

HEALTH AND DISEASE IN SOCIETY

2

UNDERSTAND: CHAPTER VIDEOS

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PUBLIC HEALTH (5:33)



EPIDEMIOLOGY (7:20)

LEARNING OUTCOMES

When you have finished studying this chapter you will be able to:

1. Understand the principles of public health and the relevance to person-centred nursing.
2. Recognise the importance of epidemiology in recognising causes of diseases and how this understanding can be used to promote person-centred care.
3. Discuss how epidemiology contributes to diagnosis and treatment of disease and to prevention through public health.
4. Describe the main approaches used in epidemiological studies to confirm the causes of disease and to control its development.
5. Understand the value of cohort and case-control studies in following up progression of people with particular conditions.
6. Illustrate how epidemiology integrates with ethical and political considerations.

INTRODUCTION

Most of this book is about disorders affecting individuals and their management. However, this chapter has a much broader perspective: public health building on the science of **epidemiology**. This is currently defined by WHO as:

the science and art of preventing disease, prolonging life and promoting health through the organized efforts of society. (Acheson, 1988 cited by WHO Europe, 2012)

This is also described as:

the branch of medicine which deals with the incidence, distribution, and possible control of diseases and other factors relating to health. (Oxford Dictionaries, 2018)

More concisely:

Epidemiology is the study of health and disease in populations. (Saracci, 2010: 2)

Together these definitions identify the key concepts with which this chapter is concerned: epidemiology is the basic science underpinning public health.

Epidemiology enables us to begin to understand the range of factors that influence the distribution of **disease** through the population and how it spreads between populations. Understanding the principles of epidemiology enables us to recognise the relationship between different factors – genetic, social class, environment, behaviour, **nutrition**, education and others – and the presentation of disease. It has a key role in identifying necessary public health measures and assists in identifying the appropriate person-centred care. Central to this is facilitating individuals in making appropriate choices about lifestyle and thus influencing disease incidence in the population.

PERSON-CENTRED CONTEXT: THE BODIE FAMILY



Some members of the Bodie family provide examples of epidemiology in practice. George and Maud are examples of generally healthy elderly people with medical conditions that epidemiological research has identified as relatively common in their age group and public health interventions are prescribed.

George was diagnosed with raised **cholesterol (hypercholesterolaemia)** when he was 73 (9 years ago), since then he has been taking **statins**. He has also received guidance on lifestyle issues to reduce the risk of heart disease.

GO DEEPER

Atherosclerosis

Atherosclerosis is very common among the population at large. The consensus statement of the European Atherosclerosis Society (Nordestgaard et al., 2013) identifies that 1 in 500 of the general population are heterozygous for the relevant gene for familial hypercholesterolaemia, which increases the risk of

ischaemic heart disease due to atherosclerosis (Humphries et al., 2006). We do not know whether George's form runs in the family or not.

However, there is evidence that there is considerable underdiagnosis and undertreatment of this condition in a number of developed and less developed countries (Ahn et al., 2015; Nordestgaard et al., 2013). For example, Pearson (2004) identified a considerable gap between those with a diagnosis of this condition and those receiving treatment in the USA. To improve this situation, OTC (Over-The-Counter) statins were being encouraged.

In the UK, only low-intensity OTC statins can be purchased. However, on-line pharmacies enable individuals to access statins via medical practitioners employed by these pharmacies. These doctors question people at a distance and tend to prescribe moderate intensity statins delivered by post. Most GPs will carry out a more comprehensive assessment, including blood tests, before prescribing appropriate treatment, which is likely to be higher density statins than OTC drugs. The majority of those taking statins in the UK are diagnosed and treated in the National Health Service by their General Practitioners and local pharmacies.

Maud also has some conditions which are more common in older people, including heart failure, which is being managed effectively, and **hypothyroidism**. She is an example of the incidence of hypothyroidism in areas which have adequate iodine, where it is higher among the elderly and 10 times more common in women than men (Vanderpump, 2011). These results are mainly from Caucasian populations (McGrogan et al., 2008).

Jack Garcia lives in New York and has a generally healthy lifestyle. However, his father had testicular **cancer** which was treated effectively. This condition is the commonest malignancy worldwide among young men (15–34 years), particularly Caucasians, and is usually curable, particularly when diagnosed early. In addition, epidemiological research with families has found that men with fathers with a history of testicular cancer are four times more likely to develop this than men in the general population (Manecksha and Fitzpatrick, 2009). Jack, at 28, is wisely performing self-examination monthly to ensure rapid treatment if anything abnormal is detected.

The siblings Derek and Margaret Jones both have conditions associated with **atopy**: Derek has asthma and Margaret hay fever. Atopy is the genetic tendency to develop the classic allergic diseases: atopic **dermatitis**, allergic **rhinitis** (hay fever) and asthma. Familial grouping of phenotypes is found, although different conditions may present – in this case one has asthma, the other hay fever. There are several chromosomal regions associated with atopic responsiveness (Koppelman et al., 2002), which may explain that two siblings are affected but neither parent is.

Danielle has been receiving the **immunisations** recommended at this stage in her life. George, Maud and Derek receive their **influenza** immunisations annually because they are all at increased risk of developing complications from flu. Other family members receive immunisations when going abroad. Epidemiological research has provided the knowledge identifying the value of these interventions and helped promote public health.

EPIDEMIOLOGY

The overall role of epidemiology has been outlined above. In addition, however, understanding the statistical analysis is important in being able to use the findings to plan future services. Statistics helps us to understand and interpret the world, including individuals with disorders with whom we work, and thus enhance the quality of care. However, the detail of statistics is not studied in this book.

Three main types of study within epidemiology can be identified: descriptive, analytical and intervention studies each contribute to our understanding of disease within populations (Carr et al., 2007). The findings contribute to understanding public health and planning health and other services to promote the health status of the community.

In addition, the field of epidemiology has been described in five areas, as shown in Table 2.1.

Table 2.1 Five major areas in epidemiology

Descriptive epidemiology	Health and disease and their trends over time in specific populations
Aetiological epidemiology	Searches for factors (hazardous or beneficial) influencing health status (e.g. toxins, poor diet, pathogenic microorganisms, health-promoting behaviours)
Evaluative epidemiology	Evaluates preventative interventions, estimates risks of specific diseases for people exposed to hazards
Health services epidemiology	Describes and analyses work of health services
Clinical epidemiology	Describes natural course of a disease in patient population and evaluates effects of diagnostic procedures and treatment

Source: Saracci, 2010: 11

Descriptive epidemiology

This branch of epidemiology examines the incidence of disease in relation to person, place and time. It aims to understand the patterns of health and disease within a population and to generate possible explanations for the findings. The sorts of questions asked in relation to a particular disorder are as follows:

- *Person*: what are the demographic details of those affected, i.e. age, gender, occupation, ethnic background, socioeconomic status, lifestyle factors such as smoking, diet, exercise? This sort of study can provide information about diversity within the population and enable the specific areas to be identified which need consideration with different groups (Lowth, 2015). For example, behaviours associated with certain religious and cultural practices may have potential health implications (Laird et al., 2007). Some examples include:
 - ritual fasting and potential implications for those with chronic diseases such as **diabetes mellitus**
 - potential exposure to infectious diseases when participating in the Haj (the major pilgrimage to Mecca that all Muslims are expected to undertake during their lifetime)
 - a high incidence of consanguineous marriage (i.e. marriage between relatives) increasing the risk of some genetic disorders
 - female genital mutilation (also known as cutting), in which a surgical procedure damages the female genital organs with no medical benefits, and possibly bleeding, infections and other complications including in childbirth (WHO, 2018a), and childhood marriage occur in some groups. While illegal in many countries (including the UK) both of these are often undertaken when girls whose families are living in Western countries are taken back to their ancestral homes and families during long holidays for the surgery and/or to marry (often) a relative whom they have never met. Efforts to minimise this practice include preparing teachers and training airport staff to identify potential girls at risk and putting 'stickers' up in toilet cubicles with advice on

how to get help (Iqbal, 2015). Nursing and midwifery professionals need to be able to recognise potential health issues associated with diversity and to intervene appropriately.

- *Place*: is there a difference in the incidence of the condition in some areas, e.g. related to geography, the condition of various parts of a city, the availability of local facilities?
- *Time*: does the incidence of the disease being considered vary over a number of years, at different times of the year, in different weather/climatic conditions, etc.?

Routinely available data

A significant amount of data related to diseases is available through routinely collected information; for example, death certificates must be completed by the attending doctor and the data becomes available to the Office for National Statistics (in the United Kingdom) and can be used to review changes in the incidence of specific diseases over time. A range of administrative data sets are also used and the Office for National Statistics coordinates the national decennial (10-yearly) census, next due in 2021.

GO DEEPER

Cholera and epidemiology

An example of an early epidemiological study was carried out by John Snow in 1854 when an area of London supplied by two water companies (the Lambeth Water Company and the Southwark and Vauxhall Company) had a cholera epidemic. Snow identified that the relative proportion of cholera deaths in parts supplied by the Southwark and Vauxhall Company was significantly higher than elsewhere, in particular in those areas where people got their water from the Broad Street Pump. Snow approached the Board of Guardians and reported that he believed that the cholera was spreading in the water from the Broad Street Pump. While this was an incredible suggestion in those times, they agreed to remove the pump handle. The cholera epidemic died down. His hypothesis that cholera was transmitted by contaminated water is now generally accepted by epidemiologists and his action recognised by the installation of the John Snow Memorial marking the epicentre of the outbreak (Rossignol, 2007).

Data on cardiovascular incidence and mortality is collected in numerous countries and parts of the world and demonstrates improving results. The epidemiological statistics enable the changes occurring and the effects of interventions on **morbidity** to be identified.

APPLY

Changes in cardiovascular morbidity

These are diseases of the heart and blood vessels, causing a range of disorders through central and peripheral parts of the circulatory system and are the primary cause of death worldwide. Over three-quarters of these deaths occur in low- and middle-income countries where they cause 37% of premature deaths (under 70 years) from non-communicable diseases (WHO, 2018b).

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However, it is also important to recognise the developments occurring and approaches to reducing morbidity (illness rate) and mortality (death rate) since they peaked in the 1960s (Luepker, 2016). In Europe these disorders have been diminishing in incidence since the 1980s but they are still the main cause of mortality and major cause of morbidity, but with considerable variability across the region. Central and Eastern Europe have higher death rates from these conditions than in Northern, Southern and Western Europe. These results tend to be linked with minimal levels of primary health care related to smoking and other lifestyle factors and inadequate approaches to early detection and treatment. While smoking has diminished across Europe, the highest rates are found in the countries of the old Soviet Union which also have high levels of cardiovascular diseases (CVDs) (Wilkins et al., 2017).

There is still progress to be made through **health promotion** activities to promote an appropriate diet to reduce **obesity**, limit smoking, encourage exercise and moderate drinking. In addition, conditions which increase risk, and therefore should be identified and treated effectively, include diabetes mellitus, **hypertension** and hypercholesterolaemia (WHO, 2018c).

Cross-sectional surveys

In this type of study, information is collected about the health status and other factors of interest in the population being studied. The aim is to identify the proportion of the population which has the disease being studied (i.e. the prevalence of the disorder is determined). This enables adequate planning of appropriate health services to be carried out.

Analytical studies

Analytical studies aim to identify associations between the diseases of interest and possible causes. There are four types of study in this group.

Ecological studies

These studies are different from most others considered here as data is collected on the whole population. Routinely collected disease data are compared with other factors in the population which could be causes of these diseases.

Cross-sectional studies

These have been mentioned above. In this context they are trying to identify the prevalence of disorders and association with various factors. For example, this type of study has demonstrated a relationship between obesity and diabetes mellitus, and behaviour.

Case-control studies

In these studies, one group of cases (who have the condition of interest) is compared with a group of controls (who do not have the condition). The individuals involved are screened by interview, survey or

previous records to determine their exposure. The exposure to potential cause of those in the two groups is compared to see if the exposure of the group of cases differs from that of the control group. If so, these variables may influence the **progression** and eventual disease outcomes (Rossignol, 2007).

ACTIVITY 2.1: UNDERSTAND

Social interventions for health

Read the following article to enhance your understanding of the relationship between physical activity, obesity and diabetes: Creatore et al. (2016) 'Association of neighborhood walkability with change in overweight, obesity, and diabetes.' This particular paper (set in Ontario, Canada) examines the suitability of the neighbourhood for walking and the incidence of obesity and diabetes. Although more research is needed, it suggests that these factors are related.

If you are using the eBook you can access the article directly by clicking the icon.



ARTICLE: PHYSICAL
ACTIVITY, OVERWEIGHT
AND DIABETES

Cohort studies

Two groups similar in characteristics relevant to the study (except for the condition of interest) are selected and the outcome of interest is compared. Cohort studies can assess a range of outcomes, allowing an exposure to be rigorously assessed for its impact in developing disease, although these studies are lengthy and expensive, especially if the follow-up period is extensive. They are useful for studying exposure to rare conditions such as radiation from the Chernobyl nuclear power plant in 1986. The study can be retrospective or prospective; in either case the groups are similar apart from the condition being studied.

Retrospective

In this case both groups have been exposed to similar conditions except in relation to the key issue being studied and outcomes have occurred. One group has been exposed to the condition being studied while the other has not. The data has already been collected and the results will be studied.

Prospective

In these studies, all the participants come from the same study population and are divided into two groups, one of which will have been exposed to the characteristic under study, and the other will not. As far as possible, the two groups are comparable on other relevant characteristics. Those in both groups are then followed for a specified period to identify the individuals who develop the expected outcome/disease.

Intervention (or experimental) studies

The difference between these and the previous types of study is that in this situation the researcher intervenes to change the exposure of the participants to the factor being studied.

Clinical trials

In these studies, one group of people with a particular condition receive a specified treatment and their progress is compared with a second control group who are not receiving the active intervention. One of the key issues is to prevent bias so that the participants are randomly assigned to a group in what is known as a *randomised double-blind controlled trial*. The 'double-blind' part of this term indicates that neither the participant nor the person managing the trial knows which group the participant is in.

When a drug is being tested, the control group of participants normally receives a tablet that appears similar to the active treatment but is not active; it is what is known as a placebo. In some circumstances the study is aiming to compare a new treatment with the one currently in use.

Community trials

In these studies the study is examining the effect of an intervention on a community as the unit of study, not individuals. Because social, cultural and environmental conditions may be key factors in the incidence of disease, a **community trial** tries to alter these conditions community-wide and then evaluate the effect. However, it is not usually feasible to undertake double-blind controlled trials.

Contribution of epidemiology

Epidemiology plays an extremely important role in identifying conditions that contribute to health or disease, and in providing you with an enhanced understanding of how to contribute to person-centred care. In addition, it provides the knowledge and understanding that politicians and officials need to undertake the planning and implementation of conditions for optimum health for individuals and the community through public health. An example is the identification of particular conditions which are more common in those from particular ethnic groups or geographical areas than other members of the population.

PUBLIC HEALTH

Public health is underpinned by the science of epidemiology and the WHO definition has already been presented. An earlier US description, still widely quoted and as relevant as ever, is below.

GO DEEPER

Public health

In 1920, Winslow, an American public health specialist of his time, defined public health as follows:

Public Health is the science and the art of preventing disease, prolonging life, and promoting physical health and efficiency through organized community efforts for the sanitation of the

environment, the control of community infections, the education of the individual in principles of personal hygiene, the organization of medical and nursing services for the early diagnosis and preventive treatment of disease, and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health.

(C.E.A. Winslow, 1920, cited in Evans, 2011)

The key issue in relation to public health is that it is 'public' and focused on enhancing the health of the whole population. The World Federation of Public Health Associations (WFPHA) developed a Global Charter for the Public's Health (GCPH) (Lomazzi, 2016), which identifies core services (protection, prevention, promotion) and functions to enable these services (governance, advocacy, capacity and information) (Figure 2.1). These largely overlap with the areas considered below.

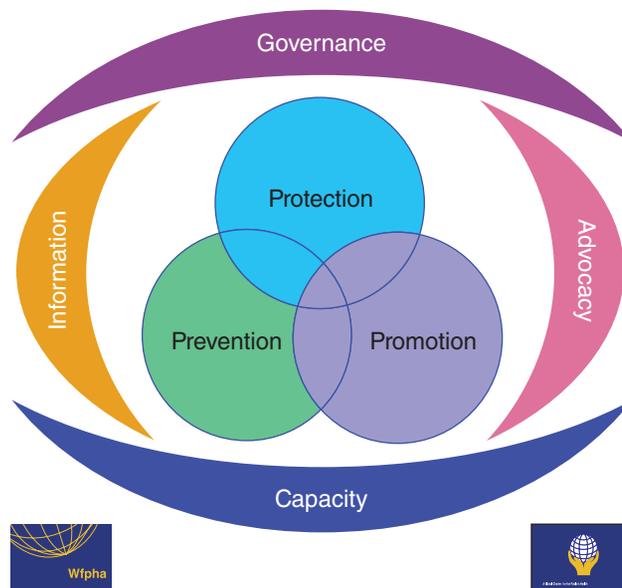


Figure 2.1 Illustration of the Global Charter for the Public's Health (Lomazzi, 2016)

Within each country the health system is determined by government involving public, private and voluntary sector organisations contributing to health maintenance, and activities influencing health behaviour and status. The structure and interaction within such organisations vary across different countries of the world. In the UK, the four countries of England, Scotland, Wales and Northern Ireland manage most of the public health issues independently, although with some coordination from national government.

Areas of public health practice

Organisations with public health remit have identified three areas of public health practice, shown in Figure 2.2. These are largely the same for different organisations but with some differences (FPH, 2010; Gray et al., 2006).

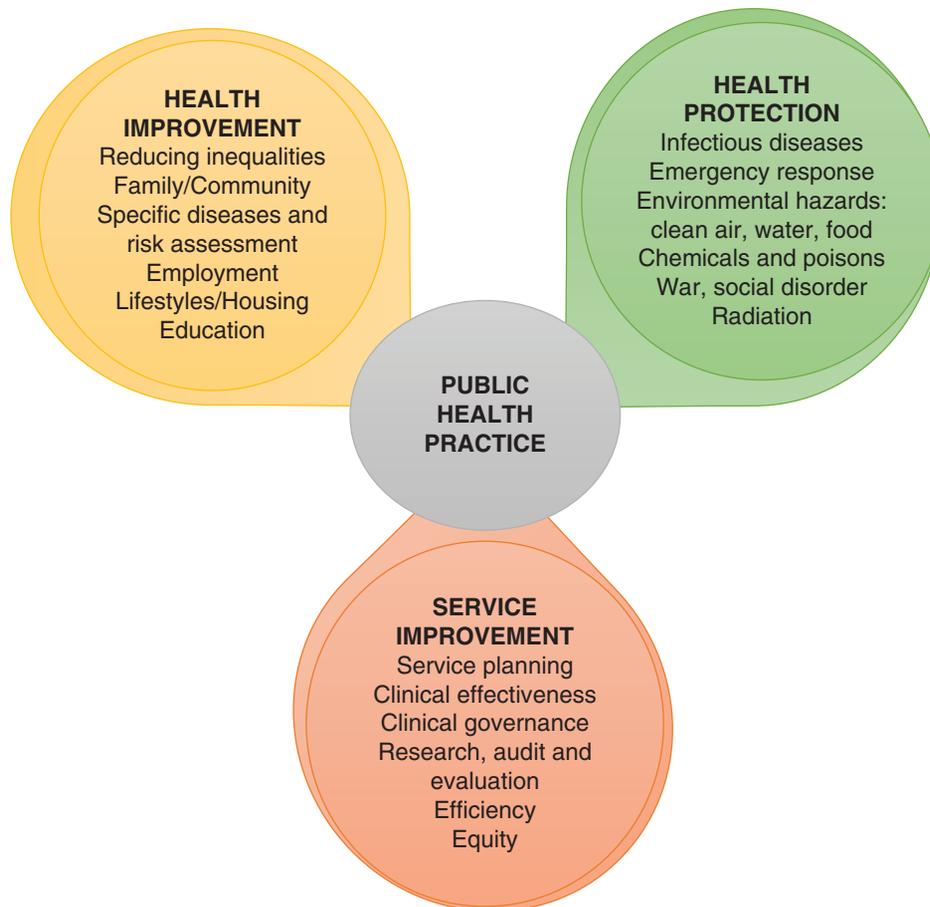


Figure 2.2 Public health practice

Health protection

This area of public health practice is concerned with actions to reduce exposure to factors that can impact on the development of ill-health. In general, these requirements require tackling at different levels. While normally there are adequate emergency services which undertake rescue and safety activities as necessary, circumstances can arise in which additional support is required and members of the public may contribute as they are able. The box below discusses unusual conditions in the UK which increased the health risks to the population and in which members of the public contributed to **health protection**.

APPLY

Health protection provided by the public

In the winter of 2017/18 some parts of the UK had very severe snow with potential public health risks. This sort of extreme weather is uncommon in the UK and resources for dealing with these conditions

are limited. Severe snow drifts, yellow and amber, and some red weather warnings, and disrupted transport by road, rail and air, caused considerable disturbances and potentially placed some citizens at risk. A number of individuals and various organisations endeavoured to contribute to health protection for members of the population at large.

Food and drink supplies were affected and the RAF (Royal Air Force) and other emergency services delivered supplies to villages cut off from the usual supply routes. Water supplies to many houses were cut off and families had to thaw snow for drinking (after boiling for 10 minutes) and washing. People living near roads where cars were stuck for many hours supplied food and water to those in the cars. Some companies were asked by power providers to shut down factories to make gas available for heating homes, particularly to ensure that older people could keep warm.

The conditions were such that a number of individuals died of hypothermia or other diseases aggravated by the very cold weather, for example the increased risk of having a heart attack (myocardial infarction). Hospitals were overloaded. Many health care staff had difficulty getting to work. Some of the armed forces and owners of 4x4 vehicles helped to move staff to work. Farmers used tractors to help community staff reach their patients. Without the contribution of many individuals, the effects of the severe weather could have been much worse.

National government officials and ministers deal with major social issues such as war and severe social disorder, and ensure that suitable emergency response equipment and facilities are available. Regulations are introduced to ensure that hazards such as chemicals, poisons and radiation are dealt with in industry or elsewhere, in a way that limits the exposure of members of the public, and that those working with these risks are trained and equipped appropriately to maintain their safety. Local authorities have responsibility for ensuring the provision of clean air, water and food. Medical authorities carry the responsibility for ensuring that appropriate measures are taken to limit exposure to or to be immunised against infectious diseases.

Health improvement

This aspect of public health aims to

improve the health and wellbeing of individuals or communities through enabling and encouraging healthy lifestyle choices as well as addressing underlying issues such as poverty, lack of educational opportunities and other such areas. (NHS Scotland, 2018)

Much of the work in this area is guided by regional government through organisations with different areas of expertise and responsibilities. The key issue is to reduce inequalities at individual, family and community level through a range of different initiatives which enhance the quality of life, life opportunities and well-being:

- *Housing*: is it possible for individuals and families to find accommodation that provides enough water, heating, space for children to play, and access to shops selling affordable items central to optimal health? Is there a library nearby? These are key issues for a satisfactory quality of life. Policies are often determined at government level and implemented locally.
- *Education*: is essential for development in life. The local education authority carries overall responsibility for the education services at primary and secondary level. Third-level education

(i.e. post-18) is mainly independent and carries a major responsibility for preparation for the professions and skilled trades. Clearly this is central to the opportunities available for life through employment. In addition, friends made at this stage in life can influence lifestyle choices later. Education for health is also valuable although introduced in very different ways in schools of various types.

- *Employment*: an adequate income is essential for a satisfactory lifestyle. Are there opportunities in the area? What is local government doing to encourage additional employment in the area?
- *Lifestyles*: the factors considered above all influence the scope for lifestyle choices in relation to social, recreational, cultural and literary activities.
- *Specific diseases and risk assessment*: this aspect of public health is managed under the direction of central and local health authorities. It aims to carry out a range of activities to identify conditions associated with differing work conditions, such as asbestos in buildings being demolished being a risk factor for mesothelioma. The local building authorities are responsible for ensuring safe asbestos disposal. The local health services arrange influenza and other immunisations, breast cancer screening, maternal and child health clinics.

The range of issues above can influence quality of life, minimise risks to health and provide necessary information about health risks and how to promote health. Education, housing and traffic conditions, and lifestyles can all contribute to undertaking adequate exercise and limiting obesity. Some key factors need consideration which are central to the quality of health. Some particular examples are:

- Obesity has already been mentioned but is one of the key factors in health. Obesity has a major influence on the risk of disorders including **cardiovascular disease** and diabetes mellitus, which both have the potential to cause serious physical damage.
- Mental ill-health can have a major impact on the quality of life and the provision of mental health services for those at all ages with such problems is essential.
- Air quality is also crucial. Air pollution is identified as the world's largest environmental health risk (WHO, 2018d). Of those living in urban areas, more than 80% are exposed to air quality levels that exceed the WHO limits, with those in low-income cities in contact with higher levels. Developments in vehicle manufacture with reduced impact on air quality are receiving considerable attention with the aim of reducing this factor.

Service improvement

This component of public health is concerned with the provision of a range of services which contribute to health in different ways.

- Research, audit and evaluation is concerned with identifying risks to health and the incidence, morbidity and mortality concerned with different disease processes. Advances in treatment are developed and resulting changes in epidemiological data are identified and used in decision-making about implementation in new treatments. The research carried out must be available for service managers.
- Service planning involves the research outputs evaluated by first-rate researchers and efficient managers who plan implementation to ensure clinical effectiveness and equity in access to care. The Cochrane Collaboration exists to improve health care decisions by gathering and summarising the best evidence involving a worldwide network of researchers, professionals and others involved in health care (Cochrane, 2018).
- Clinical governance has been described as 'the system through which NHS organisations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which clinical excellence will flourish' (Public Health England, 2018).

Value of public health and health promotion

The discipline of public health has tended to be seen as having two major directions:

- ‘a broad focus on the underlying social and economic causes of health and disease and their variation in populations’
- ‘a narrower medical focus with treatment of ill health at its centre’ (Carr et al., 2007: 6).

The list of achievements in public health (Table 2.2) includes important examples from both these directions and also relates to the three areas of public health practice discussed above.

Health promotion is a key element in the three aspects of public health discussed above. It has been defined as enabling

people to increase control over their own health. It covers a wide range of social and environmental interventions that are designed to benefit and protect individual people’s health and quality of life by addressing and preventing the root causes of ill health, not just focusing on treatment and cure. (WHO, 2016a: 1)

Table 2.2 Ten important public health achievements

Vaccination	Eradication of smallpox; polio almost eliminated; immunisation against a wide range of diseases
Control of infectious diseases	Control of typhoid, cholera through clean water and sanitation Tuberculosis and sexually transmitted disease controlled by antibiotics
Decline in mortality from coronary heart disease and stroke	Risk factor modification (cessation of smoking, control of B/P) Improved access to early detection and treatment
Healthier mothers and babies	Better hygiene and nutrition, access to health care and technological advances in neonatal and maternal health care
Family planning	Altered socioeconomic role of women, reduced family size, improved maternal and child health, barrier contraceptives, reduced unwanted pregnancies and STD transmission
Safer and healthier foods	Decreased microbial contamination, increased nutritional content, nutritional deficiency diseases (e.g. rickets, goitre, pellagra) almost eliminated
Fluoridation of drinking water	Leading to reduction in tooth decay and loss of teeth
Recognition of tobacco use as health risk	Changes in social norms leading to reduced smoking and mortality from smoking-related disease
Safer workplaces	Reduction in fatal occupational injuries; control of pneumoconiosis and silicosis
Motor vehicle safety	Fall in motor vehicle-related deaths due to engineering improvements, vehicles and roads Changed behaviours – use of seat-belts, reduction in drink-driving, lowered use of mobile phones

Source: Gray et al., 2006, after Center for Communicable Disease Control, Atlanta, GA

Three key elements for health promotion have been identified (WHO, 2016a), which are discussed below:

- *Good governance for health:* involves health becoming central to government policy; being considered in relation to all decisions and policies aiming to prevent illness and injuries. Regulations introduced need to relate private activities with public goals, e.g. tax policies to dissuade unhealthy behaviours such as eating high salt food products, or seat-belt and other safety regulations. Local authorities have requirements laid upon them to promote healthy living conditions.
- *Health literacy:* people need knowledge, abilities and understanding to be able to make choices that promote health, for example about healthy food and accessing health care appropriately. They also need to be in a setting in which members of the community can influence policy.
- *Healthy cities:* play an important role in facilitating population health, contributing to healthy countries and, thus, a healthy world. High-quality functioning of local government makes an important contribution to urban planning and developing measures to promote community health and primary and emergency health care.

Public health activities are considered necessary in all parts of the world, although application will vary according to environmental, government and economic factors. The WHO Regional Office for Europe has identified essential operations for the implementation of public health (Table 2.3).

Table 2.3 Ten essential public health operations (EPHOs)

1	Surveillance of population health and well-being
2	Monitoring and response to health hazards and emergencies
3	Health protection including environmental, occupational, food safety and others
4	Health promotion including action to address social determinants and health inequity
5	Disease prevention, including early detection of illness
6	Assuring governance for health and well-being
7	Assuring a sufficient and competent public health workforce
8	Assuring sustainable organisational structures and financing
9	Advocacy, communication and social mobilisation for health
10	Advancing public health research to inform policy and practice

Source: World Health Organisation Europe, 2012

Worldwide public health

We have been looking at some of the principles of public health and now we are examining some issues around public health worldwide or global health. This is defined as:

an area for study, research, and practice that places a priority on improving health and achieving health equity for all people worldwide. (Koplan et al., 2009: 1995)

An important role in promoting worldwide health has been identified by WHO (2016b) in the Global Strategic Directions for Strengthening Nursing and Midwifery, as outlined in Figure 2.3.



Figure 2.3 Global strategic directions for strengthening nursing and midwifery, 2016–2020

Source: WHO (2016b)

Vision, thematic areas and principles are identified which aim to achieve high-quality nursing care for all to meet population needs through supporting UHC (Universal Health Coverage) and SDGs (Sustainable Development Goals). Clearly nurses and midwives have the potential to make substantial contributions to these goals.

Key areas of inequalities, challenges and health disorders are discussed below.

Inequalities

One of the key issues in considering global health is about inequalities beginning early in life. The effects of relative poverty during pregnancy are marked and long-lasting, with deleterious influences on childhood illness and behavioural problems. In particular, the limited resources diminish inputs that influence child development, including reduced reading and stimulation limiting language and cognitive development and, often, less value placed on education. Overall, these children frequently achieve lower educational outcomes and socioeconomic status (Larson, 2007). It is abundantly clear that poverty is a major determinant of the quality of health within and between developed and less developed countries (Stuart and Soulsby, 2011a).

The differences in health between those living with greater or lesser social and economic resources are marked, with a wide range of such inequalities influencing health and well-being. The social, psychosocial, material and biological factors all influence behaviours and position in society which, in turn, are modified by education, occupation, income and political beliefs. The term 'structural violence' is sometimes used in describing the social factors that cause harm to individuals and populations. This term was originally devised by Galtung (1969, cited by Farmer et al., 2006): they are described

as structural because they are embedded in the political and economic organization of our social world; they are violent because they cause injury to people. (Farmer et al., 2006: 1686)

In general, health care professionals are not prepared to deal with these factors which are primarily the responsibility of government and regional officials plus those working within the relevant local organisations. However, health professionals do need to be able to understand the relevance of these issues and collaborate with those responsible for these areas.

Challenges

Much of the effort in reducing health inequalities worldwide is about broadly identifying the issues involved and planning across a range of organisations. For example, housing, agriculture, social services, education, infrastructure and engineering, all involving finance, are outside the responsibility of health ministries. Although countries may organise them differently, they are usually within government departments without a health remit. However, planning to enhance the health status of a country has to take account of all these issues (Clift, 2013), which fall into a number of categories:

- *Infrastructure*: in considering developing countries, this group of concerns includes health-related developments but also more general concerns such as roads, dams and power stations, schools and universities.
- *Population growth*: uncontrolled population growth, with the related increased need for food, antenatal and postnatal care, increases the high risks associated with childbirth (see Chapter 18, Female reproductive system), especially in circumstances where midwives and obstetricians may be in short supply. Family planning is crucial.

- *Agriculture and livestock*: if agriculture and livestock are not managed effectively, then poverty will limit access to adequate nutrition, clean water and sanitation, and education. Livestock may be exposed to diseases, which limits healthy animals for nutrition and for providing a living for families (Stuart and Soulsby, 2011b).

Health disorders

Another major area in enhancing global health is collaboration and funding in dealing with various specific health disorders, falling into two main groups – infectious diseases and **non-communicable disorders** (Stuart and Soulsby, 2011c).

- *Infectious diseases*: these are caused by organisms (**bacteria, viruses, fungi or parasites**), many of which compose the **microbiome** living in or on our bodies and are mainly harmless. However, in certain conditions they can cause disease and be transmitted between individuals. Some conditions are known as zoonoses in which the infecting agent is transmitted from animals to humans: 61% of human pathogens are said to be zoonotic and up to 75% of recently identified pathogens are in this group (WHO, 2018e). Terms used to describe distribution include:
 - **Endemic**: a condition that is generally present in a group or area, such as a cold
 - **Epidemic**: a widespread distribution of a condition in an area at a specific time, such as influenza
 - **Pandemic**: a condition that spreads worldwide. When a new influenza virus emerges, it often spreads widely among populations, most of whom do not have immunity.

It is clear that the issue of promoting and maintaining public health within a country or worldwide requires the combined efforts of different organisations, both health services and those with wider responsibilities. Education and leadership within the different areas of activity are also essential and the qualities of fortitude and resilience are crucial.

APPLY

Pandemic spread

The speed of spread of pandemics is strongly related to the transport methods used. Thus, the spread of plague was largely through ship travel and then horse-drawn travel on land and was thus fairly slow. Nowadays, air travel can facilitate rapid transport of infection around the world. It is crucial to understand the diseases which may become pandemic, e.g. Ebola, and how to screen travellers and implement quarantine methods as necessary.

GO DEEPER

Non-communicable disorders

WHO estimates that this group of diseases make up 59% of the 56.5 million deaths on this planet per year (Marshall, 2004). It is creating a growing problem for middle and lower income countries to deal with while

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still trying to meet the problems associated with infectious diseases. These non-communicable disorders include conditions related to obesity such as cardiovascular diseases, diabetes and cancers. Most of the cardiovascular diseases are related to major risk factors such as high cholesterol, high blood pressure, low fruit and vegetable intake, inactive lifestyle and tobacco use, and obesity is becoming a major problem in many developing countries. WHO's strategy for tackling this worldwide problem recognises the importance of all sectors contributing, including governments, NGOs (non-governmental organisations), the private sector and stakeholders (including the food industry) (WHO, 2018b).

Communicable Disorder (Pandemic)

Probably the most well-known pandemic in human history is the plague, known as the Black Death, of the mid-14th century (1346-1353). It was caused by a bacterium (carried by rats), *Yersinia pestis*, named after Alexandre Yersin, who isolated the bacterium. It is transmitted by the carrier biting someone and regurgitating the gut's contents into the bloodstream of the human. There have been a number of outbreaks of plague over the years and this bacterium is still found in the American Southwest and parts of Asia.

There are three variants of this disease:

- Bubonic: large swollen areas (buboes) appear around lymph nodes. 18% survival rate for individuals. Pus released is unpleasant to see and smell.
- Pneumonic: affected respiratory system. Easily transmitted between people. Patient drowns in own blood. Survival rate 1%, dies within 2 days.
- Septicaemic: least common form. Disseminated intravascular coagulation (DIC) occurs: blood clots and causes necrosis, then loses ability to clot properly.

This pandemic is said to have reduced the world population by about 50%. The social organisation of the population changed radically, with the size of the labouring population shrinking. Thus, the workers were able to be much more selective in the work they would undertake. The merchant class grew and became wealthier. The nobles became less wealthy and the noble and merchant classes began to intermarry (Armstrong, 2016).

It is thought that the disease originated in China and was transmitted around the world by sailing ships to sea ports. The bacteria were carried in fleas on rats and by jumping from rats to humans, transmitted to humans and carried inland. However, recently, it appears that the plague bacteria were carried by lice and human fleas (although further research is needed to confirm this) (Benedictow, 2004; Dean et al., 2018).

CHAPTER SUMMARY

In this chapter we have looked at two major concepts that influence person-centred care: epidemiology and public health. Epidemiology uses research methodology to provide the data to facilitate understanding of the context of health and disease, and to identify factors that influence the presentation of disease in populations. These data are used to enable public health services and approaches to promote health of populations through health protection, **health improvement** and **service improvement**. All these contribute to health promotion by preventing the key causes of ill-health, rather than just focusing on treatment and cure.

- Epidemiology plays an important role in identifying factors that influence health and disease and provides the understanding necessary to plan and implement conditions for optimum health for individuals and communities.
- There are three major areas of study in epidemiology: descriptive, analytical and intervention, with a number of sub-groups within them.
- Public health is underpinned by the science of epidemiology and it is defined by WHO as the science and art of preventing disease, prolonging life and promoting health through the organised efforts of society.
- Areas of public health practice are health protection, health improvement and service improvement, and health promotion is a key element in all three of these.
- The three key elements of health promotion have been identified by WHO as: good governance for health, literacy and healthy cities which together enable people to increase control over their own health.
- Worldwide public health requires the application of public health principles worldwide and is known as Global Health which aims to improve health and achieve health equity worldwide.
- Global health is achieved by acting within three main areas: inequalities in relation to socioeconomic status and poverty; challenges related to infrastructure, population growth and agriculture and livestock; and health disorders falling into two main groups – infectious diseases and non-communicable disorders.

KEY POINTS

The content of this chapter will help you understand the principles of epidemiology underpinning public health, and approaches to enhancing the health of the public and individual communities. Revise the different sections in turn then try to answer the questions.

Answers are available online. If you are using the eBook just click on the answers icon below. Alternatively go to <https://study.sagepub.com/essentialpatho/answers>

REVISE

TEST YOUR KNOWLEDGE

- 1 What is epidemiology and how does it contribute to public health?
- 2 Identify the main types of epidemiological studies and their contribution to an understanding of the distribution of disease.
- 3 Discuss what is meant by a double-blind controlled trial and their contribution to planning health care interventions.
- 4 Define and explain public health and the importance of the three areas of public health practice.
- 5 Explain why public health is valuable and evaluate five examples of public health achievements.
- 6 Analyse the importance of health promotion in influencing the health of the population.
- 7 Identify and evaluate the main elements of public health.
- 8 Discuss the importance of global health and the major groups of issues in promoting worldwide health.

REVISE

ACE YOUR ASSESSMENT

- Further revision and learning opportunities are available online
- Test yourself away from the book with **Extra multiple choice questions**
- Learn and revise terminology with **Interactive flashcards**

If you are using the eBook access each resource by clicking on the respective icon. Alternatively go to <https://study.sagepub.com/essentialpatho/chapter2>



CHAPTER 2
ANSWERS



EXTRA
QUESTIONS



FLASHCARDS

REFERENCES

- Acheson, D., Chairman (1988) *Public Health in England*. The Report of the Committee of Inquiry into the Future Development of the Public Health Function. London: HMSO.
- Ahn, S.H., Lee, J., Kim, Y.J., Kwon, S.U., Lee, D., Jung, S.C., Kang, D.W. and Kim, J.S. (2015) Isolated MCA disease in patients without significant atherosclerotic risk factors: a high-resolution magnetic resonance imaging study. *Stroke*, 46 (3): 697–703.
- Armstrong, D. (2016) *The Black Death: The World's Most Devastating Plague*. The Great Courses, Virginia: The Teaching Company.
- Benedictow, O.J. (2004) *The Black Death, 1346–1353: The Complete History*. Woodbridge, Sussex: The Boydell Press.
- Carr, S., Unwin, N. and Pless-Mulloli, T. (2007) *An Introduction to Public Health and Epidemiology*, 2nd edn. Maidenhead: Open University Press, McGraw-Hill.
- Clift, C. (2013) *The Role of the World Health Organization in the International System*. Centre on Global Health Security Working Group Papers. London: Chatham House. Available at: www.chathamhouse.org/sites/default/files/publications/research/2013-02-01-role-world-health-organization-international-system-clift.pdf (accessed 4 June 2018).
- Cochrane (2018) About us [Homepage]. Available at: <http://www.cochrane.org/about-us> (accessed 11 March 2018).
- Creator, M.I., Glazier, R.H., Moineddin, R. et al. (2016) Association of neighborhood walkability with change in overweight, obesity, and diabetes. *JAMA*, 315 (20): 2211–20.
- Dean, K.R., Krauer, F., Walløe, L., Lingjærde, O.C., Bramanti, B., Stenseth, N.C. et al. (2018) Human ectoparasites and the spread of plague in Europe during the Second Pandemic. *PNAS (Proceedings of the National Academy of Sciences of the United States of America)*, 115 (6): 1304–9.
- Evans, M.W. (2011) Basic concepts in public health. In M.T. Haneline and W.C. Meeker, *Introduction to Public Health for Chiropractors*. Sudbury, MA: Jones and Bartlett Publishers. Available at: http://samples.jbpub.com/9780763758226/58226_CH02_FINAL.pdf (accessed 9 March 2018).
- Farmer, P.E., Nizeye, B., Stulac, S. and Keshavjee, S. (2006) Structural violence and clinical medicine. *PLoS Medicine*, 3 (10): 1686–91.
- FPH (2010) *What Is Public Health?* London: The UK's Faculty of Public Health Available at: www.fph.org.uk/what_is_public_health (accessed on 9 March 2018).

- Galtung, J. (1969) Violence, peace, and peace research. *Journal of Peace Research*, 6 (3): 167–91.
- Gray, S., Pilkington, P., Pencheon, D. and Jewell, T. (2006) Public health in the UK: Success or failure. *Journal of the Royal Society of Medicine*, 99: 107–11.
- Humphries, S.E., Whittall, R.A., Hubbart, C.S., Maplebeck, S., Cooper, J.A., Soutar, A.K. et al. (2006) Genetic causes of familial hypercholesterolaemia in patients in the UK: relation to plasma lipid levels and coronary heart disease risk. *Journal of Medical Genetics*, 43 (12): 943–49.
- Iqbal, N. (2015) How border guards are trained to spot potential FGM victims. BBC Newsbeat, 22 July 2015. www.bbc.co.uk/newsbeat/article/33626605/how-border-guards-are-trained-to-spot-potential-fgm-victims.
- Koplan, J.P., Bond, T.C., Merson, M.H., Reddy, K.S., Rodriguez, M.H, Sewankambo, N.K. and Wasserheit, J.N. (Consortium of Universities for Global Health Executive Board) (2009) Towards a common definition of global health. *Lancet*, 373 (9679): 1993–5.
- Koppelman, G.H., Stine, O.C., Xu, J., Howard, T.D., Zheng, S.L., Kauffman, H.F. et al. (2002) Genome-wide search for atopy susceptibility genes in Dutch families with asthma. *Journal of Allergy and Clinical Immunology*, 109 (3): 498–506.
- Laird, D.L., Amer, M.M., Barnett, E.D. and Barnes, L.L. (2007) Muslim patients and health disparities in the UK and the US. *Archives of Disease in Childhood*, 92 (10): 922–6.
- Larson, C.P. (2007) Poverty during pregnancy: its effects on child health outcomes. *Paediatrics and Child Health*, 12 (8): 673–7.
- Lomazzi, M. (2016) A Global Charter for the Public's Health – the public health system: role, functions, competencies and education requirements. *European Journal of Public Health*, 26 (2): 210–12.
- Lowth, M. (2015) Diseases and different ethnic groups. Patient: Health information you can trust. Available at: <https://patient.info/doctor/diseases-and-different-ethnic-groups> (accessed 6 October 2018).
- Luepker, R.V. (2016) Falling coronary heart disease rates: a better explanation. *Circulation*, 133 (1): 8–11.
- Manecksha, R.P. and Fitzpatrick, J.M. (2009) Epidemiology of testicular cancer. *British Journal of Urology International (BJUI)*, 104: 1329–33.
- Marshall, S.J. (2004) Developing countries face double burden of disease. *Bulletin of the World Health Organization*, 82 (7): 556.
- McGrogan, A., Seaman, H.E., Wright, J.W. and de Vries, C.S. (2008) The incidence of autoimmune thyroid disease: a systematic review of the literature. *Clinical Endocrinology*, 69: 687–96.
- NHS Scotland (2018) *Public Health: Health Improvement*. Edinburgh: NHS Education for Scotland. Available at: www.nes.scot.nhs.uk/education-and-training/by-theme-initiative/public-health/health-improvement.aspx (accessed 11 March 2018).
- Nordestgaard, B.G., Chapman, M.J., Humphries, S.E., Ginsberg, H.N., Masana, L., Descamps, O.S. et al. (2013) Familial hypercholesterolaemia is underdiagnosed and undertreated in the general population: guidance for clinicians to prevent coronary heart disease: consensus statement of the European Atherosclerosis Society. *European Heart Journal*, 34 (45): 3478–90.
- Oxford Dictionaries (2018) Epidemiology. *English Oxford Living Dictionaries* [online]. Available at: <https://en.oxforddictionaries.com/definition/epidemiology> (accessed 2 March 2018).
- Pearson, T.A. (2004) The epidemiological basis for population-wide cholesterol reduction in the primary prevention of coronary artery disease. *American Journal of Cardiology*, 94 (Suppl): 4F–8F.
- Public Health England (2018) Guidance: 4. Clinical Governance [online]. Available at: www.gov.uk/government/publications/newborn-hearing-screening-programme-nhsp-operational-guidance/4-clinical-governance (accessed 3 November 2018).
- Rosignol, A. (2007) *Principles and Practice of Epidemiology: An Engaged Approach*. New York: McGraw-Hill.
- Saracci, R. (2010) *Epidemiology: A Very Short Introduction*. Oxford: Oxford University Press.

- Stuart, K. and Soulsby, E. (2011a) Reducing global health inequalities: Part 1. *Journal of the Royal Society of Medicine*, 104 (8): 321–6.
- Stuart, K. and Soulsby, E. (2011b) Reducing global health inequalities. Part 2: Myriad challenges. *Journal of the Royal Society of Medicine*, 104 (10): 401–4.
- Stuart, K. and Soulsby, E. (2011c) Reducing global health inequalities. Part 3: Collaboration and funding. *Journal of the Royal Society of Medicine*, 104 (11): 442–8.
- Vanderpump, M.P.J. (2011) The epidemiology of thyroid disease. *British Medical Bulletin*, 99: 39–51.
- Wilkins, E., Wilson, L., Wickramasinghe, K., Bhatnagar, P., Leal, J., Luengo-Fernandez, R. et al. (2017) *European Cardiovascular Disease Statistics 2017*. Brussels: European Heart Network.
- Winslow, C.E.A. (1920) The untilled fields of public health. *Science*, 51 (1306): 23–33.
- World Health Organisation (WHO) (2016a) What is health promotion? [Online Q&A]. Available at: www.who.int/features/qa/health-promotion/en/ (accessed 12 March 2018).
- World Health Organisation (WHO) (2016b) *Global Strategic Directions for Strengthening Nursing and Midwifery 2016–2020*. Geneva: Health Workforce Department, World Health Organisation Available at: www.who.int/hrh/nursing_midwifery/global-strategic-midwifery2016-2020.pdf (accessed 6 October 2018).
- World Health Organisation (WHO) (2018a) Fact Sheet: Female genital mutilation [online]. Available at: www.who.int/news-room/fact-sheets/detail/female-genital-mutilation (accessed 6 October 2018).
- World Health Organisation (WHO) (2018b) Fact Sheet: Noncommunicable diseases [online]. Available at: www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases (accessed 14 June 2018).
- World Health Organisation (WHO) (2018c) Health Topics: Cardiovascular disease [online]. Available at: www.who.int/cardiovascular_diseases/en/ (accessed 30 September 2018).
- World Health Organisation (WHO) (2018d) WHO Global Urban Ambient Air Pollution Database (update 2016) [online]. Available at: www.who.int/phe/health_topics/outdoorair/databases/cities/en/ (accessed 30 September 2018).
- World Health Organisation (WHO) (2018e) Neglected zoonotic diseases [online]. Available at: www.who.int/neglected_diseases/zoonoses/infections_more/en/ (accessed 17 March 2018).
- World Health Organisation (WHO) Europe (2012) European Action Plan for Strengthening Public Health Capacities and Services. Copenhagen: World Health Organisation Regional Office for Europe Available at: www.euro.who.int/__data/assets/pdf_file/0005/171770/RC62wd12rev1-Eng.pdf (accessed 9 March 2018).