



Geography 11–14

Exploring our changing world

Advance chapter: Why is disease a geographical issue?

<p>Why teach about the geographies of disease?</p>	<p>That disease is a geographical issue surprise your students; they may not feel that it is a ‘proper’ geography topic so this is a great opportunity to challenge their expectations about what geography is and can be, with numerous implications for thinking about the contribution of geography and geographers to modern life.</p> <p>As geographers, we are interested in many aspects of disease including: how diseases are caused and spread through space and time; the causes and distribution of different infections; the link between development and disease; different impacts of disease on people and economies, and how they can be prevented.</p> <p>Writing in 2020–21, this has a particular resonance because of the global spread and impact of the COVID-19 pandemic; indeed, this chapter was largely written to help students understand its geography. Learning about disease also helps build students’ understanding of key geographical concepts including distribution, scale, human-environment interaction, development and inequality, and interdependence; together with helping them become globally-minded and enquiring citizens.</p> <p>This chapter focuses on ideas including:</p> <ul style="list-style-type: none"> • that diseases (and health) have distributions in space, and can be examined at different scales • that the incidence of many diseases is related to environmental, economic and social conditions, as well as how people make decisions: the political sphere • that human progress has reduced the incidence and impact of many – but not all – diseases, and new diseases are always possible in future.
<p>Students’ prior learning</p>	<ul style="list-style-type: none"> • In key stage 2 students may have learned about climate zones, trade links and the distribution of natural resources including water, and used maps and atlases to locate countries. • In this book, students can learn about uneven development in Chapter 4, risk and hazards in Chapter 11 and human rights in Chapter 17.
<p>Students’ future learning</p>	<ul style="list-style-type: none"> • Opportunities for further development: you might want students to investigate one of the featured diseases in more detail, compare infectious with lifestyle diseases, or investigate the links between development and health more fully. • Health and uneven development, and globalisation are themes in most GCSE specifications.
<p>Key learning outcomes</p>	<p>Students will know:</p> <ul style="list-style-type: none"> • what an outbreak, epidemic and pandemic are • some examples of current or historic disease pandemics, and their effects.



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	<p>Students will understand:</p> <ul style="list-style-type: none"> • how diseases are caused and spread through populations at different scales • how disease, development, poverty and inequality and public health are linked • the impact of disease on people and economies, and how they can be prevented. <p>Students will be able to:</p> <ul style="list-style-type: none"> • interpret a variety of graphs and maps, including GIS maps and more complex thematic maps • use geographical writing to describe and explain the distribution of diseases.
<p>The geography of disease</p>	<p>1 Mapping the spread of cholera (pages 2–3)</p> <p>Cholera is a virulent bacterial disease infecting 1.3–4 million people a year worldwide, particularly in parts of sub-Saharan Africa and South Asia. It sometimes kills within hours of infection; others can have mild or no symptoms, allowing the disease to spread. The cholera bacterium is thought to have developed in the Ganges Delta and have been endemic locally for centuries. The first pandemic began in 1817, spreading along trade and military routes across Asia, the Middle East and Russia. The current (seventh) pandemic began in Indonesia in 1961.</p> <p>Cholera is caught by ingesting contaminated food or water, so is linked to poor sanitation and a lack of access to clean water and washing facilities. Cholera was and is largely a disease of inequality and poverty, although today it is readily treatable and preventable. Areas at particular risk are refugee camps and the urban squatter settlements and slums in the global South that are growing faster than the authorities can provide services, as in parts of London in the mid-19th century, the focus of this section.</p> <p>In 1853–54 the third cholera pandemic reached Britain. Contemporary thinking explained cholera by miasma ('bad air'). In London, Dr John Snow investigated a local outbreak in the overcrowded slums of Soho, using innovative dot maps to show the number of cases and distribution of infected households. He used these statistics to connect the incidence of cholera with contaminated water, identifying a water pump in Broad Street (now called Broadwick Street) as the source of infection and ending the outbreak. In doing so he became a founder of epidemiology, as well as helping single out the improvement of water supply and sanitation as a matter of public health. In 1854 the cholera bacterium was identified in Italy then rediscovered in 1884, when it became widely accepted as the cause of disease. The map on page 2 of the student book is a modern copy of Snow's map, using proportional circles rather than dots.</p> <p>2 Tracing the spread of disease (pages 4–5)</p> <p>Modern methods of controlling the spread of disease are based on tracking the spread of the disease (mapping), tracing everyone an infected person has been in contact with, and isolating them to stop them spreading the infection further. Although most of us weren't aware of them until recently, these methods have been used for over a century, as seen in the example of 'Typhoid Mary', who was what we would today call an 'asymptomatic super spreader'.</p>



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Visualising the spread of MERS helped South Korea to spot the high level of infection in hospital settings. This visualisation was a type of mapping of the spread of disease. The experience South Korea gained in dealing with MERS gave it a life-saving head start in tackling COVID-19. Unfortunately, other countries chose not to benefit from this experience, considering perhaps that COVID-19, like MERS, would not spread to them.

3 What's the link between development and disease? (pages 6–7)

The general geographical relationship is that higher-income countries (HICs) tend to have higher vaccination rates and therefore lower incidence of infectious diseases. However, they tend to have much higher incidences of degenerative diseases that are linked to longer life expectancy. Lower-income countries (LICs), on the other hand, tend to experience much higher incidences of infectious diseases. However, this is not always the case: vaccination programmes in some LICs (e.g. Eritrea), and lower vaccination confidence in some HICs (e.g. France), can cause anomalies – in 2019, Eritrea had a 99% measles vaccination rate in one-year-olds compared to France at 90%.

Globalisation, increased connectivity due to travel and trade, and closer proximity to animal populations make certain places more vulnerable to diseases, particularly zoonotic diseases (those that pass from animals to humans) e.g. SARS, Ebola, COVID-19.

4 The geographies of the initial COVID-19 outbreak (pages 8–9)

Linked to the previous spread, COVID-19, a zoonotic disease, spread to more developed countries faster than it did to less developed countries (although testing in HICs may have occurred faster too). While COVID-19 and its long-term implications have not yet been fully determined (and will not be for many years), students aged 11–14 will have witnessed some of the social, economic and environmental consequences at first-hand. The social impacts tended to be negative – lockdowns, restrictions, as well as illness and death. The economic impacts were generally negative too, with hospitality and tourism businesses in particular experiencing reduced revenue for extended periods. There were some short-lived environmental advantages, such as reduced greenhouse gas emissions and pollution, but the increase in medical waste from personal protective equipment (PPE), mass testing and mass vaccination also needs to be considered.

The data on pages 8–9 shows only the start of the 'second wave' of COVID-19 in some countries, particularly the EU and the UK. At the time of writing the student materials it was not clear that a second and even third wave would affect certain countries. More up-to-date information on this can be found on the Our World in Data website (see key information sources below).

5 The links between human rights and disease (pages 10–11)

The World Health Organization (WHO) says 'no one should get sick and die just because they are poor, or because they cannot access the health services they need': making health a human right. However, health is hugely impacted by inequalities between and within low-, medium- and high-income countries. Health indicators are key indicators for development for this reason.

As with many issues, COVID-19 highlighted existing inequalities in people's health, and the multiple reasons why people living in areas of greater deprivation and BAME people were more likely to die.

Governments' responses to COVID-19 also impacted on human rights, in positive as well as in negative ways: a human right to health was protected by furlough schemes, while lockdowns and quarantines around the world infringed rights to liberty.



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<p>Key terms</p>	<p>Anomaly: something that is different from what is expected – an outlier in a set of data</p> <p>Bacterium: a very small organism with only one cell that can live in air, soil, water, plants and animals – including humans</p> <p>Cesspit: a hole in the ground for sewage and other waste</p> <p>Degenerative disease: a disease that gets steadily worse as bodily tissue or organs deteriorate</p> <p>Deprivation: lacking something, particularly a person or place lacking the services and amenities for a decent life</p> <p>Disease: an illness or sickness caused by poor health, infection or harmful substances, but not injury or accident</p> <p>Distribution: how something is arranged in space, or spread out over a particular area</p> <p>Epidemic: a disease that affects a large number of people within a community, population, or region</p> <p>Epidemiology: the study of how often diseases occur in groups of people and why</p> <p>Index case: the first person identified as having caught an infectious disease</p> <p>Inequality: being unequal, particularly in income or wealth</p> <p>Infectious disease: an illness caused by infection from bacteria, viruses, fungi or parasites. They can be transmitted in different ways, for example from person to person, in food or water, and by insects</p> <p>Nutrition: getting the food needed to be healthy and grow</p> <p>Outbreak: the amount of a disease beyond what is normal in a community or population</p> <p>Pandemic: an epidemic that has spread over several countries or continents</p> <p>Quarantine: keeping people affected by a disease in a place away from other people until they are no longer infectious</p> <p>Sanitation: keeping places clean and healthy, particularly through providing a sewerage system</p> <p>Vaccine: a substance that encourages the body’s immune system, so protecting it from disease in future</p> <p>Zoonotic disease: an infectious disease passed from animals to humans</p>
<p>Key information sources</p>	<ul style="list-style-type: none"> • The Esri John Snow storymap is a simple GIS that enables you to show John Snow’s data in different layers and formats: https://schools.esriuk.com/teaching-resources (search ‘John Snow’) • WHO factsheets for diseases including cholera, typhoid etc: https://www.who.int/news-room/fact-sheets; the WHO website also has recent maps for a number of diseases including cholera, typhoid and malaria



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- Worldmapper has cartograms for COVID-19 and other diseases, together with conditions such as sanitation: <https://worldmapper.org/maps>
- A very quick (30-second) summary of the story of Typhoid Mary: https://youtu.be/QR_QjZPbKNw
- Our World in Data has interactive maps and charts about the eradication of diseases: <https://ourworldindata.org/eradication-of-diseases> and COVID-19: <https://ourworldindata.org/coronavirus>

The links to these resources are also provided on the PowerPoint for this chapter.



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Suggested medium term plan

Lesson	Key questions	Learning objectives	Teaching and learning	Resources	Assessment opportunities
Introduction	Why is disease a geographical issue?	<ul style="list-style-type: none"> To activate prior learning about health and disease To create interest and motivation to learn about the geography of disease 	Investigates: <ul style="list-style-type: none"> how GIS maps can represent data students' prior and future learning 	Student resource p. 1 PowerPoint slide 2	Students: <ul style="list-style-type: none"> interpret and discuss a map and images of health/disease
1 Mapping the spread of cholera	How do diseases break out and spread? How does mapping the distribution of diseases help understand and prevent them?	Know: <ul style="list-style-type: none"> that infectious diseases like cholera can spread locally, nationally and internationally Understand: <ul style="list-style-type: none"> the social, environmental and political conditions that cause cholera to develop and spread how collecting and mapping data can help investigate the causes and spread of disease Be able to: <ul style="list-style-type: none"> interpret data from maps using scale and proportional circles 	Investigates: <ul style="list-style-type: none"> the conditions leading to cholera infections and the spread of the disease in 19th-century London, including social and environmental factors (urbanisation, overcrowding, poor housing, poor services) and the political/decision-making factors that contributed to the outbreak and to the elimination of cholera parallels with its causes and global distribution today important language, particularly the geographical difference between outbreak, epidemic and pandemic how proportional circles can represent data on a map how geographers and scientists use maps to understand distributions and investigate processes/causation 	Student resource pp. 2–3 PowerPoint slide 3 Activity sheet 1: Investigating cholera deaths in Victorian London	Students: <ul style="list-style-type: none"> interpret a map and use geographical writing to describe location and distribution explain key terms: outbreak, epidemic and pandemic describe the conditions leading to cholera in 1854, compared with today explain how and why pandemics happen



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<p>2 Tracing the spread of disease</p>	<p>What are modern methods of dealing with infectious disease pandemics?</p> <p>Why was South Korea better at tackling the first wave of COVID-19 than some other countries?</p>	<p>Know:</p> <ul style="list-style-type: none"> today, countries use track, trace and isolate to deal with pandemics <p>Understand:</p> <ul style="list-style-type: none"> how 'Typhoid Mary' spread typhus how track and trace systems helped to show the spread of MERS in South Korea how tackling MERS helped South Korea tackle COVID-19 effectively <p>Be able to:</p> <ul style="list-style-type: none"> interpret data from maps of the spread of disease 	<p>Investigates:</p> <ul style="list-style-type: none"> the history of modern methods of track, trace and isolate in relation to 'Typhoid Mary' – an asymptomatic super spreader what South Korea learned about dealing with the spread of new infectious diseases by mapping how MERS spread how the experience of managing MERS helped South Korea to limit the spread of COVID-19 more effectively than some other countries 	<p>Student resources pp. 4–5</p> <p>PowerPoint slide 4</p>	<p>Students:</p> <ul style="list-style-type: none"> explain key terms about the spread of infectious disease interpret a diagram about the spread of MERS in South Korea apply their understanding of how infectious diseases spread to a new scenario
<p>3 What's the link between development and disease?</p>	<p>How complex is the link between development and disease?</p> <p>How have vaccinations impacted disease?</p> <p>How has globalisation affected disease?</p> <p>What are zoonotic diseases?</p>	<p>Know:</p> <ul style="list-style-type: none"> that development and disease are linked, but the relationship is not always simple the difference between infectious and degenerative diseases <p>Understand:</p> <ul style="list-style-type: none"> how vaccinations reduce infectious disease transmission how developed and developing countries 	<p>Investigates:</p> <ul style="list-style-type: none"> the relationship between vaccination rates and disease incidence the change from infectious diseases to degenerative diseases as countries develop, but with an understanding that the relationship is not always simple the link between globalisation and the spread of diseases recent zoonotic disease outbreaks worldwide and how they compare 	<p>Student resource pp. 6–7</p> <p>PowerPoint slide 5</p>	<p>Students</p> <ul style="list-style-type: none"> think about suitable statistics to show how effective healthcare in a country is explain why some countries have high levels of preventable disease consider government preparation for COVID-19



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		<p>experience different diseases</p> <p>Be able to:</p> <ul style="list-style-type: none"> interpret data from maps and graphs that show the link between development and disease 			
<p>4 The geographies of the initial COVID-19 outbreak</p>	<p>What were the social consequences of the initial COVID-19 outbreak?</p> <p>What were the environmental consequences of the initial outbreak?</p> <p>What were the economic consequences of the initial outbreak?</p> <p>What might the long-term consequences of COVID-19 be?</p>	<p>Know:</p> <ul style="list-style-type: none"> that the spread of COVID-19 had social, economic and environmental consequences <p>Understand:</p> <ul style="list-style-type: none"> that diseases have varying consequences why some places were affected sooner, or worse than other places <p>Be able to:</p> <ul style="list-style-type: none"> interpret maps to explain the initial spread of COVID-19 interpret a stacked area graph on daily COVID-19 deaths to understand why and how places responded differently 	<p>Investigates:</p> <ul style="list-style-type: none"> the initial spread of COVID-19 between December 2019 and November 2020 the consequences of the initial outbreak on different places around the world the direct impact of COVID-19 on students, and the potential future consequences for places 	<p>Student resource pp. 8–9</p> <p>PowerPoint slide 6</p>	<p>Students:</p> <ul style="list-style-type: none"> interpret a graph showing deaths due to COVID-19 (first wave) and use it to consider people’s opinions at the time use maps to describe the spread of COVID-19 and suggest reasons for the spread in certain places consider how COVID-19 affected their own lives
<p>5 The links between human rights and disease</p>	<p>Is health a human right?</p> <p>What did COVID-19 highlight about health inequalities?</p>	<p>Know:</p> <ul style="list-style-type: none"> that the WHO considers health a human right <p>Understand:</p>	<p>Investigates:</p> <ul style="list-style-type: none"> reasons why there are inequalities in health and how these link to development indicators 	<p>Student resource pp. 10–11</p> <p>PowerPoint slide 7</p>	<p>Students:</p> <ul style="list-style-type: none"> explain reasons why poor people are more likely to



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	<p>How do government responses to pandemics affect human rights?</p>	<ul style="list-style-type: none"> that there are inequalities in health that the COVID-19 pandemic highlighted health inequalities <p>Be able to:</p> <ul style="list-style-type: none"> discuss whether it is acceptable for governments to restrict people's freedoms in order to save lives 	<ul style="list-style-type: none"> why in, the first wave of the COVID-19 pandemic, poorer people and BAME people were more likely to die why government responses to the COVID-19 pandemic meant limiting human rights 		<p>die from disease than rich people</p> <ul style="list-style-type: none"> consider government priorities for protecting vulnerable people evaluate government priorities in protecting the old by limiting the rights of the young justify their own opinion about individual rights versus the public good
Review	<p>What do I know about the geography of disease?</p>	<p>To review learning about the geography of disease</p>	<p>In reviewing the main themes from this chapter, you might:</p> <ul style="list-style-type: none"> discuss with students what they can/can't interpret and justify from the data about malaria review the concepts covered in to be a 'Better geographer', challenging students to define the concepts and find examples from the chapter identify evidence about why disease is a geographical issue 	<p>Student resource p. 12</p> <p>Activity sheet 2: Key word check</p> <p>PowerPoint slides 8-10</p>	<p>Students summarise their learning by:</p> <ul style="list-style-type: none"> reviewing and comparing maps of disease they have used in this chapter assess evidence from a graph showing the incidence of malaria use geographical concepts and data to review and explain and their understanding of the geography of disease discuss government responses to disease



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Assessment framework: by the end of this chapter...

<p>Students who make slower progress should...</p>	<p>Know:</p> <ul style="list-style-type: none"> • that diseases have affected people in the past and today • that diseases can affect people locally, in whole countries and globally <p>Understand:</p> <ul style="list-style-type: none"> • some of the conditions that cause diseases to spread • that poverty and disease are linked, now and in the past • how improvements to public health services can help prevent the spread of disease <p>Be able to:</p> <ul style="list-style-type: none"> • interpret patterns of disease from simple graphs, maps and images • use geographical writing to describe the distribution of diseases
<p>Most students should...</p>	<p>Know:</p> <ul style="list-style-type: none"> • what an outbreak, epidemic and pandemic are • some examples of current or historic disease pandemics, and their effects <p>Understand:</p> <ul style="list-style-type: none"> • how diseases are caused and spread through populations at different scales, from local to global • the links between disease, development and public health, in the past and today • how human rights and disease are linked, particularly poverty and inequality • the impact of disease on people and economies, and how outbreaks can be prevented <p>Be able to:</p> <ul style="list-style-type: none"> • accurately interpret a variety of graphs, maps and images to support understanding of the geography of disease, including GIS maps and more complex thematic maps • use geographical writing to explain the distribution of diseases
<p>Students who make faster progress should in addition...</p>	<p>Know:</p> <ul style="list-style-type: none"> • in some detail how diseases operate at and between different scales <p>Understand:</p> <ul style="list-style-type: none"> • how a variety of social, economic and environmental processes create the conditions for disease to break out and spread • in different geographical contexts, some reasons for the varying impacts on people and environments and the effectiveness of responses to the disease hazard <p>Be able to:</p> <ul style="list-style-type: none"> • interpret and present more complex evidence from graphs and maps, with some independence • reflect on the incidence and distribution of disease using geographical concepts such as scale, distribution, human-environment interaction and development, which make links with other geography studies



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Answers to student activities

Lesson	Question	Possible answer(s)
Introduction: Why is disease a geographical issue? (p. 1)	Starter activity Think about how each of the images on this page is linked to geography. (Tip! Think about the following aspects of geography: <i>people, places, health, culture, travel and tourism, trade, population, society, politics, economy, environment</i>)	The GIS map shows how a <i>place</i> (West Africa) and the <i>people</i> living there (<i>population</i>) were affected by a disease: Ebola (<i>health issue</i>). The photo of Haiti links a natural disaster to disease (<i>health</i>) in a <i>place</i> ; <i>economic</i> factors could be important in the spread of disease as Haiti is a low-income country, and <i>environmental</i> issues are linked to disease – in this example, contamination of water supplies. The photo of Turin links together the geographical themes of <i>place</i> (Italy), <i>economy</i> and <i>trade</i> (shopping) and <i>society, politics</i> and <i>culture</i> (the impacts of the COVID-19 pandemic on <i>people</i>).
1 Mapping the spread of cholera (pp. 2–3)	1 Look at map A through John Snow’s eyes. Use geographical writing to describe: <ul style="list-style-type: none"> • the location of the pump on Broad Street (now Broadwick Street) • the distribution of most/fewest cholera deaths. 	The Broad Street pump is at the corner of Broadwick Street and Lexington Street, in the centre of map A. Overall, there are fewer deaths further away from the pump and most deaths close to the pump – for example there are 45–50 deaths in homes less than 50 m away. Students may add more precision and detail, for example, approximate deaths within 100/200 m; notable concentrations (e.g. along Broadwick Street and the north end of Marshall Street); and absences (e.g. on Poland Street, near other pumps, in the north-west/south-east of Soho).
	2 What is the geographical difference between an outbreak, an epidemic and a pandemic?	An outbreak is a local upsurge of disease at a local scale. In an epidemic many people are infected, often across a country/at the national scale. In a pandemic the disease spreads into other countries and continents.
	3 What environmental, social and political conditions led to cholera in London in 1854? Which are similar and which are different to cholera outbreaks today?	Students may discuss: <ul style="list-style-type: none"> • environmental factors – poor access to safe water (pumped from underground wells); unsafe disposal of sewage (in cesspits) • social factors – crowded/poor living conditions; rapidly growing population; poverty • political factors – little interest in improving conditions; lack of public investment in public services.



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		Most of these factors are similar today, particularly in rapidly-growing cities in many low- and some middle-income countries. Students may also identify some differences, for example as a result of improvements in scientific knowledge, treatments for disease and understanding of public health.
	4 Read the first paragraph and the history of cholera. Can you explain how and why pandemics happen?	Students' answers may include the initial factors causing disease; how infections become outbreaks by spreading among people (for example, from contaminated food or water supply); and how local outbreaks develop into epidemics or even pandemics when spread more widely, such as through trade and war. They may include examples to illustrate their understanding.
2 Tracing the spread of disease (pp. 4–5)	1 a Why do you think the rich family in 1906 wanted to trace the cause of their typhoid infection? b Why was it important to place Typhoid Mary in quarantine?	a: To stop it happening again/to find out who was to blame. b: To stop her spreading the disease to other people.
	2 Why is geography important in track, trace and isolate?	All three are about the movement of people in space. Tracking people is about seeing where they have been and how they move from place to place. Tracing people is finding out where people have been (to be in contact with an infected person) and where they are now. Isolate is about stopping people from moving around in space.
	3 Study map B showing how the 2015 MERS outbreak spread in South Korea. Based on this, what recommendations would you have made to the South Korean government about how to deal with a similar coronavirus in the future?	MERS spread when people came to visit infected people in hospital, so people should not be allowed to visit infected patients in hospital. MERS spread because infected people visited more than one hospital, so people who think they may be infected should not come into hospital; they should be told what to do instead. Most MERS infections did not happen because of close contact with an infected person, but from people picking up the virus from droplets on surfaces, so there should be a major focus on cleaning surfaces and getting people to wash their hands and avoid touching their faces.
3 What's the link between development and disease?	1 What statistics about a country could you look at to determine how effective their health care provision is? Try to think of five statistics.	Any statistic linked to health would be acceptable here including: life expectancy, infant mortality, child mortality, number of doctors/dentists per 1000 people, maternal mortality, infectious disease rates (e.g. HIV, malaria, cholera), access to clean water (%), vaccination rates, etc.



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(pp. 6–7)	<p>2 Why do you think that some countries still see high numbers of deaths from preventable diseases? What factors would decrease the number of deaths from diseases such as measles?</p>	<p>Some countries see high deaths from preventable diseases due to a number of factors, but most of these are linked to funding/economics, e.g. low-income countries have less money to invest in healthcare, may have inadequate infrastructure, access to toilets, medicine/vaccinations etc. Politics may play a part too – some governments may not prioritise healthcare, or not manage it well.</p> <p>In terms of numbers of deaths from measles, vaccination rates are key. This may also be linked to the economy, development and politics in the country, as well as the culture – in some places people are sceptical about vaccines.</p>
	<p>3 Look at the information about globalisation and table C. Do you think governments should have been prepared for a pandemic of a zoonotic disease like COVID-19? How might governments prepare for a pandemic?</p>	<p>Students can express their own opinion here. Some may say that it is very difficult to prepare for a global pandemic as they can occur quickly and at any time, but some students may use the SARS/MERS examples to say that there had already been new disease outbreaks so countries had chance to learn from those and put a plan in place. In response to the ‘how’ aspect, answers such as having a well-staffed medical service, adequate PPE, vaccination teams, locations to be used as temporary hospitals etc. would all be relevant. Students are likely to draw on their knowledge of how the COVID-19 pandemic was handled to make suggestions here.</p>
<p>4 The geographies of the initial COVID-19 outbreak</p> <p>(pp. 8–9)</p>	<p>1 Look at graph B. Which two places had the most deaths on 15 April 2020? What had changed by 15 July 2020?</p>	<p>On 15 April 2020, most deaths were in the USA and the EU. By 15 July 2020, Brazil and USA were highest.</p>
	<p>2 Look at map A. Describe the spread of COVID-19 between January and March 2020. Use country names. Explain why you think the virus spread to some countries earlier than others.</p>	<p>In January 2020, four countries were affected (China, South Korea, Japan and Thailand). By 1 March 2020 it was present in 66 countries, including all of Europe, and by 20 March, most countries were affected except a few in Africa. High-income countries were particularly affected, perhaps due to higher rates of international travel. It may also be because high-income countries had better means to test for the virus, i.e. it may have also been present elsewhere but there weren’t the tests to confirm it. The initial spread was in the countries close to China.</p>
	<p>3 Look at graph B. Why were some people in the UK still worried about COVID-19 on 22 July even though lockdown had been eased and shops and restaurants were reopening?</p>	<p>On 22 July, while the UK had a lower number of deaths, there were still high rates in other countries, so people may have been concerned that it would re-enter as people travelled to and from other places around the world. They may also have been concerned that it would continue to spread in the UK as the lockdown restrictions were eased and people started to mix more.</p>
	<p>4 What impacts of COVID-19 are you aware of? How did COVID-19 affect</p>	<p>The answers here depend very much on the student, and this question may have to be handled sensitively – students may have been personally affected by illness and death, or financial issues linked to the pandemic.</p>



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	<p>your life? Make a list of impacts and categorise your list into social, economic and environmental factors.</p>	<p>Social impacts they might mention include illness, death, mental health issues, lack of contact with friends and family, wearing masks, school closures, online learning etc. Economic impacts might involve their experience of parents/carers having to change their ways of working, and their income/hours of work/place of work changing, depending on their jobs. They may have been affected by certain businesses being shut, e.g. restaurants. Students are likely to have experienced fewer environmental consequences, but they may link reduced travel to reduced pollution for example. Note that some students will have had a very negative experience of COVID-19, but some may mention positives e.g. more time with immediate family (social).</p>
<p>5 The links between human rights and disease (pp. 10–11)</p>	<p>1 Give two reasons why poor people are more likely to die from disease than rich people.</p>	<p>Examples include: less healthy living conditions, increased difficulty accessing good-quality healthcare, increased risk and stress in their lives, poor nutrition – especially when they are children.</p>
	<p>2 What should governments do, in your opinion, to protect vulnerable people from disease?</p>	<p>Students' own opinions. Encourage students to focus on vulnerable people, i.e. those who are more likely to suffer serious consequences if they catch the disease (remind students this has implications for everyone because hospitals are only able to treat a limited number of people).</p>
	<p>3 Was it fair for governments to put old people's right to life before young people's right to education and work by locking down in 2020?</p>	<p>Students' own opinions.</p>
	<p>4 Look at photo C. In your opinion, what is more important: people's individual rights to liberty, or the government's duty to protect as many people as it can?</p>	<p>Students' own opinions.</p>
<p>Review: Why is disease a geographical issue? (p. 12)</p>	<p>1 Look back at the cholera, MERS and COVID-19 maps in this chapter. Use the words 'distribution' and 'scale' to help compare the maps: what do they have in common? What is different?</p>	<p>Cholera: map A (p. 2) shows a cholera outbreak at local scale, within a district of London. The distribution of deaths is uneven: there are high numbers of deaths in some areas, and low numbers or none in others.</p> <p>MERS: map B (pp. 4–5) shows an outbreak of MERS largely at a national scale; it also shows some international links. It shows the distribution of MERS cases in 15 healthcare institutions and an ambulance – so these are at a very local scale – and how they are linked. The distribution is uneven: there are a small number of institutions affected, and some have more cases than others.</p> <p>COVID-19: the maps in A (p. 8) show the COVID-19 epidemic spreading rapidly in 2020 to become a global-scale pandemic. The distribution of countries affected changes from China alone in January, to a number of</p>



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		<p>countries (largely in North America, Europe, parts of Asia and Oceania) in February; and to most of the world by late March.</p> <p>Among the features all the maps have in common are that they show distributions of different diseases and help us understand how diseases spread; however, they also have differences – in scale and in the type of mapping used to show the distributions.</p>
	<p>2 Study graph A and write out the statements below. Find evidence from the graph to decide whether they are true, maybe true, or false. Justify your decision.</p> <ul style="list-style-type: none"> • Malaria is a deadly disease. • Malaria is preventable and curable. • Malaria has a particular distribution. • There is a malaria pandemic. • Inequality is linked to malaria. • Malaria is a global concern. 	<p><i>Malaria is a deadly disease:</i> The graph shows there were around 440,000 deaths in 2015, so this is definitely a deadly disease.</p> <p><i>Malaria is preventable and curable:</i> There were around 840,000 deaths in 2000 were; this figure had nearly halved by 2015. Malaria deaths appear to have been eliminated in the Americas. So there is good evidence that malaria is preventable and curable.</p> <p><i>Malaria has a particular distribution:</i> The great majority of infections are in Africa, and to some extent South-East Asia; some parts of the world such as Europe are not affected. So we can say malaria has a particular distribution.</p> <p><i>There is a malaria pandemic:</i> Malaria affects a number of continents/world regions, so it has spread/is distributed across national boundaries, meeting the definition of a pandemic.</p> <p><i>Inequality is linked to malaria:</i> Global inequalities may be one explanation for differences between the predominantly low- and middle-income of the worst-affected region: Africa. Likewise, the predominantly unaffected regions (e.g. Europe) are mostly high-income countries. However, other factors such as contrasting climatic conditions may also help explain the differences.</p> <p><i>Malaria is a global concern:</i> In 2015 four world regions were affected, and one in particular. So this disease does not have a truly global distribution. However, there may be good arguments for thinking of it as a concern for people around the world, such as empathy or solidarity with those affected, a concern for progress and development, or even self-interest: concern that it may affect travellers today, or spread in future.</p>
	<p>3 a Choose three diseases. Discuss how governments responded to them, for better or for worse.</p> <p>b Read the list of concepts in the 'Becoming a better geographer' box. You've already considered scale and distribution. Choose two other</p>	<p>a: This is an open-ended question, with opportunities for students to consider their own views; they may discuss:</p> <ul style="list-style-type: none"> • the <i>laissez-faire</i> approach of government to cholera in mid-19th century London, compared with more effective recognition of, and investment in, public-health by the end of the century • the strong government response to MERS in South Korea based on track, test and isolate • differences in responses to COVID-19, resulting in variations in its impact in different countries.



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concepts and explain how they help us understand the geography of disease. Add examples from this chapter. You might include references to or sketches of maps, graphs etc. to prove your point.

b: This is another open-ended question; students may reflect on different examples of how the concepts help our understanding of:

- human-environment interactions: disease outbreaks resulting from people's interaction with the environment, for example by being infected with pathogens resulting from pollution (e.g. cholera, typhoid) or zoonotic diseases (such as MERS); helping understand how disease may occur and spread; prevention of disease by improvements to the environment and public health or reductions in air pollution (see Chapter 13 in main book)
- inequality: uneven patterns of wealth, on a global scale between countries and on national/local scale within countries, are frequently linked to patterns of health inequalities, or even responses to diseases such as COVID-19. One comparison is between diseases of relative poverty, often infectious, and diseases of wealth, including degenerative diseases
- development: in addition to these global patterns of uneven development, worldwide improvements to health are a good example of development progress, such as improvements in nutrition and public health, and the development and roll-out of vaccines.



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Concepts and curriculum links

Locational knowledge	Students extend their locational knowledge and deepen their spatial awareness using maps of the world to focus on the distribution of various diseases
Place knowledge	Students investigate people-environmental interactions at local, national and global scales. They learn about the geography of disease in the context of the UK and South Korea
Human geography	Students understand, through the use of detailed place-based exemplars the key processes in human geography relating to population, urbanisation and development
Human/physical interactions	Students understand how geographical processes interact to create increasingly complex geographical systems in the world around them
Geographical skills and fieldwork	Students build on their knowledge of maps and atlases, including using scale, topographical and other thematic mapping; use GIS to view, analyse and interpret places and draw conclusions from geographical data and use multiple sources of increasingly complex information