

ACCESS AND WIDENING PARTICIPATION



UCL

Teacher Toolkit

Introduction to Population Health

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Welcome

UCL provides a world-class education in one of the most vibrant cities in the world. As well as being a top-ranking university, UCL is right in the centre of London and it enriches students culturally as well as academically. UCL performs among the top universities globally in academic and employer reputation, student to staff ratio, citations per faculty member and the proportion of its international community*.

Introduction

This toolkit has been designed by researchers at UCL, to be used to enrich the A-level curriculum, generate knowledge in new subject areas, and to build bridges to undergraduate study. The toolkits can be used flexibly either as a resource for your A-level students to complete in their independent study time or as lesson plans to meet the requirements of subject specific programmes of study. We hope that you enjoy using this toolkit and find it useful in your teaching.

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*10th in the world (QS World University Rankings 2021)

Topic 1:

Health and Studying Health



Worksheet 1

Health and Studying Health

What is Health?

Definition 1 – World Health Organisation (WHO), 1948

“Health is a state of complete physical and mental well-being and not merely the absence of disease or infirmity” (WHO, 1948)

Definition 2 - Huber et al, 2011

“Health is the ability to adapt and to self-manage, in the face of social, physical and emotional challenges”



Activity 1 – What is Health? Discussion Points

1. Are you in a state of complete well-being?
2. Do you feel the WHO definition is achievable?
3. Is the definition appropriate today?
4. Is it possible to measure the definition?
5. Can we measure health on a continuum?
6. Is health different from disease, illness or sickness?
7. How does the second definition compare to the first?



Population Health, Public Health and Epidemiology

“**Population Health** studies the factors influencing health: the social and physical environment, individual behaviour, medical care and genetics.

It spans the life course from birth to old age, and draws in disciplines from across the health and social sciences including epidemiology, sociology, human geography, social statistics, psychology and economics.”

Population health is **the discipline** by which we understand the health of populations, how this changes over time, differences in health between populations, and health across the whole life span. It includes the study of the whole spectrum of determinants (social, physical, environmental and biological) of health in populations.

Epidemiology is the “Understanding of the underlying factors causing disease in a population” or “The study of how often diseases occur in different groups of people and why”

Epidemiology may be thought of as **the method** for which we study population health and understand the factors that determine specific diseases and health outcomes within populations. Epidemiology relies often on statistical testing, large data sets, clinical trials and population studies to determine the risk factors that are associated with disease.

Public Health is the “Removal/modification of these factors to protect the population” or in other words “the science and art of preventing disease, prolonging life, and promoting health through the organised efforts of society”

Public health might be thought of as **the application** of epidemiology and population health, with the aim of improving health in the population through collective and structured efforts of society and the state.



Worksheet 1 (cont.)

Health and Studying Health

Activity 2 – Population Health, Public Health and Epidemiology

Fill in the below table, using information from the previous page, and the two videos below:

Video by The Kings Fund “What is population health?”

▶ kingsfund.org.uk/audio-video/population-health-animation

Video by Health Careers NHS “What is public health?”

▶ healthcareers.nhs.uk/working-health/working-public-health/what-public-health

Discussion Points

1. Think of a time when you have seen something related to epidemiology e.g. a news article or a study. What did it show? What methods were used?
2. Think of a time when you have seen or experienced the application of public health? E.g. a policy, campaign, historical account.

	Provide a description of the discipline. i.e what is the main aim of public/population health/epidemiology? What tools and methods might they use? Provide an example of where you have seen each discipline applied.	Similarities. Describe similarities you have identified between the three disciplines.	Differences. Describe differences you have identified between the three disciplines.
Population Health			
Public Health			
Epidemiology			

Activity 3 – Short Essay Question

Using your answer from the above activity, as well as your own research and examples, plan and write a short essay that answers the below question. Your answer should be up to one A4 sheet in length.

Essay Question: Describe the fields of population health, public health and epidemiology. How do they relate to each other and what are their main differences? Why do you think population health is an important subject to study?

Lesson plan 1

Health and Studying Health

Key words and concepts

- Health
- Epidemiology
- Population Health
- Public Health
- Disease
- Global Health

What you'll need for this lesson

- ✓ Access to the video by The Kings Fund “What is population health?”
 - ▶ kingsfund.org.uk/audio-video/population-health-animation
- ✓ Access to the video by Health Careers NHS “What is public health?”
 - ▶ healthcareers.nhs.uk/working-health/working-public-health/what-public-health

Learning context

This session aims to give students an introduction to key concepts in population health, and encourages them to identify synergies with the A-level curriculum. Students are provided with different definitions of health, and are encouraged to think about the utility of each definition for understanding and measuring health. Students given a brief overview of what epidemiology, population health and public health are, and encouraged to discuss their differences and nuances.

Learning objectives

- Able to describe what health is and how we define and measure this.
- Able to compare the fields of epidemiology, public health and population health.
- Able to recognise the different methods applied now to study health, in particular the role of study design and statistical methods.

Time (min)

Learning opportunities / activities / differentiation

10

In groups, students are asked to come up with their own definition of what health is, and how it might be measured. Thoughts are discussed as a class, in particular common themes between definitions should be identified.

You may want to use the Kings Fund video “What is Population Health?” to help encourage discussion and ideas.

15

Students are provided with definitions of health (worksheet 1). In groups, students should work through discussion points provided and write down short answers to each question. Students should compare their own definition from the start of the lesson to the definitions provided.

20

Students are provided with an overview of what epidemiology, population health and public health are. You may wish to use the Kings Fund video “What is Population Health?” and the NHS Health Careers video “What is Public Health?” to help draw distinctions and encourage discussion.

In groups, students are encouraged to discuss the differences and nuances between the three different disciplines, and answer the discussion points. Students should complete table of similarities and differences to help draw distinctions between the disciplines.

15

Students are provided with an essay question and should use the end of the session to plan a short answer to this question (up to 1 A4 page). The answer should be completed as homework or in study periods.

Essay Question: Describe the fields of population health, public health and epidemiology. How do they relate to each other and what are their main differences? Why do you think population health is an important subject to study?

Start

Learning focus

Wrap-up

Topic 2:

A History of Population Health

Worksheet 2



A History of Population Health

Activity 1 – History of Public Health

Wave 1 (19th Century) – Improving Environmental Conditions

In the early 19th Century, public health was largely concerned with the impact of environmental conditions on health and improving these conditions:

- Sewage systems
- Clean water
- Working environment
- Hygiene practices
- Improved infant feeding

Example: John Snow and Cholera

Cholera is an infectious disease caused by **bacteria** that lives in water.

Those who are infected suffer from severe **dehydration and diarrhoea**, which can eventually lead to death.

During the outbreak in 1854, no one knew what was causing the disease, but John Snow was able to locate the source of disease to the **broad street pump in Soho**.

John Snow is often considered a **founder of epidemiology**, as he was one of the first to focus on the distribution and causes of disease through data collection.



Task 1

Watch this video to see how John Snow was able to identify the source of the outbreak:

▶ [youtube.com/watch?v=5JbtHiFXbU0/](https://www.youtube.com/watch?v=5JbtHiFXbU0/)

Wave 2 (1890 to 1950) – Vaccines and Antibiotics

The second wave of public health largely focused on prevention of disease through the use of antibiotics and vaccines.

Prevention of disease in this way was only possible with advancements in medicine at the time, such as the discovery of penicillin – the first antibiotic – by **Alexander Fleming** in 1928.

Other examples of where advancements were made was with the **eradication of small pox** in the 20th century. Despite the discovery of a vaccine for small pox by **Edward Jenner** in the 18th century, it was not until later on that small pox was eradicated.



Task 2

Follow the link below to the Centre for Disease Control and Prevention to explore the history and eradication of small pox:

▶ [cdc.gov/smallpox/history/history.html](https://www.cdc.gov/smallpox/history/history.html)

Why do you think the vaccination programme was so successful?

Worksheet 2 (cont.)

A History of Population Health

The Epidemiological Transition

Early public health focused on improving environmental conditions (i.e hygiene and sanitation) and reducing infectious disease through vaccines and antibiotics. As a result, the number of deaths resulting from infectious diseases decreased and the number of deaths resulting from chronic diseases increased over the 20th century.

This is known as **the epidemiological transition** – where the main cause of death change from being mostly infectious disease, and instead are chronic diseases such as cardiovascular disease, diabetes and cancer.



Wave 3 (1940s to 1980s) – Chronic Disease and Lifestyle

During the mid-20th Century, attention turned to **chronic diseases**, such as cancer and heart disease. Epidemiologists and public health scientists became aware of the **link between life style and disease**. This knowledge was used to identify individuals at high risk, and to target public health campaigns at changing lifestyle and behavioural factors.

It was also the start of using **large studies** of groups and populations, and following them over time, to **investigate disease**.



Task 3

Watch this video to hear about one of the earliest cohort studies established in the UK and how it has been used to research health over the life course:

▶ youtube.com/watch?v=-FbYV9eWKPI

Example: Smoking and the British Doctors Study

A longitudinal study of doctors established in 1951 was one of the first studies to convincingly link smoking to lung cancer. The results of this study have had huge influence on the smoking prevention and public health campaigns.

Follow this link to find out more information about the British Doctors study and other important findings:

▶ ctsu.ox.ac.uk/research/british-doctors-study

Wave 4 (1960s onwards) – Social and Economic Determinants of Disease

In the final wave, public health has **moved beyond** thinking about the **individual and behavioural causes of disease**, and recognises that individual behaviour is influenced by the environment and socioeconomic circumstances we experience.

Focus has turned to social and economic causes of disease.

Example: The Marmot Review

In 2010, Michael Marmot – a researcher at UCL – published the Marmot Review, *“Fair Society, Healthy Lives”* (image below), which highlighted links between our social and economic position and health outcomes. The review made a number of recommendations on how to reduce inequalities in health in the UK.

In 2020, Michael Marmot and his team published two new reports. The first, titled *“Health equity in England: the marmot review 10 years on”*, aimed to identify progress made in reducing health inequalities since the first report was published. The second, titled *“Build Back Fairer: The COVID-19 Marmot Review”* highlighted social and economic inequalities in mortality, mental and physical health from the 2020 Covid-19 Pandemic.



Task 4

Watch this video to hear about the social determinants of health:

▶ health.org.uk/what-we-do/a-healthier-uk-population/what-makes-us-healthy

You may wish to explore **The Health Foundations** website to find out more about health inequalities.

Worksheet 2 (cont.)

A History of Population Health

Activity 2 – Social inequalities and determinants



What are health inequalities?

‘... systematic differences in health between different socio-economic groups within a society. As they are socially produced, they are potentially avoidable and widely considered unacceptable in a civilised society’.

Whitehead M, 2007

Discussion Points

1. How do “inequalities” differ to health “differences”?
2. What markers of socioeconomic position can you think of? e.g. education, income.
3. What information do you think these markers are capturing?

What is Social Epidemiology?

Social Epidemiologists focus on exploring **social determinants** of the pattern of disease, and understanding the pathways that lead from social characteristics to physical or mental health outcomes. In particular, social epidemiologists are focused on the impact of **social structures** on population health outcomes.

“Social epidemiologists aim to identify social characteristics that affect the pattern of disease and health distribution in a society and to understand its mechanisms. Some important concepts of social epidemiology are: social inequalities, social relationships, social capital, and work stress.”

Olaf von dem Knesebeck, *BMC Health Services Research*, (2015)

Discussion Points

1. What is a social structure?
2. In what ways do you think social structures may impact on health?



Lesson plan 2

A History of Population Health

Key words and concepts

- Health
- Epidemiology
- Epidemiological Transition
- Social Epidemiology
- Social Inequalities
- Social Determinants

What you'll need for this lesson

- ✓ Worksheet 2
- ✓ Links to videos/ webpages provided in work sheet
- ✓ Access to laptops/internet so students can conduct their own research
- ✓ More information on “Waves of Population Health” can be found to download at:
 - healthcareers.nhs.uk/career-planning/resources/brief-history-public-health

Learning context

This session aims to give students an overview of how the focus of population health has changed over time with changing causes of death, and encourages them to identify synergies with the A-level curriculum.

Learning objectives

- Able to describe prominent causes of death have changed over time, and the role that medical advancements have played in this.
- Able to verify whether health inequalities are unavoidable.

Time (min)

Learning opportunities / activities / differentiation

5

Students should write a list of what they think the biggest focus of public health is now, and what was the biggest focus of public health 150 years ago? As a class ask for students idea and how do they think this has changed, and why?

35

Students are given an overview of the changing focus of public health (wave 1–4) with historic examples of each stage (worksheet 2). Split the class into four groups and allocate a wave to each. In their groups, students using the links provided in addition to their own research, should investigate the historic examples provided and prepare to explain it to the rest of the class. Encourage students to discuss the significance of each wave, and how this relates to the epidemiological transition. Reserve 10 minutes at the end for each group to explain the example they have investigated.

15

Using activity 2, students should discuss and write down answers to what health inequalities are, and how these differ to health differences. This should be taught in the context of being in the “4th wave” of population health. Students should also complete questions on social epidemiology.

5

Review answers to activity 2 as a class. If you intend to set the optional homework activity, use this time to introduce them to the assignment.

Optional Home Work: Students complete writing task (up to 1 A4 page) answering the question “how has public health changed since the 19th Century?”

Start

Learning focus

Wrap-up

Curriculum links

Below is a list of areas taken from the A-level curriculum that directly relate to content covered in this toolkit.

Subject area:

Geography (AQA)

3.2.4.3

Environment, health and well-being – patterns of health

Global patterns of health, mortality and morbidity. Economic and social development and the epidemiological transition.

3.2.4.3

Environment, health and well-being – Climate/ environment and health

The relationship between environment variables e.g. climate, topography (drainage) and incidence of disease. Air quality and health. Water quality and health.

3.2.4.3

Environment, health and well-being – Prevalence of communicable diseases

The global prevalence, distribution, seasonal incidence of one specified biologically transmitted disease, e.g. malaria; its links to physical and socio-economic environments including impacts of environmental variables on transmission vectors. Impact on health and well-being. Management and mitigation strategies.

3.2.4.4

Population change – Demographic Transition

Factors in natural population change: the demographic transition model, key vital rates, age–sex composition; cultural controls. Models of natural population change, and their application in contrasting physical and human settings. Concept of the Demographic Dividend.

Subject area:

Sociology (AQA)

Integral Elements – Research Methods

All the following must be an integral part of the study of each topic area:

- the design of the research used to obtain the data under consideration, including its strengths and limitations

Students must examine the following areas:

- quantitative and qualitative methods of research; research design
- sources of data, including questionnaires, interviews, participant and non-participant observation, experiments, documents and official statistics
- the distinction between primary and secondary data, and between quantitative and qualitative data
- the relationship between positivism, interpretivism and sociological methods; the nature of ‘social facts’
- the theoretical, practical and ethical considerations influencing choice of topic, choice of method(s) and the conduct of research.

Core Themes – social differentiation, power and stratification

The theme should be understood and applied to particular substantive areas of Sociology. These themes are to be interpreted broadly as threads running through many areas of social life and should not therefore be regarded as discrete topics.

In addition, students must understand the significance of conflict and consensus, social structure and social action, and the role of values.

Contemporary UK Society

The central focus of study in this specification should be on UK society today, with consideration given to comparative dimensions where relevant, including the siting of UK society within its globalised context.

Health – Unequal Distribution

- The unequal social distribution of health chances in the United Kingdom by social class, gender, ethnicity and region
- Inequalities in the provision of, and access to, health care in contemporary society

Health – Social construction of health and illness

- The social construction of health, illness, disability and the body, and models of health and illness

Role of medicine

- The role of medicine, the health professions and the globalised health industry.

Glossary

Below is a list of key terms in the toolkit, and their definitions.

Epidemiological Transition

A period in history where the main cause of death changed from being mostly infectious disease, and instead are chronic diseases such as cardiovascular disease, diabetes and cancer.

Epidemiology

Epidemiology is the method for which we study population health and understand the factors that determine specific diseases and health outcomes within populations.

Population Health

Population health is the discipline by which we understand the health of populations, how this changes over time, differences in health between populations, and health across the whole life span. It includes the study of the whole spectrum of determinants (social, physical, environmental and biological) of health in populations.

Public Health

Public health is the application of epidemiology and population health, with the aim of improving health in the population through collective and structured efforts of society and the state.

Social Determinants

The social determinants of health are the social and economic conditions and circumstances throughout our life that influence our health.

Social Epidemiology

Social epidemiology is a branch of epidemiology that tries to understand the social determinants of the pattern of disease, and tries to understand the pathways that lead from social characteristics to physical or mental health outcomes.

Social Inequalities

Social inequalities are an uneven distribution of resources in society. These may be differences in wealth, income, employment, education, and financial assets as well as differences in opportunities.

Health Inequalities

Health inequalities are unfair, avoidable and systematic differences in health. They are often a result of social inequalities.

Resources

See below some useful resources linked to this subject area.

Gap Minder

Gap Minder provides information on global development and has a number of teaching resources. Gap Minder also provides access to and use of data in an accessible way.

▼ gapminder.org

Nesstar on UK Data Service

Online data exploration system used by the UK Data Service to provide access to a wide variety of datasets. All visitors to our Nesstar Catalogue can browse study meta-data, variable frequencies and use the simple and advanced search options. Registered users can also create simple online cross-tabulations, produce graphs, and download subsets of variables in a variety of formats.

▼ ukdataservice.ac.uk/get-data/explore-online/nesstar/nesstar.aspx

Draw the charts: 60 years of change by the ONS

Good introduction activity allowing you to guess and compare changes in social and demographic trends in the UK since the 1960s.

▼ ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/articles/you-draw-the-charts-60-years-of-change/2017-10-24

Mentimeter

Lets you create interactive presentations, including polls, quizzes, word clouds. A useful tool for virtual learning environments

▼ menti.com

INED – French Institute for Demographic Studies

A public research institute specialized in population studies that works in partnership with the academic and research communities at national and international levels. Has a number of quizzes and resources on populations and demographics.

- ▼ ined.fr/en/everything_about_population/population-games/quiz/etes-vous-demographe/#tab-Easy

STAT Compiler (DHS Program)

Allows users to make custom tables based on thousands of demographic and health indicators across more than 90 countries. Customize tables to view indicators by background characteristics, over time, and across countries.

- ▼ statcompiler.com/en/

Nomis

Nomis is a service provided by the Office for National Statistics, ONS, to give you free access to the most detailed and up-to-date UK labour market statistics from official sources.

- ▼ nomisweb.co.uk

The Health Foundation

An independent charity focused on improving health in the UK and addressing health inequalities. Produces independent and up to date reports and research. A number of videos and resources available on their website.

- ▼ health.org.uk

Get in touch

UCL Institute of Epidemiology and Health Care

There are a number of different ways you can engage with UCL further. We host a number of school visits to UCL over the year, which include taster sessions of university lectures. We also run summer schools and summer challenges in a range of subjects, including in population health sciences. Additionally, we run yearly master classes and outreach events, as well as open days across UCL.

If you want more information on how to engage with UCL further, and in particular the BSc in Population Health Sciences, visit our website where you can find out more information.

▶ ucl.ac.uk/epidemiology-health-care/study/undergraduate/population-health-sciences-bsc

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