



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Social Epidemiology and Public Health Development

Foundations of Social Epidemiology

Measuring, Monitoring and Control of Disease

Semester 1 2021/22

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*Trawsnewid Addysg; Trawsnewid Bywydau
Transforming Education; Transforming Lives*



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Learning outcomes

Upon successful completion of this module, you should be able to:

- Understand different approaches and strategies used to measure, monitor and control the incidence of disease in communities
- Investigate the implications of illness and disease in communities for the provision of health and social care services
- Understand the factors influencing the health and wellbeing of individuals in health or social care settings.

Module Summary

- The module aims overall to raise learners' awareness and critical evaluation of factors influencing public health and the different approaches taken to reduce incidence of disease and illness in communities.

Aims of the Session

To understand

- Public health surveillance
- How disease can be measured
- How disease can be monitored
- How disease can be controlled

HOW CAN DISEASE BE MEASURED?



Measuring disease

The two most common means of measuring the burden of disease/assessing population's health include

- **mortality** and
- **morbidity**
- Data on deaths and illness are often used as a surrogate/substitute measures of disease and health.

(Naidoo and Wills, 2009)

Mortality

- While similar and often related, morbidity and mortality, however, are not identical.
- **Mortality** refers to the state of being mortal (destined to die).
- Mortality is the number of deaths due to a specific illness or condition.
- Mortality is related to the number of deaths caused by the health event under investigation.

Mortality

- In medicine, mortality is a term also used for ***death rate***, or the ***number of deaths*** in a ***certain group of people*** in a certain period of time.

Morbidity

- The word **morbid** is associated to sickness and disease
- **Morbidity** is the state of being symptomatic or unhealthy for a disease or condition.
- It is usually represented or estimated using ***prevalence or incidence***.
- Morbidity is when you have a specific illness or condition.
- It can be applied to an individual or a population (termed morbidity rate)
- Some examples of common morbidities are heart disease, diabetes, and obesity.
- You can have more than one morbidity (i.e two or more illness) at a time. This is called ***comorbidity***.

Importance of morbidity and mortality

- These measures describe the progression and severity of a given health event.
- They are useful tools to learn about risk factors of diseases and compare and contrast health events between different populations.

Activity

- Working in a groups, research the strategies that was implemented to measure Covid-19 in the UK

Feedback your findings to the whole class
15mins

Measuring Covid-19

- Prevalence data
- Incidence data
- Mortality and Morbidity data
- Hospital data
- Vaccine efficacy

HOW CAN DISEASE BE MONITORED?



Monitoring disease

- Disease can be monitored with the help of a public health surveillance system

WHAT IS SURVEILLANCE?



Public health surveillance

- Public health surveillance is the “ongoing, systematic collection, analysis, interpretation, and dissemination of health data to help guide public health decision making and action”.
- Surveillance is “equivalent to **monitoring** the extent of a disease in the community”.

(CDC, 2012)

Public Health Surveillance

- This is achieved through the systematic collection and evaluation of morbidity and mortality reports and other relevant health information, and
- The dissemination of these data and their interpretation to those involved in disease control and public health decision making.

(CDC, 2012)

Public Health Surveillance

- Morbidity and mortality reports are “common sources of surveillance data for local and state health departments”.
- These reports generally are “submitted by health-care providers, infection control practitioners, or laboratories that are required to notify the health department of any patient with a reportable disease such as meningitis, or AIDS”.

(CDC, 2012)

WHAT IS THE PURPOSE OF SURVEILLANCE?



Purpose of Surveillance

- The purpose of public health surveillance, which is sometimes called ***“information for action,”*** is to portray the ongoing patterns of disease occurrence and disease potential so that investigation, control, and prevention measures can be applied efficiently and effectively.

(CDC, 2012)

Purpose of surveillance

- Measures incidence of infectious disease, with changes potentially indicating an outbreak
- Tracks trends in occurrence and risk factors of an infectious disease allowing targeted interventions
- Enables priority setting and planning of control measures specific e.g. to a particular region

(Adapted from Hawker et al. Communicable Disease Control and Health Protection Handbook, Third Edition. 2012, Blackwell Publishing)

Activity

- Working in a groups, research the strategies that was implemented to monitor **Covid-19** in the UK

Feedback your findings to the whole class
15mins

Monitoring Covid-19

- Collecting data
- Vaccination data
- Lateral flow test and PCR test data
- Mutation identify by scientist

Activity

- Working in groups using the below link explore the Surveillance strategies that was use for COVID-19

<https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-surveillance-strategy-9-Apr-2020.pdf>

Feedback your findings to the whole class

Activity

- Working in groups using the below link explore the WHO Surveillance strategies for COVID-19 human infection

<https://apps.who.int/iris/handle/10665/332051>

Feedback your findings to the whole class

HOW CAN DISEASE BE CONTROLLED?



Disease control

Disease can be controlled in different ways.
These include

- Immunisation
- Lifestyle behavioural changes
- Medication: antibiotics, antivirals, and antifungals.
- Modifying the environment: vector control
- Quarantine

WHAT IS IMMUNISATION?



Immunisation

- **Immunisation:** A “process by which a person becomes protected against a disease through vaccination”.
- This term is often used interchangeably with vaccination or inoculation.

Activity

- Working independently, research the meaning of the term **vaccine**

Feedback your findings to the whole class

Activity: Answer

- **Vaccine:** A “preparation that is used to stimulate the body’s immune response against diseases”.
- Vaccines are usually “administered through needle injections, but some can be administered by mouth or sprayed into the nose”.

(CDC, 2012)

Immunisation

- Immunization is one of the most successful and cost-effective way by which disease can be controlled.
- It has eradicated smallpox,
- Lowered the global incidence of polio so far by 99% and
- Achieved dramatic reductions in illness, disability and death from tetanus, whooping cough and measles. "

The importance of immunisation

- The two public health interventions with the greatest impact are clean water and vaccination

(World Health Organisation)

- Vaccination is the most effective medical intervention in the world

Immunisation Department, Centre for Infections

Immunisation programmes

To achieve a good immunisation programme the overall aim must be decided. Is it

- To protect those at highest risk
 - or
- To eradicate, eliminate or contain disease

Immunisation Department, Centre for Infections

Establishing the need for a vaccination programme

- Disease incidence
 - Age distribution
 - Trends
 - Disease complications
 - Mortality
-
- These are ascertained by surveillance and also through published literature and special studies

Immunisation Department, Centre for Infections

Immune response to vaccination

Aim of an ideal vaccine:

- To produce the same immune protection which usually follows natural infection but without causing disease
- To generate long-lasting immunity
- To interrupt spread of infection

Immunisation Department, Centre for Infections

Activity

- Working in a groups, research the strategies that was implemented to control **Covid-19** in the UK

Feedback your findings to the whole class

Control of Covid-19

- Lockdown
- Vaccination programme
- Mass screening/testing
- Local restriction of movement
- Use of Personal Protective equipment (PPE)

Control of Covid-19

- Contact tracing
- Quarantine
- Isolation
- hand washing,
- maintaining physical/social distance,
- Covering the mouth and nose during coughs,
- and avoiding contamination of face with unwashed hands
- Use of face mask

(Girum et al., 2020)

Activity Answer

- Quarantine, contact tracing, screening, and isolation are effective measures of COVID-19 prevention, particularly whenever integrated together.
- In order to be more effective, quarantine should be implemented early and covers larger community.
- Controlling population travel will enhance the effectiveness of quarantine. Screening, contact tracing, and isolation are effective particularly in areas where contact tracing is easily attainable.
- Although screening is the effective measure recommended by the WHO, since the disease is asymptomatic, it may miss a larger share of the population.
- Therefore, this should be integrated with other preventive measures.
- In order to control the COVID-19 epidemic, the health care system should consider high level of contact tracing, early initiation of nationwide quarantine measures, increasing coverage of screening service, and preparing effective isolation centres.

Control of Covid-19

Key control measures taken by major countries in 2020 to fight against COVID-19, include lockdowns,

- social distancing,
- wearing masks,
- hand hygiene, using shelter hospitals,
- large-scale testing,
- close-contacts tracking, and
- pandemic information monitoring, as well as their prevention and control effects.

Activity

- Working in groups using the below link explore the document

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/884760/Our plan to rebuild The UK Government s COVID-19 recovery strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/884760/Our_plan_to_rebuild_The_UK_Government_s_COVID-19_recovery_strategy.pdf)

Feedback what you have learnt to the whole class

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