4 Advances in medical knowledge

This chapter focuses on the key question: How much progress has been made in medical knowledge over time? It is easy to assume that medical knowledge in medieval times was limited, yet there is plenty of evidence of successful medical treatment, if you had access to a doctor, even from the Stone Age. It was perhaps the Renaissance, and the later arrival of scientific method, that really changed our understanding of illness and made significant advances in medical knowledge, something that continues apace today. This chapter explores many of the turning points in the growth of medical knowledge.

FOCUS TASK

1 For each section of this chapter, we would like you to decide what progress has been made in medical knowledge, and then to try to measure ‘how much’.

Each section will have a card like this:

Complete the card as you work through the section.

<table>
<thead>
<tr>
<th>Breakthrough:</th>
<th>To what extent [1-5]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galen</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Common medical ideas in the medieval period

Where did medieval ideas about health come from? People have always known how to look after themselves. There is clear evidence of successful operations carried out with flint tools in the Stone Age. Archaeological evidence showed that some of these patients survived. The Indus Valley civilisation was well aware of the importance of clean running water and sewers. There is even a structure identified as a huge Public Bath house in Mohen Jaro, dating from around 2500BC. Pharaohs in Ancient Egypt had their court physicians, and we know about some of their medical practices from papyrus records recovered from tombs. The Greeks had asclepiades, or places of healing, that were temples to Asclepius, the god of healing. The Romans went to great lengths to bring fresh water to their towns and cities. Their bath-houses and underfloor heating can be found in most Roman towns, for example, Vindolanda in Northumberland. Bald’s Leechbook is an Anglo-Saxon medical text, full of remedies and medicines, some of which modern medical research has shown worked. Yet much of this medical knowledge seems to have been ‘lost’ during the so-called ‘Dark Ages,’ after the Romans left. Muslim writers, such as Ibn Sinā, played a very important role in saving much of this lost knowledge, translating the works of Ancient Greece and Rome into Arabic, that eventually passed on to Western Europe. At this time there is no doubt that Arabic medicine was much in advance of that in Western Europe.

THINK

What, according to Source A, were the main differences between Muslim and European medicine?

Source A: An account written by a Muslim doctor Usama ibn Munqidh, c.1175

They brought to me a knight with a sore on his leg; and a woman who was feeble-minded. To the knight I applied a small poultice; and the woman I put on diet to turn her humour wet. Then a French doctor came and said, ‘This man knows nothing about treating them.’ He then said, ‘Bring me a sharp axe.’ Then the doctor laid the leg of the knight on a block of wood and told a man to cut off the leg with the axe, upon which the marrow flowed out and the patient died on the spot. He then examined the woman and said, ‘There is a devil in her head.’ He therefore took a razor, made a deep cross-shaped cut in her head, peeled away the skin until the bone of the skull was exposed, and rubbed it wit salt. The woman also died instantly.

The four humours

Key to both Hippocrates and Galen’s medical knowledge was the theory of the four humours. Hippocrates wrote:

- The human body contains blood, phlegm, yellow bile and black bile.
- These are the things that make up its constitution and cause its pains and health. Health is primarily that state in which these constituent substances are in the correct proportion to each other, both in strength and quantity, and are well mixed. Pain occurs when one of the substances present is either deficient or an excess, or is separated in the body and not mixed with others.

So to remain healthy a body needed to keep the four humours in balance. As you can see from Figure 4.1, some humours are ‘hot’ and therefore create sweating illnesses; and some humours are ‘cold’, creating illnesses such as melancholia.

Different foods and different seasons could affect the humours, so it was important to do all things in moderation to keep the body in balance. During the medieval period much of the medical knowledge was based on the idea of the four humours and keeping them in balance. It was only later, during the Renaissance, that people began to challenge the work of Galen, and develop new medical knowledge.

Activities

1 Use the internet to research Hippocrates and Galen. You might like to consider the following questions:
   - Where did their ideas about medicine come from?
   - How did these ideas reach the Muslim world?
   - How did their ideas then reach Europe and Britain?
   - How influential were these ideas in shaping medical knowledge in Britain in the medieval period and later?
The influence of the medical work of Vesalius, Paré and Harvey in the sixteenth and seventeenth centuries

The Renaissance and Galen
Initially, the Renaissance led to a revival of all things ancient. Many of Galen’s works were re-translated from Arabic into Greek and Latin. Texts were compared and efforts made to get back to the original meaning. By 1525 his complete works had been published in Greek and translations into Latin soon followed. Galen was regarded as the font of all medical knowledge, to be slavishly copied.

Galen’s position was soon to be challenged. The very essence of the Renaissance was to question things. And the more artists and surgeons studied anatomy, and the more humans they dissected, the more they began to notice discrepancies between what Galen said and what they were discovering for themselves. The initial reaction was that Galen was right and the current anatomists were wrong. But gradually enough opinion grew to successfully challenge Galen and cast doubts on his observations.

Once challenged on anatomy, other challenges followed. The medical world seemed to be split into two, depending on how strongly you supported Galen. It also seemed to split into two between physicians, who mostly learned from texts and lectures and thus largely supported Galen’s ideas; and surgeons, who were exploring the human body on a daily basis and were learning by experimenting and experience. Scientific discovery played a part in this as new tools, like the microscope, allowed both scientists and medical men to look at things in ever more detail. But so too did William Caxton and his printing press, which allowed the much more rapid spread of ideas from 1476 onwards.

Vesalius and anatomy
Andreas Vesalius (1514–64) was born in Brussels but studied medicine in Paris and Padua in Italy. He was appointed professor of surgery and anatomy in Padua. Perhaps most importantly he carried out his own dissections and firmly believed anatomy was the key to understanding how the human body worked. In 1543 he published De humani corporis fabrica libri septem, which completely changed attitudes to medicine. Vesalius challenged Galen’s works on human anatomy, and developed much more accurate views of the inside of the human body by, unlike Galen, looking at and dissecting humans rather than animals. His work was very influential for early modern medicine both because it gave doctors more detailed knowledge of human anatomy and because it encouraged them to investigate critically the claims of ancient medical authorities.

THINK
1. What changes did the Renaissance bring to medical knowledge?
2. Who do you think had the greater impact – Vesalius or Paré?
3. What do you think helped bring about change more – war or science and technology?

Paré and treating wounds
Ambroise Paré (1510–90) began his medical work as an apprentice to his elder brother, a barber-surgeon. He is perhaps the most famous example from the sixteenth century of someone who adopted the new scientific ways of treating disease. He trained at the Hotel de Dieu hospital in Paris before becoming a surgeon in the French army for 30 years. At the siege of Milan in 1536 he ran out of hot oil for cauterising wounds. He made up a mixture of egg yolk, turpentine and oil of roses to dress raw wounds – much less painful and, as he discovered the next morning, much more effective at encouraging healing. He also used ligatures to tie off wounds after amputation again instead of cauterisation – and found that wounds healed better. Later he helped develop artificial limbs for those who had lost a hand or a leg due to their wounds. His time as an army surgeon allowed Paré to observe his patients and treat them more effectively. He published his experiences in a book, Le ouevre, in 1575, and became famous across Europe. He is considered one of the fathers of modern surgery.

THINK
1. Do you think the Renaissance led to a revival of all things ancient?
2. How did the church help advances in medical knowledge?
3. Why were science and alchemy so closely linked in medieval times?
William Harvey and the circulation of blood

Harvey’s most famous work, *On the Motion of the Heart*, was published in 1628. It is more than any other book at the time, challenged the work of Galen and the Ancients, and changed medicine for ever.

While studying in Padua, Harvey was taught that the veins in the human body had valves, and blood pumped only one way. But no one understood how or why. Later in his career Harvey experimented on animals, and it was during this experimentation that he discovered blood was pumped around the body in a circular motion. This led to his famous discovery of the circulation of the blood.

His discovery was made partly as a result of theoretical work - he was unable to see the tiny capillaries which are the smallest blood vessels - but also as a result of experiment and observation. His work on cold-blooded amphibians, whose blood circulates much more slowly, allowed him to see blood pumping around the body and his most famous experiment, described in his book, showed blood moving in a patient’s forearm. With this experiment he was able to show convincingly that the heart worked as a pump, and that blood flowed in a ‘one-way system’ around the human body.

He was also able to show that Galen’s belief that the liver, not the heart, was the centre of the human body, was completely wrong. Galen also believed that the liver made new blood to replace that lost around the body. Harvey’s work on the circulation of blood around the body proved that this was wrong, and also challenged the idea of ‘bleeding’ as a cure - if Harvey was right then it was impossible for the body to have too much blood.

How was Harvey’s work greeted by contemporaries?

As you might imagine, those who supported Galen totally rejected Harvey’s work. They argued that Harvey could not see capillaries and therefore could not prove their existence - it was another 60 years before capillaries were observed in action. Some refused to accept the role of experiments in challenging the ancient texts. Many were very conservative and resistant to change. In fact Harvey himself told a friend that he lost many patients after 1628 because of his ‘crackpot idea’.

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Nineteenth century advances in medical knowledge: improved knowledge of the germ theory

**Pasteur and Koch**

At the beginning of the nineteenth century most people still believed ill-health was caused by bad air, the ‘spontaneous combustion’ of disease or an imbalance of the four humours. Germ theory changed all that. As we have seen in Chapter 2 (page 40), by the 1880s and 1890s huge steps had been taken in identifying the cause of disease, thus enabling techniques to be developed to effectively treat illnesses.

Three people played a major part in this breakthrough: Pasteur, Koch and Ehrlich. They were not the only ones, but they led the way in experimental science. Louis Pasteur was the first person to establish the link between germs and disease. He argued that microorganisms were responsible for disease, and that if only we could discover these micro-organisms then a vaccine could be developed to specifically target the disease. This allowed him to develop effective vaccines to target specific diseases. His first work was on chicken cholera and this led in 1880 to an effective vaccine against rabies.

Robert Koch took this work further. In the laboratory he was able to link particular germs to particular diseases, in effect developing the new science of bacteriology. In 1882 he identified the specific bacteria that caused tuberculosis and in 1883 and 1884 those responsible for cholera, thus confirming the work of John Snow in Britain in 1854 (see Chapter 2, page 35). Following this, he and his students rapidly isolated the causes of many diseases including diphtheria, typhoid, pneumonia, plague, tetanus and whooping cough, all of which were major killer diseases in Britain. He and his team also developed a technique for using dyes to stain bacteria to make it easier to see and study them under a microscope. His work was regarded as so important he was awarded a Nobel Prize in 1905.

**Paul Ehrlich**

Paul Ehrlich, a German physician and scientist, was one of Koch’s students. He epitomises the scientific approach to identifying and treating diseases. He is perhaps best known for Salvarsan 606, developed in 1910, the first effective treatment for syphilis, a sexually transmitted disease (STD), which at the time was widespread. It was called ‘606’ because it was literally the 606th drug he and his colleagues had used to try to kill the germs causing syphilis. Salvarsan 606 was the first of what became known as ‘magic bullets’, carefully designed drugs targeting the specific germs causing illness and having little or no effect on any other part of the human body. No wonder people were so excited about the power of science to eradicate disease.

**The impact of germ theory**

Germ theory completely changed medical knowledge about the causes of diseases and how to treat them. It came about through careful scientific observation and experiment, and established once and for all the link between bacteria and disease.
The development of scanning techniques in the twentieth century: X-rays, ultrasound and MRI scans

**FOCUS TASK**

Complete the card as you work through the section.

<table>
<thead>
<tr>
<th>Breakthrough:</th>
<th>To what extent (1-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-rays</td>
<td></td>
</tr>
</tbody>
</table>

**X-rays**

X-rays were discovered by Wilhelm Röntgen, a German scientist, in 1895, building on work by other scientists. He found that radiation would pass through the body at different rates, depending on whether it encountered bones or flesh. He realised he could photograph bones and his discovery rapidly led to the use of X-rays to investigate broken bones. Initial doses of radiation were high, leading to severe side-effects.

During the First World War mobile X-ray units were set up to check for bullets, shrapnel and other ‘foreign bodies’ inside wounded soldiers’ bodies, thus allowing quicker and safer surgery, saving many lives (see Source E). Since the war, X-rays have been routinely used in hospitals to investigate problems with bones and teeth (see Source F).

**Ultrasound**

During the Second World War sound waves were used to detect German submarines. The British called this system ASDIC while the Americans referred to it as Sonar. It was after the war that it was realised you could use sound to ‘see’ inside the human body, by using high frequency sound waves. This avoided the need to use radiation, as in X-rays. It also produced 3D images. Ultrasound is used for images of organs in the body, such as the heart, liver and muscles, rather than bones, thus complementing X-rays. It is also, since the 1970s, routinely used to check the progress of unborn babies, to see if they are growing normally.

**MRI**

Magnetic resonance imaging (MRI) scanning uses radio waves to build up a detailed picture of organs and tissues within the body. It uses powerful magnets to give a high resolution image allowing doctors to see clearly any areas of disease. It is also often used to check how effective previous medical treatment has been. Since the 1980s this has become an increasingly useful tool for doctors investigating the workings of the human body. A group of doctors surveyed in the USA in 2010 said MRI scans were the most useful weapon in their armoury in fighting disease.

**PET scans and CT Scans**

Positron emission tomography (PET) injects a slightly radioactive tracer into the bloodstream, allowing 3D colour images of tissues and bones to be seen, and is often used to investigate cancers and heart problems. Computed tomography (CT) uses many X-ray images taken at slightly different angles to produce a cross-sectional image of the area of the body, which can be used to diagnose illness or to find the location of, for example, cancerous cells. These procedures are expensive, often costing £1000 a time, and are usually used after the other scanning techniques have raised issues or complications.
The discovery of DNA and genetic research in the later twentieth century

In 1953 Crick, Watson and Franklin published a paper about DNA (deoxyribonucleic acid) which carries genetic information about hereditary materials in human beings. Nearly every cell contains identical information. It is how humans reproduce themselves. In 1990 the Human Genome Project set out to build up a complete genetic blueprint of human beings; a task completed in 2003. Understanding DNA has huge implications for medical research and medical knowledge. In 1996 by copying cells (cloning) researchers were able to clone Dolly the sheep in an attempt to 'grow' medicines for humans in sheep's milk. By modifying DNA it has become possible to eliminate genetic diseases. Already genetic engineering has reversed mutations that cause blindness, stopped cancer cells from multiplying and made some cells impervious to AIDS. DNA can be used to screen people for inherited diseases, and ensure babies are born without life-threatening diseases (see Source H and Figure 4.1). Surely now scientists know more of what there is to know about disease. That must be an advance in medical knowledge.

Think
1. What are the arguments in favour of three-parent babies?
2. What are the arguments against three-parent babies?
3. What does the issue tell us about the development of medical knowledge?

FOCUS TASK
Complete the card as you work through the section.

Breakthrough: To what extent [1-5]
DNA: __________________________


Source H: An article from Discover Magazine, February 2015
On Tuesday, the UK’s House of Commons voted 382 to 128 in favour of the controversial technique, called mitochondrial donation, and the first ‘three-person baby’ could be conceived later this year. Doctors say mitochondrial donation will prevent mothers from transferring incurable genetic diseases to their children. Opponents have raised ethical concerns, saying it sets humanity on the slippery slope towards ‘designer babies’. Church groups in the UK lobbied for parliament to oppose the new law. They oppose the destruction of human embryos, and worry that the law opens a Pandora’s box of genetic tinkering.

HOW THE EMBRYOS ARE MADE
The mother’s healthy egg, with a healthy mitochondrial DNA is fertilised in the laboratory with the father’s sperm.
Donor egg cell
Donor sperm
Fertile sperm
Donor sperm removed
The new modified egg is then re-implanted into the mother.
The baby will now be born containing the genetic information from three parents.

Figure 4.1: How three-parent babies are made

FOCUS TASK REVISITED
1. The focus task asked you to complete various cards to help you decide what progress has been made in medical knowledge.
2. Collect all your focus task cards and plot the information onto your personal copy of this graph:

3. Now decide which period had, in your opinion, the most progress in medical knowledge, and why.
4. In groups, discuss your answer to Question 3 – do you all agree or are some answers different? (How do you define ‘medical progress’?)

ACTIVITY
Use your focus task cards to hold a balloon debate. Take it in turns to present the argument for each bit of medical progress on the focus task cards. At the end of each round take a vote to decide which of the bits of medical progress will be ejected from the balloon. Keep going until you have the ‘best’ bit of medical progress remaining.

TOPIC SUMMARY
- Medieval people did have some medical knowledge.
- Alchemists and scientists tried hard to find the ‘Elixir of Life’ but failed, although they did much to improve scientific techniques.
- The Renaissance was when people started to question the ‘wisdom’ of the Ancient World.
- People like Vesalius, Paré and Harvey radically changed the way illness was understood.
- Germ theory fundamentally altered the way people thought of disease.
- In the twentieth century techniques to ‘see’ inside the body revolutionised the way doctors identify illness.
- Throughout the twentieth and twenty-first centuries scientists have discovered more and more how the human body works.
- DNA and genetic engineering have introduced further advances in our understanding of illness.
- Some people think we now have too much medical knowledge.

Practice questions
1. Describe developments in medical knowledge in medieval times. (For guidance, see page 125.)
2. Explain why the work of Vesalius, Paré and Harvey was important in advancing medical knowledge in the sixteenth and seventeenth centuries. (For guidance, see page 126.)
3. Which of Sources E and F is the more useful to a historian studying developments in scanning technology over the twentieth century? (For guidance, see page 123.)
4. Outline how medical knowledge has changed from c. 500 to the present day. (For guidance, see page 127.)
The role of the church and monasteries from the medieval period up to the mid-sixteenth century

During the medieval period hospitals were essentially religious institutions whose role and functions were very different from what we expect from modern hospitals today. The principal concern of medieval hospitals was the health of the soul over the health of the body. As we have already seen, the emphasis was on care and religion rather than treatment and cure.

Almost all medieval hospitals were run by the church and the building of the monasteries during the twelfth century onwards led to an explosion in the number of hospitals set up between the twelfth and fourteenth centuries. Most monasteries included an infirmary in its layout, such as that of Tintern Abbey on the Welsh border (see Figure 5.1). Throughout England and Wales over 1100 hospitals were set up during the medieval period. These hospitals varied greatly in size — many were small, containing no more than a dozen patients, while a few were larger, such as St Leonard’s in York which, by 1287, could accommodate 225 sick patients.

5 Developments in patient care

This chapter focuses on the key question: How has the care of patients improved over time?

In the UK today if you are sick and in need of medical treatment you either visit your local doctor or, for more serious illnesses, injuries or for an operation, you visit a hospital. All these services are provided under a state-run National Health Service (NHS). However, this has not always been the case. The development of these care facilities has been a very long process. During the medieval period, the church dominated provision but from the mid-sixteenth century onwards voluntary and charity institutions began to take on the responsibility for nursing and patient care. During the twentieth century the government began to take an active role in looking after the welfare of its citizens and since 1948 the NHS has been in operation, treating people 'from the cradle to the grave'.

FOCUS TASK

As you work through this chapter gather together information to enable you to complete this time chart. In each section make bullet points to spell out the key features of hospitals, nursing and patient care during that period. At the end of the chapter you will be able to use this information to make a judgement upon the degree of change in patient care that has taken place.

<table>
<thead>
<tr>
<th>Time period</th>
<th>Types of hospital available</th>
<th>Responsibility for running the hospital</th>
<th>Standard of nursing and patient care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medieval period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sixteenth and seventeenth centuries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eighteenth century</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nineteenth century</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twentieth and twenty-first centuries</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Different types of hospitals in medieval times

The medieval period witnessed a growth in hospitals but only about 10 per cent of them actually cared for the sick (see Figure 5.2). They were called hospitals because they provided 'hospitality', a place of rest and recuperation but not a place to be cured. Some specialised in looking after certain types of people, such as lepers, while others such as St Bartholomew’s in London looked after destitute women who were pregnant and supported the infants of mothers who had died during childbirth.

Leper hospitals

A common incurable and contagious disease during the medieval period was leprosy and a great leprosy epidemic during the twelfth and thirteenth centuries brought about a growth of specific leprosy hospitals. Leprosy infected horrible deformities on its victims and they were forced to wear special clothes and ring a warning bell as they walked, and they were not allowed to marry. Many people feared lepers and thought that those with the disease were being punished by God. Leper hospitals were built on the outskirts of towns to limit the mixing with the rest of the population. They provided lodging and food but no treatment.

Almshouses

Almshouses were the medieval equivalent of the modern care home and they were a response to an ageing population. Almshouses offered sheltered accommodation and basic nursing but no medical treatment.

Most were very small, sometimes just a priest and up to a dozen inmates. Most occupants were elderly needing long-term care, but they also contained widows with young children or single pregnant women. Almshouses also gave shelter to travellers and the poor, who would be given a few nights accommodation.

Source A: A local Law enforced in the town of Berwick-upon-Tweed in an attempt to stop the spread of leprosy.
No leper shall come within the gates of the borough and if one gets in by chance, the serjeant shall put him out at once. If one willfully forces his way in, his clothes shall be taken off him and burnt and he shall be turned out naked.

Figure 5.1: A plan of Tintern Abbey which was constructed in stages between the late twelfth and late thirteenth century. The infirmary (red) was an important part of the monastery.

Figure 5.2: Pie-chart showing the type of patient care provided during the medieval period.

- 31% were leper hospitals which provided no medical care
- 47% housed the poor and elderly. They provided no medical care
- 12% gave shelter to poor travellers and pilgrims
- 10% cared for the sick
The roles of voluntary charities in patient care after the mid-sixteenth century

The mid-sixteenth century onwards witnessed a decline in the role of the church in administering patient care and the growth of voluntary charities taking on that role, especially after the closure of the monasteries.

The impact of the closure of the monasteries

When Henry VIII ordered the dissolution of the monasteries in the 1530s it resulted in the closure of many hospitals and this had a dramatic impact upon patient care. The church now ceased to be a supporter of hospitals and that role now had to be taken on by voluntary charities.

In some areas town or city councils stepped in to take over the running of almshouses that looked after the elderly poor and the hospital, which took care of the poor in general. In London the authorities petitioned the crown to provide funds to endow hospitals such as St Bartholomew’s, St Thomas’ and St Mary’s to enable them to continue to provide services of patient care for their communities. In providing royal funds, it proved to be the first occasion when secular support was provided for medical institutions.

The creation of ‘royal hospitals’ in London

Across London a total of five major hospitals were endowed with royal funds during the mid-sixteenth century to enable them to continue to administer care for the sick and poor of the capital. The endowment usually took the form of the granting of land, which could then be rented out to provide the institution with a steady, though often insufficient, income.

St Bartholomew’s Hospital

The dissolution of the monasteries left St Bar’s in a difficult position as it took away its income. In a bid to keep the hospital open, the city authorities petitioned the king in December 1546 the institution was granted to the Corporation of the City of London by royal charter of Henry VIII and endowed with properties, land and other income entitlements. The hospital served the poor of the area of West Smithfield.

St Mary Bethleheim (including Bethlem)

St Mary Bethleheim, which included Bethlem Hospital, was dissolved in the late 1530s. In 1546 the Lord Mayor of London, Sir John Gresham, petitioned the crown to grant both institutions to the city. A royal charter was granted in 1547. The Bethlem site concentrated upon looking after the mentally insane.

THINK

1. How did the responsibility for care of the sick and the poor change after the dissolution of the monasteries in the 1530s?

2. ‘Hospitals in London during the late sixteenth century began to specialize in the care of particular types of patients.’ What evidence can you find to support this statement?
Science and the development of endowed hospitals in the eighteenth century

During the eighteenth century new hospitals were opened, paid for by private individuals, charities or town councils. A number of factors influenced the growth in the provision of hospital care during this century.

The development of scientific enquiry
This period witnessed a growth in scientific enquiry which in turn resulted in a growing interest in medical issues. The founding of the Royal Society in London in 1662 and various medical societies, such as the one established in Edinburgh in 1732, did much to encourage new scientific discoveries. These new societies provided opportunities to discuss ideas about medicine and to analyse and evaluate the results of experiments or trials in new surgical processes. The desire to investigate, experiment and report led to the growth of the Enlightenment, an age of scientific advancement and enquiry, a period which saw the advancement in medical knowledge.

The impact of the Industrial Revolution
Industrial development resulted in several consequences, one of which was a sharp rise in population levels. As the new industrial towns expanded so there was a corresponding demand for increased hospital provision. Part of that demand was met through financial donations from new wealthy industrialists. They wished to use their new wealth to fund the establishment of hospitals, believing that God had given them the responsibility to improve the lives of the poor and sick. One of these early philanthropists was Thomas Guy, a wealthy printer and bookseller who financed the establishment of Guy’s Hospital in 1724. He held the Christian belief that the rich should help the poor, and through receiving such help, the poor would be provided with the opportunity to live cleaner and more disciplined lives.

The setting up of endowed hospitals
During the first half of the eighteenth century many new voluntary hospitals were opened, paid for by private individuals like Guy, local charities or town councils who provided the new institutions with endowments to fund their upkeep. Eleven new hospitals were founded in London during this period and a further 46 across the country in the growing industrial towns and cities (see Table 5.1).

<table>
<thead>
<tr>
<th>Date</th>
<th>Hospital</th>
<th>Location</th>
<th>Sponsored by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1719</td>
<td>Westminster Hospital</td>
<td>London</td>
<td>Funded by a private bank, C. Hoare &amp; Co</td>
</tr>
<tr>
<td>1724</td>
<td>Guy’s Hospital</td>
<td>London</td>
<td>Bequest of a wealthy businessman, Thomas Guy</td>
</tr>
<tr>
<td>1729</td>
<td>Royal Infirmary Hospital</td>
<td>Edinburgh</td>
<td>Wealthy patrons of Edinburgh donated funds</td>
</tr>
<tr>
<td>1730</td>
<td>Royal Infirmary Hospital</td>
<td>Bristol</td>
<td>Funded by Paul Fisher, a wealthy city merchant</td>
</tr>
<tr>
<td>1697</td>
<td>The Foundling Hospital</td>
<td>Bloomsbury, London</td>
<td>Founded by Thomas Coram, a sea captain. He wished the hospital to look after deserted young children</td>
</tr>
<tr>
<td>1752</td>
<td>Royal Infirmary Hospital</td>
<td>Manchester</td>
<td>Funded by Charles White, a physician, and Joseph Bancroft, a wealthy industrialist</td>
</tr>
<tr>
<td>1766</td>
<td>Addenbrooke’s Hospital</td>
<td>Cambridge</td>
<td>Dr John Addenbrooke left £4500 in his will to set up a hospital</td>
</tr>
<tr>
<td>1779</td>
<td>The General Hospital</td>
<td>Birmingham</td>
<td>Donations from wealthy landowners and industrialists, including Matthew Boulton</td>
</tr>
</tbody>
</table>

Table 5.1: Examples of some of the endowed hospitals set up during the eighteenth century

Source C: An engraving from the 1820s showing Guy’s Hospital in London. This was one of the first voluntary endowed hospitals to be established in 1724

Source D: The rules of Guy’s Hospital, issued after its foundation in 1724
The sick must acknowledge the goodness of God in providing so comfortable a situation, care, medicine and skill, while under the alighting hand of God. They must behave soberly and religiously as Christians.

The role and function of endowed hospitals
The establishment of endowed hospitals marked a turning point in the development of the hospital. They now evolved from a place to provide basic care of the sick to a centre in which to treat illness and conditions that required surgery. Some of them became centres for the education and training of doctors and surgeons.

Within these institutions the primary role was to look after the poor sick, as people with money normally paid for a doctor and nurse to treat them privately at home. The patients were looked after by nursing helpers who undertook the manual work and ensured that the patients were washed, kept warm and fed regularly. Nursing sisters were able to treat ill patients with herbal remedies. Simple surgery such as the removal of bladder stones and the setting of broken bones was carried out by physicians. Treatment was normally free.

Another function of the hospital was the issue of medicines. During the 1770s a number of dispensaries were set up – the Public Dispensary of Edinburgh in 1776, the Metropolitan Dispensary and Charitable Fund in 1779 and the Finsbury Dispensary in 1780, both in central London.

THINK
1. What do Sources C and D tell us about hospitals in the eighteenth century?
2. The growth in the provision of hospital care during the eighteenth century was influenced by developments such as:
   - scientific enquiry
   - industrial development
   - funding by private individuals.
   - Arrange these developments in order of their significance in influencing the growth in hospital provision. Explain your choices.
Changes in the nineteenth century

Two important developments in patient care occurred during the nineteenth century. One was the emergence of nursing as a profession and the other was the planned design of hospitals. Both of these developments were heavily influenced by one individual – Florence Nightingale.

Growth in the number of hospitals

As the country’s population continued to grow throughout the nineteenth century the pressure to provide medical care resulted in the establishment of general hospitals in cities across the country. In 1800 there were approximately 3000 patients in hospitals across England and Wales and by 1851 this figure had risen to 7619. Specialist hospitals had also begun to appear, dealing with such areas as maternity care, orthopaedics, and eye, nose, and throat (see Table 5.2). By the 1860s the cottage hospital movement had resulted in the setting up of small hospitals in rural areas run by general practitioners.

<table>
<thead>
<tr>
<th>Date of foundation</th>
<th>Developments in specific medical care</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800</td>
<td>Royal College of Surgeons opened</td>
</tr>
<tr>
<td>1814</td>
<td>London Chest Hospital</td>
</tr>
<tr>
<td>1828</td>
<td>Royal ‘Free’ Hospital founded by William Marsden</td>
</tr>
<tr>
<td>1834</td>
<td>Westminster Medical School</td>
</tr>
<tr>
<td>1851</td>
<td>Royal ‘Marsden’ Cancer Hospital</td>
</tr>
<tr>
<td>1852</td>
<td>Great Ormond Street Children’s Hospital</td>
</tr>
<tr>
<td>1860</td>
<td>Nightingale School of Nursing</td>
</tr>
</tbody>
</table>

▲ Table 5.2: Major hospitals and specialist training institutions established between 1800 and 1900

Conditions within these new hospitals

While there was a growth in the number of hospitals, conditions for the patients within them were generally poor. Cramped, stuffy wards helped infections to spread quickly, and the fact that the wards were seldom cleaned meant that the death rate from infection was high. The quality of nursing was poor, with untrained nurses securing reputations for being dirty, ignorant and often drunk. They received little, if any, training and were often ignorant of the most basic standards of hygiene. The most common complaints waged against nurses were that they were too often dirty and drunk (see Source E). Many thought nursing was a job only for uneducated women who could do nothing else. Nursing was not looked upon as a respected profession and was certainly not seen as a career for a respectable young woman like Florence Nightingale.

Source E: A description of nursing at St Bartholomew’s hospital in London in 1877. It was written in 1902 by a nurse who had been a sister in the hospital in the 1870s.

Drunkeness was very common among the staff nurses, who chatty were of chairwoman type, frequently of bad character, with little education. ‘Nursing, as you understand it now, was unknown. Patients were not nursed, they were attended to, more or less. The work was hard – lookers and failures to scrub every day. We did not scrub the floors. The patients had their beds made once a day, and you thought nothing of changing fourteen or fifteen poultries two or three times a day. The nurses never used a thermometer, the dressers and clerks took the temperatures.

▲ Source F: Shortly after her arrival in Scutari, Florence Nightingale wrote to Sydney Herbert, describing the conditions in which wounded and sick soldiers were treated. Her letter is dated 25 November 1854.

It appears that in these hospitals the washing of linen and of the men are considered a minor detail. No washing has been performed for the men or the bed – except by ourselves. When we came here, there was neither basin, towel, nor soap in the Wards. The consequences of this are Fever, cholera, gangrene, lice, bugs, fleas.

THINK

1. What do Source E and F tell you about conditions for sick and wounded soldiers in army hospitals at the start of the Crimean War?

2. Describe the changes made by Florence Nightingale to the care of sick and wounded soldiers in the army hospital at Scutari.

THINK

1. The first half of the nineteenth century saw the opening of many new hospitals but these hospitals did not bring about any improvement in patient care. What evidence can you find in this section to support this statement?

Florence Nightingale goes to the Crimea

Having secured government funding, Nightingale took 38 of the best nurses she could find and travelled to the British military hospital at Scutari on the Black Sea coast of Turkey. Upon their arrival at Scutari on 4 November 1854 they were appalled by what they saw. There were 1700 wounded and sick soldiers in the field hospital, many of whom were suffering from cholera and typhoid, housed in filthy wards. There were not enough beds or medical supplies. Added to this problem was the fact that the army doctors resented Nightingale’s presence and opposed her interference.

However, Nightingale had the support of both Sydney Herbert, Minister of War Supplies, and Dr Andrew Smith, head of the Army Medical Department. Dr Smith ensured that she obtained sufficient supplies of the medical items she needed, and she also had financial backing from The Times, which reported upon her improvements.

One of Nightingale’s first tasks was to clean the wards. Patients were given a regular wash, clean clothes and had their bedding changed regularly. To help prevent the spread of disease, patients were separated according to their illness, plenty of space was put between each bed and fresh air circulated from open windows. These measures had dramatic results. After just six months only 100 of the 1700 patients were still confined to bed, and the death rate in the hospital had fallen from 42 in every 100 patients to 2 in every 100. Through these reforms Nightingale had laid down new standards of patient care.

▲ Source G: Conditions in the military hospital at Scutari in 1854 before the arrival of Florence Nightingale

▲ Source H: A hospital ward at Scutari in 1856 showing the changes to patient care introduced by Florence Nightingale

Florence Nightingale and the professionalisation of nursing

As we have seen, during the first half of the nineteenth century standards of nursing were very poor. What changed nursing were the actions of a number of females – Florence Nightingale, Mary Seacole and Betta Cardwadler – all of whom took part in the nursing of British soldiers during the Crimean War (1854–6).

The impact of the Crimean War

The Crimean War was the first war in which reporters sent back reports to newspapers in Britain using the new telegraph system and the public soon began reading about the awful conditions experienced by sick and wounded British soldiers fighting in the Crimea. What got Florence Nightingale interested in the war were the reports she read in The Times.

Born into a wealthy family, Nightingale believed God had wanted her to be a nurse and despite opposition from her parents she had trained as a nurse in Germany and in Paris during the early 1850s. After returning to England she worked in several hospitals before the outbreak of the Crimean War in 1854.

Source F: Shortly after her arrival in Scutari, Florence Nightingale wrote to Sydney Herbert, describing the conditions in which wounded and sick soldiers were treated. Her letter is dated 25 November 1854.

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▲ Source G: Conditions in the military hospital at Scutari in 1854 before the arrival of Florence Nightingale

▲ Source H: A hospital ward at Scutari in 1856 showing the changes to patient care introduced by Florence Nightingale
Florence Nightingale and the birth of modern nursing

Upon her return to Britain in 1856 Nightingale set up a public fund and was successful in raising nearly £50,000. Much of this was used to set up the Nightingale School of Nursing in a wing of St Thomas’ Hospital in London. In 1859 she published Notes on Nursing, which set out the training nurses should receive. The training was very practical and ward based. Training in the school was very strict:
- Nurses were only allowed to go out in pairs.
- They had to live in at the hospital.
- They had to keep a diary of their work, which was inspected every month.

They were taught to be as clean as possible, to change dressings and to be proper assistants to doctors and surgeons. Instead of being minders and cleaners as they had been in the past, nurses were now to be seen as an essential part of patient care and treatment. By 1900 nursing schools had opened around the country using Nightingale’s ideas.

Florence Nightingale influences the design of new hospitals

In 1863 Nightingale published Notes on Hospitals, which introduced new ideas about the design of hospitals. She believed that new hospitals should consider the importance of ‘the proper use of fresh air, light, warmth, cleanliness, quiet and the proper selection and administration of diets’. When St Thomas’ Hospital was rebuilt in 1868 it became one of the first hospitals to adopt the ‘pavilion principle’ devised by Nightingale. This consisted of six separate wards at right angles to a long, linked corridor which encouraged good circulation of air.

The importance of Florence Nightingale

In 1859 there had been no trained nurses in Britain, yet by 1901 there were 68,000. In 1899 the International Council of Nurses was set up in London. Nursing had finally been recognised as a profession, in large part due to the efforts of Florence Nightingale. Hospital design had also undergone radical change. By the end of the nineteenth century many towns and cities had built new hospitals and in their design they embodied many of the recommendations put forward by Florence Nightingale.

<table>
<thead>
<tr>
<th>Problems in 1850</th>
<th>Solutions found by 1900</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untrained nurses</td>
<td>Trained nurses</td>
</tr>
<tr>
<td>Lack of respect for nurses</td>
<td>Nursing recognised as a profession</td>
</tr>
<tr>
<td>Cramped, stuffy wards</td>
<td>Spacious, light and well-ventilated wards</td>
</tr>
<tr>
<td>Poor sanitation, toilet facilities and sewage disposal</td>
<td>Good sanitation, connected to main drains and piped water supplies</td>
</tr>
<tr>
<td>Lack of cleanliness</td>
<td>Clean wards</td>
</tr>
<tr>
<td>Unhygienic surgery and dressings</td>
<td>Aseptic surgery and dressings</td>
</tr>
</tbody>
</table>

Table 5.3: Changes in nursing and hospitals between 1850 and 1900

The contribution of Mary Seacole (1805–81)

Another nurse who made her mark in the Crimean War was Mary Seacole. The daughter of a Scottish sailor, Seacole was born in Kingston, Jamaica, where her mother ran a medical centre for British soldiers and sailors on the island, and Seacole soon developed a keen interest in nursing. She travelled to Britain in 1854 and volunteered services to the army in the Crimea.

In 1855 she opened the ‘British Hospital’ between Balaklava and Sebastopol to treat wounded and sick soldiers. She dealt with typhus, diarrhea, dysentery and frostbite, and was often seen going into the thick of the battle with her medicine bag. When the war ended she returned to Britain and in 1857 published an autobiography, The Wonderful Adventures of Mrs Seacole in Many Lands, which helped to raise awareness of the contribution of nursing during the Crimean War.

The contribution of Betsi Cadwaladr (1789–1860)

Like Seacole, Betsi Cadwaladr helped with the nursing of soldiers in the Crimea. Born in Bala in north Wales in 1789, Cadwaladr was one of 16 children. At the age of 14 she ran away from home, travelled to Liverpool and then to London where she became interested in nursing. Between 1815 and 1820 she served as a maid to a ship’s captain, which enabled her to travel to South America, Africa and Australia. Upon her return to London she trained as a nurse and in 1854, aged 65, she went to the Crimea to help nurse the wounded soldiers. She did not get on well with Florence Nightingale and so moved from the hospital at Scutari to Balaklava. She cleaned wounds and changed bandages, working from 6 a.m. to 11 p.m. However, the war took its toll on her health and she caught cholera and dysentery. She had to leave the Crimea in 1855 and died in 1860. The Betsi Cadwaladr NHS Trust in north Wales commemorates her.
The impact of the early twentieth century Liberal reforms

The early decades of the twentieth century witnessed the beginnings of the creation of the Welfare State when the government began to take some responsibility for managing the care and treatment of the sick and those in need.

Changes in government attitude

During the nineteenth century governments had traditionally followed a policy of laissez-faire, believing it was not their job to interfere with people's lives unless they really had to. During the early twentieth century, however, attitudes began to change and the Liberal governments of 1906-14 broke with the past and introduced a series of welfare reforms designed to help people who fell into difficulty through sickness, old age or unemployment. The reforms tackled such areas as the provision of education, the medical inspection of school pupils, workers, compensation rights and the provision of old-age pensions (see Table 5.4).

<table>
<thead>
<tr>
<th>Year</th>
<th>Act passed</th>
<th>Effect of legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1906</td>
<td>Workmen's Compensation Act</td>
<td>Granted compensation for injury at work</td>
</tr>
<tr>
<td>1907</td>
<td>Education (Provision of Meals) Act</td>
<td>Introduced free school meals</td>
</tr>
<tr>
<td>1908</td>
<td>Education (Administrative Provisions) Act</td>
<td>Created school medical inspections</td>
</tr>
<tr>
<td>1908</td>
<td>Matrimonial Causes Act</td>
<td>Maintenance payments to be paid to divorced women</td>
</tr>
<tr>
<td>1909</td>
<td>Children and Young Person's Act (Children's Charter)</td>
<td>Made it illegal to sell alcohol, tobacco or fireworks to children</td>
</tr>
<tr>
<td>1909</td>
<td>Old Age Pensions Act</td>
<td>Over 70s received 5 shillings a week (25p), 7 shillings and 6 pence for a married couple</td>
</tr>
<tr>
<td>1909</td>
<td>Labour Exchanges Act</td>
<td>Helped get people back into a job</td>
</tr>
<tr>
<td>1911</td>
<td>Housing and Town Planning Act</td>
<td>Made it illegal to build back-to-back houses</td>
</tr>
<tr>
<td>1911</td>
<td>National Insurance Act</td>
<td>Sick and unemployment pay introduced if you paid contributions into the scheme</td>
</tr>
</tbody>
</table>

Table 5.4: Early twentieth-century Liberal reforms

Case study: School meals in Bradford

Manchester and Bradford local authorities had introduced school meals for 'necessitous children' and led the campaign for the introduction of school meals nationally. One of the first things the Liberal government did in 1906 was to introduce free school meals, but it was not compulsory for local authorities to provide them until 1914, when 14 million were served over the course of the year. Parents could be asked to make a contribution towards the cost if they could afford it, and the rest of the money had to come from local rates.

What were the achievements of the Liberal government of 1906–14?

In introducing the 1909 Budget, Lloyd George stated: 'This is a war budget ... to wage implacable warfare against poverty and squaloriness.' But did these measures have as much impact as he stated they would? Medical inspections were introduced in 1907, but poor families could not afford to pay for necessary treatment. Pensions were introduced for over 70s (the average age of death was around 50), but only if you had worked all your life and could prove you were not a drunkard. The National Insurance scheme only applied if you paid regular contributions, but part of the cause of poverty was irregular employment. The 1909 Budget was thrown out in the House of Lords by the Conservative peers, who were opposed to paying for these reforms. It caused a constitutional crisis. Even some Liberals thought they were too expensive. And others, like those in the newly formed Labour Party, felt they did not go far enough.

The National Insurance Act 1911

Among the most significant was the introduction of the National Insurance Act 1911, which laid down the first steps towards the creation of a welfare state. The minister responsible for this Act was David Lloyd George, the Chancellor of the Exchequer. Lloyd George proposed an insurance scheme which involved workers and their employers making weekly contributions into a central fund which was used to give workers sickness benefit and free medical care from a panel doctor if they became ill. Those workers contributing into the scheme would be entitled to receive free medical attention and a payment of 10 shillings (50p) per week for 26 weeks if absent from work due to illness, after which a disability pension of 5 shillings (25p) paid weekly would be available. Many doctors, however, opposed the scheme but Lloyd George got over the opposition by paying each doctor more money for each patient they saw.

A second National Insurance Act was passed in 1913 which extended the scope to include unemployment insurance. This allowed workers who became unemployed to claim unemployment benefit of 7 shillings per week up to a maximum of 15 weeks.

While this was a major step forward in providing welfare care it also had its limitations. The scheme was restricted to certain trades and occupations and it did not cover families (wives and children), only the insured husbands. Neither did it cover the unemployed, the elderly, the mentally ill or the chronically ill.

Welfare care during the 1920s and 1930s

After the First World War Lloyd George, who was then Prime Minister, promised 'a land fit for heroes' and he initiated a building programme for over 200,000 new houses to be built by 1922 to replace slum housing. He also extended National Insurance to cover a greater proportion of the workforce, allowing insured persons to claim both sickness and unemployment benefit. The payments came to be known as the dole.

During the economic depression of the 1930s it became harder to get good medical care and the government even reduced its contributions to health insurance. Many of the unemployed failed to keep up with their contributions into the scheme and by 1934 there were 4 million insurance policies on which people owed payments. As people had little money they were forced to rely on cheap, easy-to-obtain remedies which had been handed down through the generations.

THINK

1. Why were the Liberal reforms so divisive?
2. Which of the reforms do you think might be most successful? Why?
3. What can you learn from Source M about the National Insurance Act 1911?
4. To what extent does the National Insurance Act 1911 mark a change in government attitudes towards the welfare of its citizens?
The Beveridge Report

Lloyd George and the Liberal governments of 1906-14 had set up a free health service for insured workers but their wives and children had to pay for any treatment they needed. Visits to and from the doctor, medicine, spectacles and dental treatment all had to be paid for. During the Second World War questions began to be asked about how medical care should be best organised once the war was over.

The Beveridge Report, 1942

In June 1941 the wartime government set up a committee to look into welfare provision and it was chaired by William Beveridge, a man who had helped formulate the Liberal welfare reforms of 1906-14. The Beveridge Report was published in December 1942 and it became a best seller with over 600,000 copies sold. It identified 'five evil giants' that needed to be tackled by government action and these were 'Want, Disease, Ignorance, Squalor and Idleness'. While Churchill, the wartime Conservative Prime Minister, was reluctant to act upon the suggestions of the report, the Labour Party, under its leader Clement Attlee, promised to put the proposals into action if it was elected after the war.

Tackling the ‘five evil giants’

When the Labour Party was elected into office after a landslide victory in July 1945 it immediately set about implementing the recommendations of the Beveridge Report. It passed a number of Acts which together helped establish the 'Welfare State'.

Battle against want

- National Insurance Act 1946 provided benefits for the unemployed and pregnant women, pensions for the retired, allowances for the sick, widowed and mothers and children

Battle against sickness

- 1946 and 1949 Housing Acts provided financial aid to local authorities to rebuild towns and cities and provide for the building of council houses
- 1948 New Towns Act allowed for the construction of 14 new towns
- 1949 Access to the Countryside Act

Battle against ill health and ignorance

- 1944 Education Act provided free primary and secondary education
- 1947 School leaving age raised to 15 in 1947
- 1948 Employment and Training Act attempted to establish a skilled workforce

Battle against disease

- 1946 National Health Service Act proposed the setting up of a free health service for all

The National Health Service Act 1946 is considered to be the foundation stone in the creation of the Welfare State. The aim of the Act was to set up a health service that was to be 'free of charge' and available to everyone. The main features of the Act were:

- for the first time every British citizen could have free medical treatment - hospitals, doctors, nurses, pharmacists, opticians and dentists were brought together under one umbrella organisation
- all hospitals were to be brought under state control (nationalisation) under the control of the Ministry of Health
- consultants in hospitals received salaries and all treatment to patients in hospitals was to be free
- a national system of general practitioners (GPs) was to be set up and they, along with dentists and opticians, were to receive fees according to the numbers of patients on their registers, not according to the treatment given. All treatment was to be free to the patient
- health centres were to be set up - local authorities were paid to provide vaccinations, maternity care, district nurses, health visitors and ambulances
- the aim was to provide support 'from the cradle to the grave', financed out of taxation through the payment of National Insurance contributions.

These changes, announced in 1946, took two years to complete. A major reason for this was because the Minister for Health, Aneurin Bevan, faced considerable opposition to his proposals, especially from the British Medical Association (BMA) and from many Conservative MPs.

- The BMA opposed the changes - a survey of its members in January 1948 showed that 90 per cent of its members would refuse to cooperate with the NHS
- Many local authorities and voluntary bodies opposed the nationalisation of all hospitals, fearing they would lose control over them.
- Arguments raged over the enormous costs involved.

However, Bevan was able to win the arguments by agreeing to a compromise which allowed doctors to take on fee-paying patients as long as they treated NHS patients as well. By the spring of 1948 opposition had crumbled and by the time the NHS was officially launched on 5 July 1948 over 90 per cent of doctors had enrolled on the new scheme.

Source D: An extract from a speech made by Aneurin Bevan, Minister for Health, in 1946

Medical treatment should be made available to rich and poor alike in accordance with medical need and no other criteria. Worry about money in a time of sickness is a serious hindrance to recovery apart from its unnecessary cruelty. The records show that it is the mother in the average family who suffers most from the absence of a full health service. In trying to balance her budget she puts her own needs last. No society can call itself civilised if a sick person is denied medical aid because of lack of money. The essence of a satisfactory health service is that the rich and the poor are treated alike, that poverty is not a disability, and wealth is not advantaged.

Source O: An extract from the British Medical Journal, 18 January 1946

If the Bill is passed no patient or doctor will feel safe from interference by some ministerial edict or regulation. The Minister's spies will be everywhere, and intrigue will rule.

THINK

1. Explain why the BMA was initially opposed to the setting up of an NHS.
2. Study Source O. What arguments does Aneurin Bevan put forward to support his idea of creating a national health service?