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Thinking about Individual and Population Health

Learning Objectives

In this chapter, you will learn to

- Distinguish between individual and population level of analysis;
- Understand how a shift to population-level of analysis changes our perspectives on
 - Treating people for disease;
 - Modifying individual behaviour;
 - Preventing bad health outcomes through screening and early intervention; and
 - Evaluating health programs and services;
- Appreciate how broader features of society such as its level of affluence affect the population.

Chapter Overview

The chapter begins by differentiating among three levels of analysis: cellular level, individual level, and population level. Each level of analysis is important for understanding the concept of health, but requires different understanding of how health can be achieved and influenced. The concept of ecological fallacy demonstrates why it is important not to confuse these different levels of analysis or to make inferences about persons based on variables applied to groups or collectives. Nevertheless, individual experiences can be affected by population-level variables and there is a relationship between these two levels of analysis.

Nesting and event cascade models help us to understand the relationship between individual and community. Both of these models are criticized for overemphasizing the individual-level factors in understanding population health. The chapter explains the appeal and shortcoming of the biomedical and behavioural versions of the risk factors model for the individual level of analysis of health and disease. By focusing on most common risk factors of a host and agent model—age, sex, and genetics—we can see that these factors are variable, complex, and susceptible to environmental influences. Behavioural approaches are ineffective and leading to victim-blaming.

After describing the failure of individual-based approaches, the chapter moves on to demonstrate the importance of population-based measures for improving health. Using smoking as an example, we can see that population-based campaigns might not be as useful as we previously believed. Instead, a more effective way for improving population health may be to modify the social context in which the behaviour is produced. The works of John Snow, Friedrich Engels, Rudolf Virchow, and Émile Durkheim help us to understand how social factors can shape the distribution of disease among populations. The work of Thomas McKeown demonstrates that a narrow focus on health care measures is misleading in research on population health.

The chapter ends with an overview of demographic and epidemiological transitions and a list of terms related to population level measurements of health and disease. The conclusion states that we ought to develop a population-based approach for understanding distribution of health and disease that goes beyond focusing on individual behaviours and health education.

Key Terms and Concepts

Agent the cause of the disease (p. 20)

Behavioural variant an analysis of health and disease which emphasizes health behaviour (lifestyle factors) (p. 20)

Biomedical individualism reducing the analysis of population health down to lifestyle and environmental factors (p. 20).

Crude death rates number of people who died within a given period, usually a year (p. 40)

Distal variables variables that are distant (p. 18)

Ecological fallacy applying inferences derived from variables pertaining to groups/collectives to individuals/persons (p. 16)

Epigenetics the study of gene expression in response to the environment (p. 23)

Gender the social expectations placed on a person and the social roles that the person adopts (p. 22)

Health adjusted life expectancy (HALE) a life expectancy that is adjusted to calculate only years spent in good health (p. 41)

Host an organism that harbours a virus or a parasite and provides it with nourishment and shelter (p. 20)

Incidence the number of new cases that arise in a specified population in a specific period of time (p. 40)

Infant mortality deaths of children less than one year old (p. 41)

Intermediate variables variables situated between distal and proximal levels or a meso level of analysis (p. 18)

Life expectancy an average lifespan for the men and women in a given population (p. 41)

Morbidity any departure from a normal state, such as illness and disability (p. 40)

Premature mortality calculation of years of life lost before age 70 (p. 41)

Prevalence number of cases in a population at a point in time (p. 40)

Proximal variables variables that are near in time or proximity to an event (p. 18)

Relative risk the measure of probability that a factor contributes to a disease or premature mortality (p. 27)

Risk factors set of factors that can be characterized as potential threats to health. These can include sex, age, genetic inheritance, health-related behaviours, or environmental factors (p. 16)

Secular change when the behaviour of individuals in the study is shaped not only in response to an intervention but also due to broader societal changes and cultural beliefs and practices (p. 29)

Social capital features of social structures acting as resources for individuals (p. 42)

Social facts human artifacts that arise from interactions of people in groups (p. 33)

Social patterning of behaviour the study of the social determination of individual behaviour (p. 26)

Study Questions

Scroll down for answers.

1. Identify three different levels of analysis employed when discussing health and disease.
2. Summarize two variants of the risk factors model and identify the weaknesses of the model.
3. Define secular change. Provide an example to illustrate your answer.
4. Summarize three phases of demographic transition.

Critical Thinking Questions

Scroll down for answers.

1. Consider any recent population-based campaign introduced by Health Canada or your local community (e.g., flu vaccines, etc.). Analyze this approach using the nesting model of analysis and identify the shortcomings of this campaign.
2. Explain whether or not developments in genetic research can eradicate the disease in society.
3. Explain whether or not the works of nineteenth-century thinkers, such as Snow, Engels, or Virchow, are still applicable to the analysis of social life today.

Annotated Multimedia Resources

1. TedTalk with Steven Bezruchka
<https://www.youtube.com/watch?v=Q0X2exKyC7k> (8 min)

Dr Steven Bezruchka is a US physician and an acknowledged leader in public health policy. In this talk Dr Bezruchka talks about the growing global inequality and identifies direction for addressing them via social policy.

2. Demographic Transition

<https://www.youtube.com/watch?v=6P2bsPWCRvM> (8 min).

In this video produced by Khan Academy, the narrator explains the stages of demographic transition.

3. TedTalk with Lisa Ranking

<https://www.youtube.com/watch?v=s2hLhWSlO10> (20 min)

Lisa Ranking is a physician and a founder of the Whole Health Medicine Institute. In this talk, she claims that loneliness may be more detrimental for individual health than genetics, diet, or exercise.

4. National Geographic: 5 Countries Where People Live the Longest

<https://www.nationalgeographic.com/travel/lists/tips-advice-countries-people-live-longest/>

This paper from *National Geographic* features the top five countries with longest life expectancies.

5. Social Determinants of Health: Dennis Raphael

https://www.youtube.com/watch?v=GMw_7AWEg4A (3:58 min)

In this short video, Dennis Raphael, a professor from York University, explains the basic foundations for understanding social determinants of health.

6. Sir Michael Marmot: Social Determinants of Health

<https://www.youtube.com/watch?v=h-2bf205upQ> (22:31 min)

In this video, Professor Marmot discusses social determinants of health from a global standpoint.

7. Hans Rosling: Population Growth Explained with Ikea Boxes

<https://www.gapminder.org/videos/population-growth-explained-with-ikea-boxes/> (10 min)

In this video, Professor Rosling explains how poverty relates to population growth.

8. Epidemiological Transition

<https://www.youtube.com/watch?v=nt3d4oMmByI> (6:40 min)

In this video the epidemiological transition is explained. The video is sponsored by the University of Edinburgh and also considers the future developments in global health.

Answers to Study Questions

1. Three levels of analysis include healthy cells, which need glucose and oxygen to maintain health, healthy people which need proper diet and exercise to maintain health, and healthy populations, which need safe and secure living conditions and environmental protection to maintain their health (p. 16)
2. The biomedical variant of risk factors model focuses on host and agent and sees characteristics of the host (age, sex, genetic predisposition) as major factors contribution the risks of the host to develop a particular condition. The behavioural approach focuses on the choices that individuals make with respect to their health practices (e.g., smoking, exercising, diet) in estimating the risks of an individual for a particular health conditions. Both approaches are not very successful in explaining health and illness since both are ignoring the social context in which age, gender/sex, genetic make-up or behaviours are exhibited (p. 20).
3. Secular change refers to the situation where the results of the study can be misinterpreted due to broader social or cultural change that happened in the population over the course of the study. In the chapter, the author uses the MR FIT study to demonstrate the possible effect of secular change (p. 29).
4. The phases of demographic transition are: (1) High birth and death rates and near-zero population growth and a low economic development; (2) From a stage characterized by high birth rates to a stage of relatively advanced economic development characterized by declining birth rates; (3) From a period of declining birth and death rates to an advanced stage of economic development characterized by near stability of the population—very similar birth and death rates (pp. 37–38)

Answers to Critical Thinking Questions

1. The nesting model of analysis considers larger societal factors that influence community-level factors that, in turn, influence the behaviours of individuals. Looking at any recent campaign related to health education, it may be evident that the onus of change is situated primarily within the individual who is expected to change (e.g., do the flu shot, wash hands, etc.). This is one of the criticisms of the nesting model of analysis (pp. 17–18).
2. Genetic factors in themselves are not very good predictors of risk of developing a particular condition, with an exception of few hereditary genetic conditions. The popularity of epigenetics suggests that social context in which individuals live and develop may have an important effect on the development of particular diseases. We see, for instance, that identical twins may have different health statuses despite the identical genetic makeup. Therefore, focusing exclusively on genetics most likely would not lead to eradication of disease (pp. 22–25).
3. While the works of Snow, Engels, or Virchow examined different populations/causes of disease, they all pointed out to the importance of social factors in shaping health of the population. We largely agree with their approach today, but we continue to live in society where the gap between the poor and the rich is wide and where individuals who are of lower socio-economic status are more likely to experience poor health than more affluent populations. Hence their works would be relevant today in calling for policy change and support of the disadvantaged population (pp. 31–33)