



## Users' Pack

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### OBJECTIVES

*Understanding epidemics* has been designed with three main objectives in mind.

1. **Public awareness**  
To make accessible to the general public at large, and senior school students in particular, a range of materials on epidemics, with examples of specific diseases. Epidemics are 'hot' news: whether human epidemics, such as SARS, or animal epidemics ('epizootics') such as foot and mouth disease or avian flu. In a globalised world, epidemics are becoming ever more frequent and widespread.
2. **Public concern**  
These materials should help make you more aware of a contemporary public health and policy issues surrounding these and other epidemics. It will also show you how the effects of the epidemic diseases can be managed by interventions at different scales – from the national government, to local authorities and individual behaviour, including your own!
3. **Public examinations**  
To allow you and many other users to learn about epidemics as part of your formal education. The knowledge that you acquire from reading the web site text will be consolidated and tested though a series of interactive and self-

assessed exercises that you need to complete to ensure your full understanding of the epidemics. Since epidemics have become a topic specifically identified for study in the specifications of public qualifications, especially at A and AS levels in UK, the material can have a direct value to you in examination preparation.

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## THE LANGUAGE AND SCOPE OF EPIDEMICS

### ***A bio-social approach***

The approach we take here is distinctly 'scientific': i.e. it is based on an understanding of 'epidemics' derived from their systematic exploration by scientists in a range of disciplines, in the social sciences as well as in the medical sciences. An understanding of the biological causes of a disease and aspects of its control and cure are clearly the concerns of medical sciences – including biology and pharmacology. However, they may also be the concerns of social scientists through the study of their spread and geographical patterns and also their causes and control in terms of human behaviour. Hence a full understanding of epidemics requires a 'bio-social' approach, that requires your discussion and your understanding of a range of factual knowledge and concepts from both the 'sciences' and the 'social sciences'.

### ***What is an epidemic?***

An epidemic has a very specific meaning in this approach. The term is applied to the growth and spread of a disease across space (i.e. in a particular place) and through time (i.e. over a particular period of time). Each epidemic of any given disease describes its own distinctive pattern: some are confined to small areas and are over with relatively quickly; others may be global and may last for decades. No two diseases describe the same epidemic pattern, but we will demonstrate to you that 'epidemics' of different diseases in different parts of the world and developing at different times and at different rates do have a lot in common.

### ***When and where are epidemics?***

Epidemics are not new. They may be very ancient, as in the biblical plagues in Ancient Egypt described in the Old Testament of the Bible. They may be major events in recorded history, as in the Black Death of the 14<sup>th</sup> Century AD in Europe. But they may also be current, as we are only too aware. They can occur anywhere, both in the most developed and most globalised societies (think of foot and mouth disease in UK in 2001) and also in the least developed and most isolated societies (think of recurring outbreaks of ebola fever in isolated areas of Congo). While diseases may be controlled and preventive steps taken to minimise the risk of epidemics (e.g. through vaccination programmes), they do recur, even in the most medically prepared societies, and are likely to remain important features for the continuing health and well-being of all societies into the foreseeable future.

### ***Who are affected by epidemics?***

Epidemics are outbreaks of disease within a population, an increase in the level of the disease over the norm. While they will affect the whole population, and that population may take common preventive steps against it (e.g. ensuring availability of drugs for cure, enforcing quarantines of people or animals to prevent spread), not all members of a population or society will be equally affected. Not all people will be biologically equally

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susceptible – they may be biologically resistant or are equally at risk. Others may remain isolated from contagion.

However, most epidemics are characterised by their affecting different groups in a population to different extents. Many epidemics seem to affect the poor disproportionately in most societies. The poor may be less resistant to infection (they may be weaker and less well fed), they may live in more hazardous conditions (e.g. with greater access to infection in overcrowded housing, or without access to clean water). However, a few epidemics seem disproportionately to affect the rich as a result of their lifestyle (e.g. HIV/AIDS in its earliest outbreaks in Africa). For other diseases it is where you live rather than who you are, or your position in society, that matters: some diseases have a very highly differentiated geography. Geography and lifestyle combine to form the basis for a social science perspective on epidemics.

### ***Why do epidemics occur?***

Most epidemics are inherently unpredictable in their origin. Why there is an upsurge of a known disease, or even the initial spread of a new disease, may occur as a result of new strains of viruses or bacteria against which there is little resistance in a population, or where a disease crosses a species barrier (e.g. the early 2004 threat of Asian avian flu crossing the species barrier to humans). In other cases the epidemic may be more predictable; there may be regular upsurges associated with environmental seasonality, especially with seasonal rainfall regimes (e.g. for malaria). However, it is the unpredictability that gives epidemics a particular concern for disease control.

### ***How can epidemics be prevented and controlled?***

Prevention is clearly desirable, but has in the past been hard to achieve. However with the development of vaccines for a number of infectious diseases (e.g. measles, whooping cough, diphtheria), the geographical patterns and seriousness of epidemics have been controlled, and even, as in the case of smallpox, eradicated altogether. The intensive search goes on for vaccines for other epidemic diseases (e.g. malaria, HIV/AIDS), but major technical barriers to their formulation remain. In these circumstances prevention from airborne, waterborne or contagious infection remains impossible. In other cases, however, behavioural change may be sufficient prevention, now most obviously in the case of sexually transmitted infections and HIV/AIDS and ensuring 'safe sex'.

Much more common are measures for control rather than prevention. All societies have developed mechanisms for controlling disease and their spread in epidemics as best they could. The typical biblical disease of leprosy was associated with isolation and marginalisation of 'the leper', but since leprosy can now be easily and cheaply controlled by anti-biotics, it no longer carries the social threat and stigma it once did. Isolation was a typical control measure to prevent epidemics of major infectious diseases in 19<sup>th</sup> and 20<sup>th</sup> Century Europe (e.g. in tuberculosis sanatoria or in 'fever hospitals'). For animals, a common but controversial control measure is culling and slaughter, as was the preferred strategy for foot and mouth disease in UK in 2001 (even though a vaccination was possible and preferred by some), and has recently been widely used in Asia to control avian influenza.

For those epidemic diseases where there are not yet vaccines available, the main approach to epidemic control into the 21<sup>st</sup> Century is through the growing range of drug therapies available for those affected and those at risk.

## **USING THE TEXT MATERIAL AND ASSESSMENT EXERCISES**

While the text can be read and used on its own, it is designed to be read in parallel with the exercises that are associated with each section of the web site. There are exercises associated with the general material that introduced the general nature of epidemics, and also exercises based on the material within each of the sections on individual diseases.

These exercises are designed in part to test your understanding of the factual information and concepts presented in the text. This will be critical for those of you using the material for public examination. Systematically going through the questions and reviewing the answers and solutions given against your own answers will consolidate your understanding of the key features and ideas. You will be able to identify those areas where your answers seem to suggest some misunderstanding or partial knowledge, and you will be able to use the answers given to rectify any problems that you may have.

However, the exercises are also designed to help you to extend the text into discussion of further associated issues with others in your learning group or with your teachers. This might be done in association with suggestions for further reading or web search. For most of the exercises, there are suggestions made for specific discussion themes to take your understanding and interest further.

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