as heart disease or cancer
- has a higher risk of developing a work-related disease or is susceptible to hazardous chemicals in the workplace.

Genetic screening has the potential to offer many benefits in general health. It can identify markers for certain diseases so that people can be made aware and take appropriate action, e.g. specific diet if the person has a **genetic predisposition** to heart disease. In some situations, genetic screening could be lifesaving.

In the workplace, genetic screening could be used to accept or reject job applicants on the basis of their **susceptibility** to certain diseases or substances. For example, people with a genetic predisposition to serious health conditions such as **age-related macular degeneration (AMD)** could be turned down for jobs requiring good eyesight, such as pilots. However, the World Health Organization[4] (WHO) warns that most genetic screenings can only identify a predisposition for a certain disease but cannot guarantee a person will actually develop it.

Figure 2 shows the annual cost of employee absence, due to illness, in billions of pounds[5].

Occupation	Annual cost of employee absence (billions of £)
Managers	12.2
Service workers, e.g. cleaners	6.6
Teachers	4.4
Nurses	2.8
Business owners	1.6
Construction	1.0

Figure 2

In a survey carried out by the Institute of Directors[6], 50% of employers who replied were in favour of using genetic screening. In the future, insurance companies may put increasing pressure on employers to use genetic screening when recruiting. Employers might mistakenly believe that they could use genetic screening to identify individuals

who are likely to be absent from work or retire early due to ill health. Excluding these individuals could then reduce the employer's insurance costs. **Biotechnology** and **pharmaceutical** industries may also promote genetic screening services to recover the money spent on research and gene **patents**.

The difficulty, apart from the considerable ethical aspects, is that genetic screening is in most cases not a simple yes/no – it is an indicator of risk. The possession of a certain genetic profile that predisposes someone to a condition does not necessarily mean that they will develop the trait and, even if they do, there is no way of determining at what point in their life they will begin to show symptoms of the disease. Conversely, the absence of a genetic predisposition doesn't necessarily mean that someone won't develop a serious condition in the future. This means that taking any employment decisions based on genetic information could be unreliable.

Cause for controversy?

There is a real possibility that genetic screening could lead to discrimination. People could be turned down for employment on the basis of a number of factors, such as:

- employers may reject an applicant because of a positive result even when the employee's condition does not affect their health or their ability to perform the job
- a person may be rejected for a job on the basis of a **false positive** genetic screening result
- genetic screening may lead to **indirect discrimination**[7] as gene variations are not distributed evenly in different ethnic groups.

In 2009 a sample of 2,028 people from the general population gave their opinions on genetic testing. Figure 3 shows that 83% of the sample were opposed to employers using genetic screening as part of the recruitment process[8].

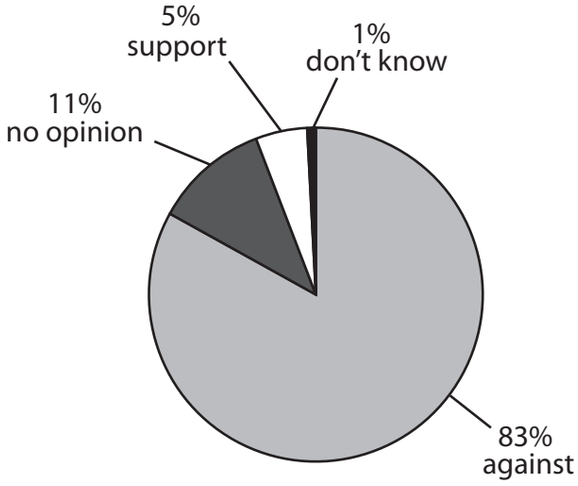

Figure 3

There was strong opposition to employers using genetic screening information because people do not want to be evaluated on things they cannot control. When applying for a job, you want to be employed on the basis of your skills and knowledge rather than your predisposition to a genetic condition. The negative consequences of pre-employment genetic screening could impact a candidate's mental health and make the recruitment process even more stressful.

However, pre-employment genetic screening also has the potential to provide employers with valuable information that can be used to better support their employees. This could result in a healthier workforce, providing benefits to both employers and employees.

What lies ahead?

The Health and Safety Commission[9] states that it is unacceptable to exclude a person from the workplace because they might develop a genetic condition. The Human Genetics Commission[10] (HGC) and UK Government have concluded that employee genetic screening is not currently occurring in the workplace.

The technology for genetic testing is becoming more commonplace and the temptation to make decisions about recruitment based on the information in our genes is greater than ever. The debate over the right to privacy of our genetic profile and the use of genetic screening for job recruitment will no doubt continue for many years.

Glossary

Age-related macular degeneration (AMD) – the most common cause of irreversible blindness, which gets worse with age.

Biotechnology – the use of living systems and organisms to develop or make useful products.

False positive – a test result that wrongly indicates that a particular condition is present.

Genetic predisposition – a genetic profile that increases the potential for a person to develop a genetic condition.

Genetic profile – the genetic makeup of an individual that codes for their characteristics.

Genetic screening – used to identify variants in DNA sequence or chromosome structure. Also known as DNA testing or genetic testing.

Indirect discrimination – when a practice that applies to everyone in the same way has a worse effect on some people than others.

Nurture – refers to the effect of the environment on a person's development e.g. diet, exposure to UV light, exposure to chemicals.

Patents – licenses giving the right to exclude others from making, using, or selling a product or service.

Pharmaceutical – the industry that discovers, develops, produces, and markets drugs for use as medicines.

Susceptibility – the likelihood of a person developing a genetic condition.

References

All references correct at time of writing.

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3. Genewatch UK, GreenNet [internet], Berkshire UK; cited 11/2019. Available from http://www.genewatch.org/

4. Human Genomics in Global Health, WHO [internet], Geneva Switzerland, 2019. "Quality & Safety in Genetic Testing: An Emerging Concern"; cited 11/2019. Available from https://www.who.int/genomics/policy/quality_safety/en/index1.html

5. Investopedia(NASDAQ), Forbes.com [internet], New Jersey USA, June 2013. "The Causes and Costs of Absenteeism in the Workplace"; cited 3/2020. Available from https://www.forbes.com/sites/investopedia/2013/07/10/the-causes-and-costs-of-absenteeism-in-the-workplace/

6. Day G, Institute of Directors Research Paper, IOD [internet], London UK, 2000. "Testing Times: Directors' Views on Health Testing at Work"; cited 3/2020. Available from http://www.iod.com/intershoproot/eCS/Store/en/pdfs/regulation_publications_policypapers_healthwork.pdf

7. Markel, H., The American Journal of Medicine 93(2): 209-215, Tuscon USA, 1992, "The stigma of disease: Implications of genetic screening"

8. EKOS Research Associates Inc, Office of the Privacy Commissioner of Canada [internet], March 2009, Ontario Canada. "Canadians and Privacy"; cited 3/2020. Available from https://www.priv.gc.ca/en/opc-actions-and-decisions/research/explore-privacy-research/2009/ekos_2009_01/

9. Summers, N., "Genetic testing for employment: susceptibility and exposure to hazardous substances". Advisory Committee on Toxic Substances, HSE, London UK, 2004; cited 3/2020. Available from http://www.hse.gov.uk/aboutus/meetings/iacs/acts/250304/paper10.pdf

10. House of Lords Science and Technology Committee, UK Government [internet], London UK, April 2008, "Genomic Medicine Government Memorandum"; cited 3/2020. Available from https://www.parliament.uk/documents/lords-committees/science-technology/stgmgovernmentresponse.pdf

Set Task

Answer all activities in the spaces provided.

The activities in this task are based on the article.

Use the article and your knowledge and understanding of applied human biology principles, procedures and techniques to support your answers.

1 Discuss how the article uses scientific information to present the pre-employment genetic screening issue.

In your answer, you should consider:

- how the article has interpreted and analysed scientific information to support the conclusions/judgements being made
- validity and reliability.

(12)

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(Total for Activity 1 = 12 marks)

2 Discuss the key factors affecting the pre-employment genetic screening issue.

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(Total for Activity 2 = 16 marks)

3 Explain how different organisations/individuals influence the pre-employment genetic screening issue.

In your answer, you should consider:

- research
- health initiatives.

(10)

(Total for Activity 3 = 10 marks)

4 Suggest potential areas for further development and/or research of the pre-employment genetic screening issue.

(6)

(Total for Activity 4 = 6 marks)

5 A recent news headline said:

UK employers push for pre-employment genetic screening

You have been asked to write a letter to the House of Commons Science and Technology committee to argue against the use of pre-employment genetic screening.

When writing your letter, you must consider:

- who is likely to read your letter
- what you would like the reader to learn from your letter.

You should **not** include any personal details in your letter, e.g. your address.

(16)

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(Total for Activity 5 = 16 marks)

TOTAL FOR PAPER = 60 MARKS

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