

Course Name	: Introduction to Public & Community Health
Course Code	: APBPH 1101
Course level	: level 1
Course Credit	: 4 CU
Contact Hours	: 60 Hrs

Course Description

This Course introduces the basic aspects of public health in particular the definitions of public health, its characteristics, origin & background of Public health, early intervention of the subject matter, relevant examples of public health programs, critical issues involved in public health, health conditions vital to public health, health interventions, community health as a branch of public health, in-depth understanding of health economics.

Course Objectives

- To help students interact with and learn the major focus of public health.
- To ensure that students grasp the relevant public health programs/intervention responsible for achieving good health standards in a given community.
- To help practitioners of public health to acquire knowledge on how to implement programs to bring positive social change.
- To help students learn the fundamentals of public health.

Course Content

Introduction

- Definition of Public Health
- Characteristics of Public Health
- Objectives of Public Health
- Origin of Public Health
- Early Public Health Interventions
- Modern Public Health

Public Health Programs

- Examples of Public Health Programs
- Functions of Public Health Programs
- Applications in Health care

Issues of Public Health

- Breast Feeding Entity
- Global Mental Health
- Life expectancy
- Disability adjusted life years
- Quality adjusted life years
- Infant and child mortality
- Morbidity

Health Conditions

- Respiratory diseases and measles
- Diarrhoeal diseases
- Maternal Health
- HIV/AIDs
- Malaria
- Nutrition and micronutrient deficiency
- Surgical disease burden
- Chronic disease

Health Interventions

- How health interventions are conducted
- Levels of preventive medicine
- Levels of Universal, selective and indicative interventions

Prophylaxis

- Meaning of Prophylaxis
- Examples of prophylaxis
- Limitations of Prophylaxis

Community Health

- Definition of Community Health
- Broad categories of Community Health
- Health Promotion
- Forms of Health Promotion
- Arguments which see publicly-funded healthcare as improving the quality of health care
- Arguments which see publicly-funded health care as worsening the quality of health care

Health Economics

- Meaning of Health Economics
- Scope of Health Economics
- Health care demand
- Cost Determination
- Market equilibrium

Assessment

Course work 40%

Exams 60%

Total Mark 100%

Overview

This by far is the most fundamental unit of the course. By understanding this course unit effectively you will be in position to understand public health through a broad intensity and depth

Aims and objectives

Throughout this course, students are introduced to a variety of subjects that provide the knowledge base and skills for understanding the social, economic, biological, and environmental dimensions of health and health improvement. Typical courses in the programme offer students a range of options to examine, including health promotion and public health; management; finance; gender; globalisation; clinical governance; data management, quality assurance, leadership, and epidemiology. The aim of this BSc programme is to provide students with a broad knowledge of the theories and methods of public health as well as skills in working with the health problems of the communities in which they work.

Outcomes

Increasingly it is recognised that to tackle these public health problems, health care workers require relevant public health skills and knowledge. This undergraduate diploma programme will train professionals with the skills and competencies to tackle public health issues in Uganda today. Through following this programme, students will be assisted to:

Evaluate and analyse the challenges confronting public health and the provision of health services today; engage in policy debates about global and international health; and respond to the challenge of the widening health inequalities that exist within and between communities and indeed countries.

One definition of public health is to prolong life and promote health through the organised efforts of society. Chief concerns are to monitor the health of a community by identifying health needs, implementing policies that promote health, evaluating health services and eliminating health disparities. As such, the scope of public health is huge. And as standards of living, income and access to public health services become more disparate, it is also one of the most crucial issues in the world today. Health protection functions include disease control such as tuberculosis, HIV, communicable disease epidemiology and immunisation, ensuring that air is safe to breathe and water and food are safe to consume.

They also include preventing behaviours that lead to disease, averting injuries, managing chronic health conditions and advocating access to quality health care for all. This includes forming partnerships with service providers and directly providing individual health services where there is a need. Public health has become

increasingly important on the political agenda, due to concerns about increasing levels of disease that take lives unnecessarily. In addition to increasing lifestyle-related poor health (including obesity, heart diseases, diabetes, and high blood pressure), Sub-Saharan Africa suffers from diseases and illnesses that are closely related to poverty and lack of access to preventative health care.

Poverty, HIV/AIDS, malnutrition, pollution-related conditions, preventable diseases, and conflict-related illnesses are problems that we see all around the region today. This only emphasises the need for health care workers to have the relevant public health skills and knowledge in order to tackle public health problems. The Bachelor of Public Health is for those already working within the health sector who wish to specialise in public health - and equally for those who wish to enter this emerging, challenging and crucial field.

This module is their for to clearly bring out the main picture of public health and thus to you to understand public health broadly

Course work

Define public health

Briefly account for the issues of public health

Definition

Public health is "the science and art of preventing disease, prolonging life and promoting health through the organised efforts and informed choices of society, organizations, public and private, communities and individuals" (1920, C.E.A. Winslow). It is concerned with threats to health based on population health analysis. The population in question can be as small as a handful of people or as large as all the inhabitants of several continents (for instance, in the case of a pandemic). The dimensions of health can encompass "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity", as defined by the United Nations' World Health Organization. Public health incorporates the interdisciplinary approaches of epidemiology, biostatistics and health services. Environmental health, community health, behavioural health, health economics, public policy and occupational health are other important subfields.

There are 2 distinct characteristics of public health:

1. It deals with preventive rather than curative aspects of health
2. It deals with population-level, rather than individual-level health issues

The focus of public health intervention is to improve health and quality of life through the prevention and treatment of disease and other physical and mental health conditions, through surveillance of cases and the promotion of healthy behaviours. Promotion of hand washing and breastfeeding, delivery of vaccinations, and

distribution of condoms to control the spread of sexually transmitted diseases are examples of common public health measures.

Modern public health practice requires multidisciplinary teams of professionals including physicians specialising in public health/community medicine/infectious disease, epidemiologists, biostatisticians, public health nurses, medical microbiologists, environmental health officers, dental hygienists, dieticians and nutritionists, health inspectors, veterinarians, public health engineers, public health lawyers, sociologists, community development workers, communications officers, and others

Objectives

The focus of a public health intervention is to prevent and manage diseases, injuries and other health conditions through surveillance of cases and the promotion of healthy behaviours, communities and environments. Many diseases are preventable through simple, non-medical methods. For example, research has shown that the simple act of hand washing with soap can prevent many contagious diseases. In other cases, treating a disease or controlling a pathogen can be vital to preventing its spread to others, such as during an outbreak of infectious disease, or contamination of food or water supplies. Public health communications programs, vaccination programs, and distribution of condoms are examples of common public health measures.

Public health plays an important role in disease prevention efforts in both the developing world and in developed countries, through local health systems and non-governmental organizations. The World Health Organisation (WHO) is the international agency that coordinates and acts on global public health issues. Most countries have their own government public health agencies, sometimes known as ministries of health, to respond to domestic health issues. For example in the United States, the front line of public health initiatives are state and local health departments. The United States Public Health Service (PHS), led by the Surgeon General of the United States, and the Centres for Disease Control and Prevention, headquartered in Atlanta, are involved with several international health activities, in addition to their national duties. In Canada, the Public Health Agency of Canada is the national agency responsible for public health, emergency preparedness and response, and infectious and chronic disease control and prevention. The Public health system in India is managed by the Ministry of Health & Family Welfare of the government of India with state owned health care facilities.

There is a vast discrepancy in access to health care and public health initiatives between developed nations and developing nations. In the developing world, public health infrastructures are still forming. There may not be enough trained health workers or monetary resources to provide even a basic level of medical care and disease prevention. As a result, a large majority of disease and mortality in the developing world results from and contributes to extreme poverty. For example, many African governments spend less than US\$10 per person per year on health care, while, in the United States, the federal government spent approximately US\$4,500 per capita in 2000.

Origin

In some ways, public health is a modern concept of human development in science, although it has roots in antiquity. From the beginnings of human civilisation, it was recognized that polluted water and lack of proper waste disposal spread communicable diseases (theory of miasma). Early religions attempted to regulate behaviour that specifically related to health, from types of food eaten, to regulating certain indulgent behaviors, such as drinking alcohol or sexual relations. The establishment of governments placed responsibility on leaders to develop public health policies and programs in order to gain some understanding of the causes of disease and thus ensure social stability prosperity, and maintain order.

The term "healthy city" used by today's public health advocates reflects this ongoing challenge to collective physical well-being that results from crowded conditions and urbanisation.

Early public health interventions

By Roman times, it was well understood that proper diversion of human waste was a necessary tenet of public health in urban areas. The Chinese developed the practice of variolation following a smallpox epidemic around 1000 BC. An individual without the disease could gain some measure of immunity against it by inhaling the dried crusts that formed around lesions of infected individuals. Also, children were protected by inoculating a scratch on their forearms with the pus from a lesion. This practice was not documented in the West until the early-18th century, and was used on a very limited basis. The practice of vaccination did not become prevalent until the 1820s, following the work of Edward Jenner to treat smallpox.

During the 14th century Black Death in Europe, it was believed that removing bodies of the dead would further prevent the spread of the bacterial infection. This did little to stem the plague, however, which was most likely spread by rodent-borne fleas. Burning parts of cities resulted in much greater benefit, since it destroyed the rodent infestations^[citation needed]. The development of quarantine in the medieval period helped mitigate the effects of other infectious diseases. However, according to Michel Foucault, the plague model of govern mentality was later controverted by the cholera model. A Cholera pandemic devastated Europe between 1829 and 1851, and was first fought by the use of what Foucault called "social medicine", which focused on flux, circulation of air, location of cemeteries, etc. All those concerns, born of the miasma theory of disease, were mixed with urbanistic concerns for the management of populations, which Foucault designated as the concept of "bio power". The German conceptualized this in the *Polizeiwissenschaft* ("Police science").

The science of epidemiology was founded by John Snow's identification of a polluted public water well as the source of an 1854 cholera outbreak in London. Dr. Snow believed in the germ theory of disease as opposed to the prevailing miasma theory. Although miasma theory correctly teaches that disease is a result of poor sanitation, it was based upon the prevailing theory of spontaneous generation. Germ theory developed slowly: despite Anton van Leeuwenhoek's observations of Microorganisms, (which are now known to cause many of the most common infectious diseases) in the

year 1680, the modern era of public health did not begin until the 1880s, with Louis Pasteur's germ theory and production of artificial vaccines.

Other public health interventions include latrinisation, the building of sewers, the regular collection of garbage followed by incineration or disposal in a landfill, providing clean water and draining standing water to prevent the breeding of mosquitoes. This contribution was made by Edwin Chadwick in 1843 who published a report on the sanitation of the working class population in Great Britain at the time. So began the inception of the modern public health. The industrial revolution had initially caused the spread of disease through large conurbations around workhouses and factories. These settlements were cramped and primitive and there was no organised sanitation. Disease was inevitable and its incubation in these areas was encouraged by the poor lifestyle of the inhabitants.

Modern public health

With the onset of the epidemiological transition and as the prevalence of infectious diseases decreased through the 20th century, public health began to put more focus on chronic diseases such as cancer and heart disease. Previous efforts in many developed countries had already led to dramatic reductions in the infant mortality rate using preventative methods. For instance in the United States, public health worker Dr. Sara Josephine Baker established many programs to help the poor in New York City keep their infants healthy, leading teams of nurses into the crowded neighbourhoods of Hell's Kitchen and teaching mothers how to dress, feed, and bathe their babies.

During the 20th century and early in the next, the dramatic increase in average life span is widely credited to public health achievements, such as vaccination programs and control of many infectious diseases including polio, diphtheria, yellow fever and smallpox; effective health and safety policies such as road traffic safety and occupational safety; improved family planning; tobacco control measures; and programs designed to decrease non-communicable diseases by acting on known risk factors such as a person's background, lifestyle and environment. One of the major sources of the increase in average life span in the early 20th century was the decline in the "urban penalty" brought on by improvements in sanitation. These improvements included chlorination of drinking water, filtration and sewage treatment which led to the decline in deaths caused by infectious waterborne diseases such as cholera and intestinal diseases. In Cutler and Miller's, "The Role of Public Health Improvements in Health Advances", they display evidence of the decline in typhoid fever deaths in Chicago, Baltimore, Cincinnati, and Cleveland after these American cities adopted chlorination, filtration, or a sewage improvement

Meanwhile, large parts of the developing world remained plagued by largely preventable/treatable infectious diseases and poor maternal and child health outcomes, exacerbated by malnutrition and poverty. The WHO reports that a lack of exclusive breastfeeding during the first six months of life contributes to over a million avoidable child deaths each year. Intermittent aimed at treating and preventing malaria episodes among pregnant women and young children is one public health measure in endemic countries.

Front-page headlines continue to present society with public health issues on a daily basis: emerging infectious diseases such as SARS, rapidly making its way from China (see Public health in China) to Canada, the United States and other geographically distant countries; reducing inequities in health care access through publicly funded health insurance programs; the HIV/AIDS pandemic and its spread from certain high-risk groups to the general population in many countries, such as in South Africa; the increase of childhood obesity and the concomitant increase in type II diabetes among children; the social, economic and health impacts of adolescent pregnancy; and the ongoing public health challenges related to natural disasters such as the 2004 Indian Ocean tsunami, 2005's Hurricane Katrina in the United States and the 2010 Haiti earthquake.

Since the 1980s, the growing field of population health has broadened the focus of public health from individual behaviours and risk factors to population-level issues such as inequality, poverty, and education. Modern public health is often concerned with addressing determinants of health across a population. There is a recognition that our health is affected by many factors including where we live, genetics, our income, our educational status and our social relationships - these are known as "social determinants of health." A social gradient in health runs through society, with those that are poorest generally suffering the worst health. However even those in the *middle classes* will generally have worse health outcomes than those of a higher social stratum. The *new* public health seeks to address these health inequalities by advocating for population-based policies that improve health in an equitable manner.

Public Health 2.0

Public Health 2.0 is the term given to a movement within public health that aims to make the field more accessible to the general public and more user-driven. There are three senses in which the term "Public Health 2.0" is used. In the first sense, "Public Health 2.0" is similar to the term "Health 2.0" and is used to describe the ways in which traditional public health practitioners and institutions are reaching out (or could reach out) to the public through social media. In the second sense, "Public Health 2.0" is used to describe public health research that uses data gathered from social networking sites, search engine queries, cell phones, or other technologies. In the third sense, "Public Health 2.0" is used to describe public health activities that are completely user-driven. An example this type of Public Health 2.0 is the collection and sharing of information about environmental radiation levels following the March 2011 tsunami in Japan. In all cases, Public Health 2.0 draws on ideas from Web 2.0, such as crowd sourcing, information sharing, and user-centred design.¹

Education and training

Education and training of public health professionals is available throughout the world in Medical Schools, Veterinary Schools, Schools of Nursing, Schools of Public Health, and Schools of Public Affairs. The training typically requires a university degree with a focus on core disciplines of biostatistics, epidemiology, health services

administration, health policy, health education, behavioral science and environmental health.

Schools of public health

In the United States, the Welch-Rose Report of 1915 has been viewed as the basis for the critical movement in the history of the institutional schism between public health and medicine because it led to the establishment of schools of public health supported by the Rockefeller Foundation. The report was authored by William Welch, founding dean of the Johns Hopkins Bloomberg School of Public Health, and Wycliffe Rose of the Rockefeller Foundation. The report focused more on research than practical education. Some have blamed the Rockefeller Foundation's 1916 decision to support the establishment of schools of public health for creating the schism between public health and medicine and legitimizing the rift between medicine's laboratory investigation of the mechanisms of disease and public health's nonclinical concern with environmental and social influences on health and wellness.

Even though schools of public health had already been established in Canada, Europe and North Africa, the US had still maintained the traditional system of housing faculties of public health within their medical institutions. A \$25,000 donation from businessman Samuel Zemurray, instituted the country's first School of Hygiene and Tropical Medicine in 1912, laying the groundwork for today's School of Public Health and Tropical Medicine at Tulane University. A year following the Welch-Rose report, and four years following Samuel Zemurray's donation to Tulane, the Johns Hopkins School of Hygiene and Public Health was founded in 1916. By 1922, schools of public health were established in Columbia, Harvard and Yale universities. By 1999 there were twenty nine schools of public health in the US, enrolling around fifteen thousand students.

Over the years, the types of students and training provided have also changed. In the beginning, students who enrolled in public health schools typically had already obtained a medical degree; public health school training was largely a second degree for medical professionals. However, in 1978, 69% of American students enrolled in public health schools had only a bachelor's degree

Degrees in public health

Schools of public health offer a variety of degrees which generally fall into two categories: professional or academic. The two major postgraduate professional degrees are the Master of Public Health (MPH) or the Master of Science in Public Health (MSPH). Doctoral studies in this field include Doctor of Public Health (DrPH) and Doctor of Philosophy (PhD) in a subspeciality of greater Public Health disciplines. DrPH is regarded as a professional leadership degree and PhD is more an academic degree.

Professional degrees are oriented towards practice in public health settings. The Master of Public Health, Doctor of Public Health, Doctor of Health Science (DHSc) and the Master of Health Care Administration are examples of degrees which are geared towards people who want careers as practitioners of public health in health

departments, managed care and community-based organisations, hospitals and consulting firms among others. Master of Public Health degrees broadly fall into two categories, those that put more emphasis on an understanding of epidemiology and statistics as the scientific basis of public health practice and those that include a more eclectic range of methodologies. A Master of Science of Public Health is similar to an MPH but is considered an academic degree (as opposed to a professional degree) and places more emphasis on quantitative methods and research. The same distinction can be made between the DrPH and the DHSc. The DrPH is considered a professional degree and the DHSc is an academic degree.

Academic degrees are more oriented towards those with interests in the scientific basis of public health and preventive medicine who wish to pursue careers in research, university teaching in graduate programs, policy analysis and development, and other high-level public health positions. Examples of academic degrees are the Master of Science, Doctor of Philosophy, Doctor of Science (ScD), and Doctor of Health Science (DHSc). The doctoral programs are distinct from the MPH and other professional programs by the addition of advanced coursework and the nature and scope of a dissertation research project.

In the United States, the Association of Schools of Public Health represents Council on Education for Public Health (CEPH) accredited schools of public health Delta Omega is the honorary society for graduate studies in public health. The society was founded in 1924 at the Johns Hopkins School of Hygiene and Public Health. Currently, there are approximately 68 chapters throughout the United States and Puerto Rico.

Qualification in Uganda

Like most countries Uganda does recognise Public health making it a relevant course in it's school system. Though many institutions do teach public health but it's studied from Diploma, Bachelors degree to Doctoral level.

A diploma is two years and a bachelor's degree is three year Graduates will gain:

- The ability to evaluate and analyse the challenges confronting public health and the provision of health services today.
- The knowledge to engage in policy debates about global and international health, and respond to the challenge of the widening health disparities that exist within communities and between countries.
- An understanding of the role public health practitioners play as advocates for change in public health, and of the strengths and weaknesses of differing approaches to health care systems.
- The ability to evaluate the quality and performance of health care systems and understand the various multi-agency approaches, along with their advantages and disadvantages.

Public health programs

Today, most governments recognise the importance of public health programs in reducing the incidence disease, disability, and the effects of aging and other physical and mental health conditions, although public health generally receives significantly less government funding compared with medicine. In recent years, public health programs providing vaccinations have made incredible strides in promoting health, including the eradication of smallpox, a disease that plagued humanity for thousands of years.

The World Health Organisation (WHO) identifies core functions of public health programs including:

- providing leadership on matters critical to health and engaging in partnerships where joint action is needed;
- shaping a research agenda and stimulating the generation, translation and dissemination of valuable knowledge;
- setting norms and standards and promoting and monitoring their implementation;
- articulating ethical and evidence-based policy options;
- monitoring the health situation and assessing health trends.

In particular, public health surveillance programs can:

- serve as an early warning system for impending public health emergencies;
- document the impact of an intervention, or track progress towards specified goals; and
- monitor and clarify the epidemiology of health problems, allow priorities to be set, and inform health policy and strategies.
- diagnose, investigate, and monitor health problems and health hazards of the community

Public health surveillance has led to the identification and prioritization of many public health issues facing the world today, including HIV/AIDS, diabetes, waterborne diseases, zoonotic diseases, and antibiotic resistance leading to the reemergence of infectious diseases such as tuberculosis. Antibiotic resistance, also known as drug resistance, was the theme of World Health Day 2011.

For example, the WHO reports that at least 220 million people worldwide suffer from diabetes. Its incidence is increasing rapidly, and it is projected that the number of diabetes deaths will double by the year 2030. In a June 2010 editorial in the medical journal *The Lancet*, the authors opined that "The fact that type 2 diabetes, a largely preventable disorder, has reached epidemic proportion is a public health humiliation." The risk of type 2 diabetes is closely linked with the growing problem of obesity. The WHO's latest estimates highlighted that globally approximately 1.5 billion adults were overweight in 2008, and nearly 43 million children under the age of five were overweight in 2010. The United States is the leading country with 30.6% of its population being obese. Mexico follows behind with 24.2% and the United Kingdom with 23%. Once considered a problem in high-income countries, it is now on the rise in low-income countries, especially in urban settings. Many public health programs are increasingly dedicating attention and resources to the issue of obesity, with

objectives to address the underlying causes including healthy diet and physical exercise.

Some programs and policies associated with public health promotion and prevention can be controversial. One such example is programs focusing on the prevention of HIV transmission through safe sex campaigns and needle-exchange programmes. Another is the control of tobacco smoking. Changing smoking behaviour requires long term strategies, unlike the fight against communicable diseases which usually takes a shorter period for effects to be observed. Many nations have implemented major initiatives to cut smoking, such as increased taxation and bans on smoking in some or all public places. Proponents argue by presenting evidence that smoking is one of the major killers, and that therefore governments have a duty to reduce the death rate, both through limiting passive (second-hand) smoking and by providing fewer opportunities for people to smoke. Opponents say that this undermines individual freedom and personal responsibility, and worry that the state may be emboldened to remove more and more choice in the name of better population health overall.

Simultaneously, while communicable diseases have historically ranged uppermost as a global health priority, non-communicable diseases and the underlying behaviour-related risk factors have been at the bottom. This is changing however, as illustrated by the United Nations hosting its first General Assembly Special Summit on the issue of non-communicable diseases in September 2011.

Applications in healthcare

As well as seeking to improve population health through the implementation of specific population-level interventions, public health contributes to medical care by identifying and assessing population needs for health care services, including:

- Assessing current services and evaluating whether they are meeting the objectives of the health care system
- Ascertaining requirements as expressed by health professionals, the public and other stakeholders
- Identifying the most appropriate interventions
- Considering the effect on resources for proposed interventions and assessing their cost-effectiveness
- Supporting decision making in health care and planning health services including any necessary changes
- Informing, educating, and empowering people about health issues

Behavioural medicine is an interdisciplinary field of medicine concerned with the development and integration of knowledge in the biological, behavioural, psychological, and social sciences relevant to health and illness. The term is often used interchangeably, and incorrectly, with health psychology, whereas the practice of behavioural medicine also includes applied psycho physiological therapies such as biofeedback, hypnosis, and bio behavioural therapy of physical disorders, aspects of occupational therapy, rehabilitation medicine, and psychiatry, as well as preventive medicine. One of its academic forebears is the field of psychosomatic

medicine. Practitioners of behavioural medicine include appropriately qualified nurses, psychologists, and physicians.

- More recently, it has expanded its area of practice to interventions with providers of medical services, in recognition of the fact that the behaviour of providers can have a determinative effect on patients' outcomes. For example, there exists a large interest in communication behaviours between clinician and patient within the field. Other areas include correcting perceptual bias in diagnostic behaviour; remediating clinicians' attitudes that impinge negatively upon patient-treatment; and addressing clinicians' behaviours that promote disease-development and illness-maintenance in patients, whether within a malpractice framework or not.

ISSUES OF PUBLIC HEALTH

Breast feeding Entity

In Uganda, campaigns to promote breastfeeding have been conducted in the mass media, including public service announcements via radio, television, posters, newspapers and magazines, leading to improved knowledge of the benefits of breastfeeding for infants and mothers among individuals and communities. This has made this a compulsory factor in the health care system of Uganda thus a mother is bound to breast feed unless there is a proper defined cause for not breast feeding

Global Mental Health

The World Health Organisation (WHO) defines mental health as a 'state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community'.

The term **Global Mental Health** refers to the international perspective on different aspects of mental health. It has been defined as 'the area of study, research and practice that places a priority on improving mental health and achieving equity in mental health for all people worldwide' Taking into account cultural differences and country-specific conditions, it deals with the epidemiology of mental disorders in different countries, their treatment options, mental health education, political and financial aspects, the structure of mental health care systems, human resources in mental health, and human rights issues among others.

The overall aim of the field of Global Mental Health is to strengthen mental health all over the world by providing information about the mental health situation in all countries, and identifying mental health care needs in order to develop cost-effective interventions to meet those specific

Global health

Global health is the health of populations in a global context and transcends the perspectives and concerns of individual nations. Health problems that transcend national borders or have a global political and economic impact are often emphasized. It has been defined as 'the area of study, research and practice that places a priority on improving health and achieving equity in health for all people worldwide' Thus, global health is about worldwide improvement of health, reduction of disparities, and protection against global threats that disregard national borders. The application of these principles to the domain of mental health is called Global Mental Health. The major international agency for health is the World Health Organization (WHO). Other important agencies with impact on global health activities include UNICEF, World Food Programme (WFP), United Nations University - International Institute for Global Health and the World Bank. A major initiative for improved global health is the United Nations Millennium Declaration and the globally endorsed Millennium Development Goals. .

Measurement

Analysis of global health hinges on how to measure health burden. Several measures exist: DALY, QALY and mortality measurements. The choice of measures can be controversial and includes practical and ethical considerations.

Life expectancy

Life expectancy is a statistical measure of the average life span (average length of survival) of a specified population. It most often refers to the expected age to be reached before death for a given human population (by nation, by current age, or by other demographic variables). Life expectancy may also refer to the expected time remaining to live, and that too can be calculated for any age or for any group.

Disability adjusted life years

The disability-adjusted life year (DALY) is a summary measure that combines the impact of illness, disability and mortality on population health. The DALY combines in one measure the time lived with disability and the time lost due to premature mortality. One DALY can be thought of as one lost year of 'healthy' life and the burden of disease as a measurement of the gap between current health status and an ideal situation where everyone lives into old age free of disease and disability. For example, DALYs for a disease are the sum of the years of life lost due to premature mortality (YLL) in the population and the years lost due to disability (YLD) for incident cases of the health condition. One DALY represents the loss of one year of equivalent full health.

Quality adjusted life years

Quality-adjusted life years, or QALYs, is a way of measuring disease burden, including both the quality and the quantity of life lived, as a means of quantifying in benefit of a medical intervention. The QALY model requires utility independent, risk neutral, and constant proportional tradeoffs behaviour. QALYs attempt to combine expected survival with expected quality of life into a single number: if an additional year of

healthy life expectancy is worth a value of one (year), then a year of less healthy life expectancy is worth less than one (year). QALY calculations are based on measurements of the value that individuals place on expected years of survival. Measurements can be made in several ways: by techniques that simulate gambles about preferences for alternative states of health, with surveys or analyses that infer willingness to pay for alternative states of health, or through instruments that are based on trading off some or all likely survival time that a medical intervention might provide in order to gain less survival time of higher quality. QALYs are useful for utilitarian analysis, but does not in itself incorporate equity considerations.

Infant and child mortality

Life expectancy and DALYs/QALYs represent the average disease burden well. However, infant mortality and under-five child mortality are more specific in representing the health in the poorest sections of a population. Therefore, changes in these classic measures are especially useful when focusing on health equity. These measures are also important for advocates of children's rights. Approximately 56 million people died in 2001. Of these, 10.6 million were children under 5 years of age, 99% of these children were living in low-and middle-income countries. That translates to roughly 30,000 children dying every day.

Morbidity

Morbidity measures include incidence rate, prevalence and cumulative incidence. Incidence rate is the risk of developing some new condition within a specified period of time. Although sometimes loosely expressed simply as the number of new cases during some time period, it is better expressed as a proportion or a rate with a denominator.

HEALTH CONDITIONS

The main diseases and health conditions prioritized by global health initiatives are sometimes grouped under the terms "diseases of poverty" versus "diseases of affluence", although the impacts of globalization are increasingly blurring any such distinction.

Respiratory diseases and measles

Infections of the respiratory tract and middle ear are major causes of infant and child mortality. In adults, tuberculosis is highly prevalent and causes significant morbidity and mortality. Mortality in tuberculosis has increased due to the spread of HIV. The spread of respiratory infections is increased in crowded conditions. Current vaccination programmes against pertussis prevent 600 000 deaths each year. Measles is caused by the morbillivirus and spread via the airways. It is highly contagious and characterized by flulike symptoms including fever, cough, and rhinitis and after a few days development of a generalized rash. It can effectively be prevented by vaccination. In spite of this, almost 200,000 people, mostly children under 5 years of age, died from

measles in 2007. Pneumococci and Haemophilus influenzae cause approximately 50 % of child deaths in pneumonia, and also cause bacterial meningitis and sepsis. Novel vaccines against pneumococci and Haemophilus influenzae are clearly cost-effective in low-income countries. Universal use of these two vaccines are estimated to prevent at least 1 000 000 child deaths annually. For maximal long-term effect, vaccination of children should be integrated with primary health care measures.

Diarrhoeal diseases

Diarrhoeal infections are responsible for 17 per cent of deaths among children under the age of five worldwide, making them the second most common cause of child deaths globally. Poor sanitation can lead to increased transmission through water, food, utensils, hands and flies. Rotavirus is highly contagious and a major cause of severe diarrhoea and death (ca 20%) in children. According to the WHO, hygienic measures alone are insufficient for the prevention of rotavirus diarrhoea. Rotavirus vaccines are highly protective, safe and potentially cost-effective. Dehydration due to diarrhoea can be effectively treated through oral rehydration therapy (ORT), with dramatic reductions in mortality. By mixing water, sugar and salt or baking soda and administering it to the affected child, dehydration can be effectively treated. Important nutritional measures are promotion of breastfeeding and zinc supplementation.

Maternal health

In many developing countries, complications of pregnancy and childbirth are the leading causes of death among women of reproductive age. A woman dies from complications from childbirth approximately every minute. According to the World Health Organisation, in its *World Health Report 2005*, poor maternal conditions account for the fourth leading cause of death for women worldwide, after HIV/AIDS, malaria, and tuberculosis. Most maternal deaths and injuries are caused by biological processes, not from disease, which can be prevented and have been largely eradicated in the developed world - such as postpartum haemorrhaging, which causes 34% of maternal deaths in the developing world but only 13% of maternal deaths in developed countries.

HIV/AIDS

Human immunodeficiency virus (HIV) is a retrovirus that first appeared in humans in the early 1980s. HIV progresses to a point where the infected person has AIDS or Acquired Immunodeficiency Syndrome. HIV becomes AIDS because the virus had depleted CD4+ T-cells that are necessary for a healthy immune system. Antiretroviral drugs prolong life and delay the onset of AIDS by minimizing the amount of HIV in the body.

HIV is transmitted through bodily fluids. Unprotected sex, intravenous drug use, blood transfusions, and unclean needles spread HIV through blood and other fluids. Once thought to be a disease that only affected drug users and homosexuals, it can affect anyone. Globally, the primary method of spreading HIV is through heterosexual intercourse. It can also be passed from a pregnant woman to her unborn child during pregnancy, or after pregnancy through breast milk. While it is a global disease that

can affect anyone, there are disproportionately high infection rates in certain regions of the world.

In June 2001, the United Nations held a Special General Assembly to intensify international action to fight the HIV/AIDS epidemic and to mobilize the resources needed towards this aim, labelling the situation a "global crisis".

Malaria

Malaria is an infectious disease caused by protozoan Plasmodium parasites. The infection is transmitted via mosquito bites. Early symptoms may include fever, headaches, chills and nausea. Each year approximately 500 million cases of malaria occur worldwide, most commonly among children and pregnant women in underdeveloped countries. Malaria can hinder economic development of a country. Economic effects of malaria include decreased work productivity, treatment cost, and time spent for getting treatment.

Deaths in malaria can be sharply and cost-effectively reduced by use of insecticide-treated bed nets, prompt Artemisia-based combination therapy, and supported by intermittent preventive therapy in pregnancy. However, only 23% of children and 27% of pregnant women in Africa were estimated to sleep under insecticide-treated bed nets.

Nutrition and micronutrient deficiency

Greater than two billion people in the world are at risk of micronutrient deficiencies (including lack of vitamin A, iron, iodine and zinc). Among children under the age of five in the developing world, malnutrition contributes to 53% of deaths associated with infectious diseases. Malnutrition impairs the immune system, thereby increasing the frequency, severity, and duration of childhood illnesses (including measles, pneumonia and diarrhoea). Micronutrient deficiencies also compromise intellectual potential, growth, development and adult productivity.

However, infection is also an important cause and contributor to malnutrition. For example, gastrointestinal infections causes diarrhoea, and HIV, tuberculosis, intestinal parasites and chronic infection increase wasting and anaemia

Fifty million children under the age of five are affected by vitamin A deficiency. Such deficiency has been linked with night blindness. Severe vitamin A deficiency is associated with xerophthalmia and ulceration of the cornea, a condition that can lead to total blindness. Vitamin A is also involved in the function of the immune system and in maintaining epithelial surfaces. For this reason, vitamin A deficiency leads to increased susceptibility to infection and disease. In fact, vitamin A supplementation was shown to reduce child mortality rates by 23% in areas with significant levels of vitamin A deficiency.

Iron deficiency affects approximately one-third of the world's women and children. Iron deficiency contributes to anaemia along with other nutritional deficiencies and infections and is associated with maternal mortality, prenatal mortality and mental retardation globally. In anaemic children, iron supplementation combined with other micronutrients improves health and haemoglobin levels. In children, iron deficiency compromises learning capacity, and emotional and cognitive development.

Iodine deficiency is the leading cause of preventable mental retardation. As many as 50 million infants born annually are at risk of iodine deficiency. Pregnant women who are iodine deficient should be included in the target population for this particular intervention because pregnant women with iodine deficiency increases the chance of miscarriages and also lowers the development potential of the infant. Global efforts for universal salt iodization are helping eliminate this problem.

According to Lasserini and Fischer et al., zinc deficiency may increase the risk of mortality from diarrhoea; pneumonia and malaria. Almost 30% of the world's children are estimated to be zinc deficient. Supplements have been shown to reduce the duration of diarrhoea episodes.

Interventions to prevent malnutrition include micronutrient supplementation, fortification of basic grocery foods, dietary diversification, hygienic measures to reduce spread of infections, and promotion of breastfeeding. Dietary diversification aims to increase the consumption of vital micronutrients in the regular diet. This is done by education and promotion of a diverse diet, and by improving access to micronutrient-rich and locally produced food.

Surgical disease burden

While infectious diseases such as HIV exact a great health toll in low-income countries, surgical conditions including trauma from road traffic crashes or other injuries, malignancies, soft tissue infections, congenital anomalies, and complications of childbirth also contribute significantly to the burden of disease and impede economic development. It is estimated that surgical diseases comprise 11% of the global burden of disease, and of this 38% are injuries, 19% malignancies, 9% congenital anomalies, 6% complications of pregnancy, 5% cataracts, and 4% prenatal conditions. The majority of surgical DALYs are estimated to be in South-East Asia (48 million), though Africa has the highest per capita surgical DALY rate in the world.

As discussed above, injuries are the largest contributor to the global surgical disease burden with road traffic accidents (RTAs) contributing the largest share. According to the WHO, more than 3500 RTA related deaths occur daily with millions injured or disabled for life. Road traffic accidents are projected to rise from the ninth leading cause of death and DALYs lost globally in 2004, to the top five in 2030. This would place injuries ahead of infectious diseases by 2030.

Chronic disease

The relative importance of chronic non-communicable disease is increasing. For example, the rates of type 2 diabetes, associated with obesity, have been on the rise in

countries traditionally noted for hunger levels. In low-income countries, the number of individuals with diabetes is expected to increase from 84 million to 228 million by 2030. Obesity is preventable and is associated with numerous chronic diseases including cardiovascular conditions, diabetes, stroke, cancers and respiratory diseases. About 16% of the global burden of disease, measured as DALYs, has been accounted for by obesity.

In September 2011, the United Nations is hosting its first General Assembly Special Summit on the issue of non-communicable diseases. Noting that non-communicable diseases are the cause of some 35 million deaths each year, the international community is being increasingly called to take important measures for the prevention and control of chronic diseases,.

DISEASES OF AFFLUENCE

Diseases of affluence is a term sometimes given to selected diseases and other health conditions which are commonly thought to be a result of increasing wealth in a society. Also referred to as the "Western disease" paradigm, these diseases are in contrast to so-called "diseases of poverty", which largely result from and contribute to human impoverishment.

Examples of diseases of affluence include mostly chronic non-communicable diseases (NCDs) and other physical health conditions for which personal lifestyles and societal conditions associated with economic development are believed to be an important risk factor - such as type 2 diabetes, coronary heart disease, cerebrovascular disease, peripheral vascular disease, obesity, hypertension, cancer, alcoholism, gout and some types of allergies. They may also be considered to include depression and other mental health conditions associated with increased social isolation and lower levels of psychological well being observed in many developed countries. Many of these conditions are interrelated, for example obesity is thought to be a partial cause of many other illnesses.

In contrast, the diseases of poverty tend to be largely infectious diseases, often related to poor hygiene, low vaccination coverage, inadequate public health safety or weak enforcement of environmental health regulations.

Despite the term, the so-called "diseases of affluence" are predicted to become more prevalent in developing countries, as diseases of poverty decline, longevity increases and lifestyles change. In 2008, nearly 80% of deaths due to NCDs - including heart disease, strokes, chronic lung diseases, cancers and diabetes - occurred in low- and middle-income countries.

Tuskegee Study of Untreated Syphilis in the Black Male

In 1932, the Public Health Service, working with the Tuskegee Institute, began a study to record the natural history of syphilis in hopes of justifying treatment programs for blacks. It was called the "Tuskegee Study of Untreated Syphilis in the Negro Male".

The study initially involved 600 black men – 399 with syphilis, 201 who did not have the disease. The study was conducted without the benefit of patients' informed consent. Researchers told the men they were being treated for "bad blood," a local term used to describe several ailments, including syphilis, anaemia, and fatigue. In truth, they did not receive the proper treatment needed to cure their illness. In exchange for taking part in the study, the men received free medical exams, free meals, and burial insurance. Although originally projected to last 6 months, the study actually went on for 40 years. It has been called "arguably the most infamous biomedical research study in U.S. history."

Note that a USPHS physician who took part in the Tuskegee program, John Charles Cutler, was in charge of the US government's syphilis experiments in Guatemala, in which Guatemalan prisoners, soldiers, orphaned children, and others were deliberately infected with syphilis and other sexually-transmitted diseases from 1946-1948 in order to study the disease, in a project funded by a grant from the National Institutes of Health. President Obama apologised to Guatemala for this program in 2010.

Emergency response since 1999

Commissioned Corps emergency response teams are managed by the Office of the Surgeon General. They are trained and equipped to respond to public health crises and national emergencies, such as natural disasters, disease outbreaks, or terrorist attacks. The teams are multidisciplinary and are capable of responding to domestic and international humanitarian missions. Officers have responded to many such emergencies in the past, including:

- Cholera out breaks in Uganda
- Ebola out break in Uganda
- Polio outbreak
- Fire out break in Kenya
- Internally displaced peoples camps in Northern Uganda
- Mud slide in Uganda
- HIV scourge in Africa
- Malaria management

All the above are interventions which desperately required public health

HEALTH INTERVENTIONS

Many low-cost, evidence-based health care interventions for improved health and survival are known. Priority global targets for improving maternal health include increasing coverage of deliveries with a skilled birth attendant. Interventions for improved child health and survival include: promotion of breastfeeding, zinc supplementation, vitamin A fortification and supplementation, salt iodization, hand washing and hygiene interventions, vaccination, treatment of severe acute malnutrition. In malaria endemic regions, use of insecticide treated bed nets and intermittent pharmacological treatment reduce mortality. Based on such studies, the

Global Health Council suggests a list of 32 treatment and intervention measures that could potentially save several million lives each year.

Progress in coverage of health interventions, especially relating to child and maternal health (Millennium Development Goals 4 and 5), is tracked in 68 low-income countries by a WHO- and UNICEF-led collaboration called *Countdown to 2015*. These countries are estimated to account for 97% of maternal and child deaths worldwide.

To be most effective, interventions need to be appropriate in the local context, be timely and equitable, and achieve maximum coverage of the target population. Interventions with only partial coverage may not be cost-effective. For example, immunization programs with partial coverage often fail to reach the ones at greatest risk of disease. Furthermore, coverage estimates may be misleading if not distribution is taken into account. Thus, mean national coverage may appear fairly adequate, but may nevertheless be insufficient when analyzed in detail. This has been termed 'the fallacy of coverage'.

While investments by countries, development agencies and private foundations has increased substantially in recent years with aim for improving health intervention coverage and equitable distribution, including for measuring progress towards the achievement of the Millennium Development Goals, attention is also being increasingly directed to addressing and monitoring the health systems and health workforce barriers to greater progress. For example, in its *World Health Report 2006*, the WHO estimated a shortage of almost 4.3 million doctors, midwives, nurses and support workers worldwide, especially in sub-Saharan Africa, in order to meet target coverage levels to achieve the Millennium Development Goals 4 and 5.

Preventive medicine

Preventive medicine or **preventive care** refers to measures taken to prevent diseases, (or injuries) rather than curing them or treating their symptoms. The term contrasts in method with curative and palliative medicine, and in scope with public health methods (which work at the level of population health rather than individual health).

Levels

Preventive medicine strategies are typically described as taking place at the primary, secondary, tertiary and quaternary prevention levels. In addition, the term primal prevention has been used to describe all measures taken to ensure fetal well-being and prevent any long-term health consequences from gestational history and/or disease. The rationale for such efforts is the evidence demonstrating the link between fetal well-being, or "primal health," and adult health. Primal prevention strategies typically focus on providing future parents with: education regarding the consequences of epigenetic influences on their child, sufficient leave time for both parents, and financial support if required. This includes parenting in infancy as well.

Simple examples of preventive medicine include hand washing, breastfeeding, and immunisations. Preventive care may include examinations and screening tests tailored to an individual's age, health, and family history. For example, a person with a family history of certain cancers or other diseases would begin screening at an earlier age and/or more frequently than those with no such family history. On the other side of preventive medicine, some non-profit organizations, such as the Northern California Cancer Centre, apply epidemiologic research towards finding ways to prevent diseases.

Prevention levels			Doctor's side			
			Disease			
			absent		present	
Patient's side	Illness	absent	Primary prevention illness absent disease absent	Secondary prevention illness absent disease present		
		present	Quaternary prevention illness present disease absent	Tertiary prevention illness present disease present		

Definitions

Level	Definition
Primary prevention	Methods to avoid occurrence of disease. Most population-based health promotion efforts are of this type.
Secondary prevention	Methods to diagnose and treat extant disease in early stages before it cause significant morbidity.
Tertiary prevention	Methods to reduce negative impact of extant disease by restoring function and reducing disease-related complications.
Quaternary prevention	Methods to mitigate or avoid results of unnecessary or excessive interventions in the health system.

Universal, selective, and indicated

Gordon (1987) in the area of disease prevention, and later Kumpfer and Baxley in the area of substance use proposed a three-tiered preventive intervention classification system: universal, selective, and indicated prevention. Amongst others, this typology

has gained favour and is used by the U.S. Institute of Medicine, the NIDA and the European Monitoring Centre for Drugs and Drug Addiction.

Tier	Definition
Universal prevention	Involves whole population (nation, local community, school, district) and aims to prevent or delay the abuse of alcohol, tobacco, and other drugs. All individuals, without screening, are provided with information and skills needed to prevent the problem.
Selective prevention	Involves groups whose risk of developing problems of alcohol abuse or dependence is above average. Subgroups may be distinguished by traits such as age, gender, family history, or economic status. For example, drug campaigns in recreational settings.
Indicated prevention	Involves a screening process, and aims to identify individuals who exhibit early signs of substance abuse and other problem behaviours. Identifiers may include falling grades among students, known problem consumption or conduct disorders, alienation from parents, school, and positive peer groups etc.

Outside the scope of this three-tier model is *environmental prevention*. Environmental prevention approaches are typically managed at the regulatory or community level and focus on ways to deter drug consumption. Prohibition and bans (e.g. on smoking, alcohol advertising) may be viewed as the ultimate environmental restriction. However, in practice, environmental preventions programs embrace various initiatives at the *macro* and *micro* level, from government monopolies for alcohol sales through roadside sobriety or drug tests, worker/pupil/student drug testing, increased policing in sensitive settings (near schools, at rock festivals), and legislative guidelines aimed at precipitating punishments (warnings, penalties, fines).

Professionals

Professionals involved in the public health aspect of this practice may be involved in entomology, pest control, and public health inspections. Public health inspections can include recreational waters, swimming pools, beaches, food preparation and serving, and industrial hygiene inspections and surveys.

In the United States, preventive medicine is a medical specialty, one of the 24 recognized by the American Board of Medical Specialties (ABMS). It encompasses three areas of specialization:

- General preventive medicine and public health
- Aerospace medicine

- Occupational medicine

To become board-certified in one of the preventive medicine areas of specialization, a licensed U.S. physician (M.D. or D.O.) must successfully complete a preventive medicine medical residency program following a one-year internship. Following that, the physician must complete a year of practice in that special area and pass the preventive medicine board examination. The residency program is at least two years in length and includes completion of a master's degree in public health (MPH) or equivalent. The board exam takes a full day: the morning session concentrates on general preventive medicine questions, while the afternoon session concentrates on the one of the three areas of specialization that the applicant has studied.

In addition, there are two subspecialty areas of certification:

- Medical toxicology (MT)
- Undersea and hyperbaric medicine (UHB), formerly "undersea medicine"

These certifications require sitting for an examination following successful completion of an MT or UHB fellowship and prior board certification in one of the 24 ABMS-recognized specialties.

Prophylaxis

Prophylaxis (Greek: προφύλασσω *to guard or prevent beforehand*) is any medical or public health procedure whose purpose is to prevent, rather than treat or cure a disease. In general terms, prophylactic measures are divided between *primary* prophylaxis (to prevent the development of a disease) and *secondary* prophylaxis (whereby the disease has already developed and the patient is protected against worsening of this process).

Examples

Some specific examples of prophylaxis include:

- Many vaccines are prophylactic, vaccines such as polio vaccine, smallpox vaccine, measles vaccine, mumps vaccine and others have greatly reduced many childhood diseases; HPV vaccines prevent certain cancers; influenza vaccine.
- Birth control methods are used to prevent unwanted pregnancy. Condoms, for instance, are sometimes euphemistically referred to as "prophylactics" because of their use to prevent pregnancy as well as the transmission of sexually transmitted infections.
- Daily and moderate physical exercise in various forms can be called prophylactic because it can maintain or improve one's health. Cycling for transport appears to very significantly improve health by reducing risk of heart diseases, various cancers, muscular- and skeletal diseases, and overall mortality.
- Eating plenty of fruits and vegetables each day may be prophylactic. It may reduce the risk of heart disease.

- Fluoride therapy and tooth cleaning, either at home or by a professional, are parts of dental prophylaxis or oral prophylaxis.
- Antibiotics are sometimes used prophylactically: For example, during the 2001 anthrax attacks scare in the United States, patients believed to be exposed were given ciprofloxacin. In similar manner, the use of antibiotic ointments on burns and other wounds is prophylactic. Antibiotics are also given prophylactically just before some medical procedures such as pacemaker insertion.
- Tricyclic antidepressants (TCAs) may, *with caution*, be an example of a chronic migraine preventive (see amitriptyline and migraines' prevention by medicine).
- Antimalarials such as chloroquine and mefloquine are used both in treatment and as prophylaxis by visitors to countries where malaria is endemic to prevent the development of the parasitic *Plasmodium*, which cause malaria.
- Mechanical measures (such as graduated compression stockings or intermittent pneumatic compression) and drugs (such as low-molecular-weight heparin, unfractionated heparin, and fondaparinux) may be used in immobilized hospital patients at risk of venous thromboembolism.
- Risk reducing or prophylactic mastectomies may be carried out for carriers of the BRCA mutation gene to minimise the risk of developing breast cancer.
- Early and exclusive breastfeeding provides immunological protection against infectious diseases and well as reduced risk of chronic diseases for both mother and child.
- Polypill for prevention of e.g. cardiovascular disease.
- Potassium iodide is used prophylactically to protect the thyroid gland from absorbing inhaled or ingested radioactive iodine, which may lead to the development of thyroid cancer; radioactive iodine may be released into the environment in the event of an accident at a nuclear power plant, or the detonation of a nuclear explosive (see thyroid protection due to nuclear accidents and emergencies).
- Prophylaxis may be administered as oral medication. Oral prophylaxis includes: PEP, nPEP, or PrEP. PEP stands for post-exposure prophylaxis used in an occupational setting e.g., to prevent the spread of HIV or Hepatitis C from patient to staff following an accidental needlestick. nPEP is non-occupational post-exposure prophylaxis. nPEP may be used in a sexual or injection exposure to HIV, hepatitis, or other infectious agents; for example, during intercourse, if the condom breaks and one partner is HIV-positive, nPEP will help to decrease the probability that the HIV-negative partner becomes infected with HIV. (An nPEP is sometimes known as a PEPse - i.e. post-exposure prophylaxis sexual encounter.) PrEP is a measure taken daily (before, during, and after) possible exposure; for example, by a person who inconsistently uses condoms during sex with a partner who may have an HIV infection.

Limitations

Since preventive medicine deals with healthy individuals or populations the costs and potential harms from interventions need even more careful examination than in treatment. For an intervention to be applied widely it generally needs to be affordable and highly cost effective.

For instance, intrauterine devices (IUD) are highly effective and highly cost effective contraceptives, however where universal health care is not available the initial cost may be a barrier. IUDs work for several years (3 to 7 or more) and cost less over a year or two's time than most other reversible contraceptive methods. They are also highly cost effective, saving health insurers and the public significant costs in unwanted pregnancies. Making contraceptives available with no up front cost is one way to increase usage, improving health and saving money.

Preventive solutions may be less profitable and therefore less attractive to makers and marketers of pharmaceuticals and medical devices. Birth control pills which are taken every day and may take in a thousand dollars over ten years may generate more profits than an IUD, which despite a huge initial mark-up only generates a few hundred dollars over the same period.

List of preventable causes of death

The World Health Organisation has traditionally classified death according to the primary type of disease or injury. However, causes of death may also be classified in terms of preventable risk factors such as smoking, unhealthy diet, and sexual behaviour which contribute to a number of different diseases. Such risk factors are usually not recorded directly on death certificates.

Leading cause of preventable death

Leading causes of preventable death worldwide as of the year 2001

Cause	Deaths caused (millions per year)
Hypertension	7.8
Smoking	5.0
High cholesterol	3.9
Malnutrition	3.8
Sexually transmitted infections	3.0
Poor diet	2.8
Overweight and obesity	2.5
Physical inactivity	2.0
Alcohol	1.9
Indoor air pollution from solid fuels	1.8
Unsafe water and poor sanitation	1.6

Leading preventive interventions that reduce deaths in children 0–5 years old worldwide

Intervention	Percent of all child deaths preventable
Breastfeeding	13
Insecticide-treated materials	7
Complementary feeding	6
Zinc	4
Clean delivery	4
Hib vaccine	4
Water, sanitation, hygiene	3
Antenatal steroids	3
Newborn temperature management	2
Vitamin A	2
Tetanus toxoid	2
Nevirapine and replacement feeding	2
Antibiotics for premature rupture of membranes	1
Measles vaccine	1
Antimalarial intermittent preventive treatment in pregnancy	<1%

Public health programs

Today, most governments recognize the importance of public health programs in reducing the incidence of disease, disability, and the effects of aging, although public health generally receives significantly less government funding compared with medicine. In recent years, public health programs providing vaccinations have made incredible strides in promoting health, including the eradication of smallpox, a disease that plagued humanity for thousands of years.

An important public health issue facing the world currently is HIV/AIDS. Antibiotic resistance is another major concern, leading to the reemergence of diseases such as Tuberculosis.

Another major public health concern is diabetes. In 2006, according to the World Health Organization, at least 171 million people worldwide suffered from diabetes. Its incidence is increasing rapidly, and it is estimated that by the year 2030, this number will double.

A controversial aspect of public health is the control of smoking. Many nations have implemented major initiatives to cut smoking, such as increased taxation and bans on smoking in some or all public places. Proponents argue by presenting evidence that smoking is one of the major killers in all developed countries, and that therefore governments have a duty to reduce the death rate, both through limiting passive (second-hand) smoking and by providing fewer opportunities for smokers to smoke. Opponents say that this undermines individual freedom and personal responsibility (often using the phrase nanny state in the UK), and worry that the state may be emboldened to remove more and more choice in the name of better population health overall. However, proponents counter that inflicting disease on other people via passive smoking is not a human right, and in fact smokers are still free to smoke in their own homes.

There is also a link between public health and veterinary public health which deals with zoonotic diseases, diseases that can be transmitted from animals to humans.

Community health

Community health, a field within public health, is a discipline that concerns itself with the study and betterment of the health characteristics of biological communities. While the term community can be broadly defined, community health tends to focus on geographic areas rather than people with shared characteristics. The health characteristics of a community are often examined using geographic information system (GIS) software and public health datasets. Some projects, such as InfoShare or GEOPROJ combine GIS with existing datasets, allowing the general public to examine the characteristics of any given community in the United States.

Because health III (broadly defined as well-being) is influenced by a wide array of socio-demographic characteristics, relevant variables range from the proportion of residents of a given age group to the overall life expectancy of the neighborhood. Medical interventions aimed at improving the health of a community range from improving access to medical care to public health communications campaigns. Recent research efforts have focused on how the built environment and socio-economic status affect health.

In Africa, community health is studied in three broad categories:

- Primary health care which refers to interventions that focus on the individual or family such as hand-washing, immunisation, circumcision and use of condoms etc.
- Secondary health care refers to those activities which focus on the environment such as draining puddles of water near the house, clearing bushes and spraying insecticides to control vectors like mosquitoes.
- Tertiary health care on the other hand refers to those interventions that take place in a hospital setting such as intravenous rehydration or surgery.

Success of community health programmes rely on the transfer of information from health professionals to the general public using one-to-one or one to many communication (Mass communication). The latest shift is toward Health marketing with the centers for disease control (CDC) taking the lead.

Health promotion

Health promotion has been defined by the World Health Organization's 2005 Bangkok Charter for Health Promotion in a Globalized World as "the process of enabling people to increase control over their health and its determinants, and thereby improve their health". The primary means of health promotion occur through developing healthy public policy that addresses the prerequisites of health such as income, housing, food security, employment, and quality working conditions. There is a tendency among public health officials and governments -- and this is especially the case in liberal nations such as Canada and the USA -- to reduce health promotion to health education and social marketing focused on changing behavioral risk factors.

Worksite health promotion

Health promotion can be performed in various locations. Among the settings that have received special attention are the community, health care facilities, schools, and worksites. Worksite health promotion, also known by terms such as "workplace health promotion," has been defined as "the combined efforts of employers, employees and society to improve the health and well-being of people at work". WHO states that the workplace "has been established as one of the priority settings for health promotion into the 21st century" because it influences "physical, mental, economic and social well-being" and "offers an ideal setting and infrastructure to support the promotion of health of a large audience"^[19].

Worksite health promotion programs (also called "workplace health promotion programs," "worksite wellness programs," or "workplace wellness programs") include exercise, nutrition, smoking cessation and stress management. Reviews and meta-analyses published between 2005 and 2008 that examined the scientific literature on worksite health promotion programs include the following:

Health policy

Health care often accounts for one of the largest areas of spending for both governments and individuals all over the world, and as such it is surrounded by controversy. For example, it is now clear that medical debt is now a leading cause of bankruptcy in the United States. Though there are many topics involved in health care politics, most can be categorized as either philosophical or economic. Philosophical debates center around questions about individual rights and government authority while economic topics include how to maximize the quality of health care and minimize costs.

Philosophy

Right to Health Care

The United Nations' Universal Declaration of Human Rights (UDHR) asserts that medical care is a right of all people. Many religions also impose an obligation on their followers to care for those in less favourable circumstances, including the sick. Humanists too would assert the same obligation and the right has been enshrined in many other ways too.

An opposing school of thought rejects this notion. They (laissez-faire capitalists for example) assert that providing health care funded by taxes is immoral because it is a form of legalized robbery, denying the right to dispose of one's own income at one's own will. They assert that doctors should not be servants of their patients but rather they should be regarded as traders, like everyone else in a free society."

Government Regulation

A second question concerns the effect government involvement would have. One concern is that the right to privacy between doctors and patients could be eroded if governments demand power to oversee health of citizens.

Another concern is that governments use legislation to control personal freedoms. For example, some Canadian provinces have outlawed private medical insurance from competing with the national social insurance systems for basic health care to ensure fair allocation of national resources irrespective of personal wealth. Laissez-faire supporters argue that this blocks a fundamental freedom to use one's own purchasing power at will.

Controlling the Industry

When a government controls the health care industry, it defines what health care is available, and how it is paid for, privately or with taxes. Public regulation, investor owned HMOs and medical insurance companies (which are not under the democratic control of health care users) may all determine what health care a person might get.

Universal health care requires government involvement and oversight.

Impact on quality of health care

One question that is often brought up is whether publicly-funded health care provides better or worse quality health care than market driven medicine. There are many arguments on both sides of the issue.

Arguments which see publicly-funded health care as improving the quality of health care:

- For those people who would otherwise go without care, any quality care is an improvement.
- Since people perceive universal health care as *free*, they are more likely to seek preventative care which makes them better off in the long run.
- A study of hospitals in Canada found that death rates are lower in private not-for-profit hospitals than in private for-profit hospitals.

Arguments which see publicly-funded health care as worsening the quality of health care:

- It slows down innovation and inhibits new technologies from being developed and utilized. This simply means that medical technologies are less likely to be researched and manufactured, and technologies that are available are less likely to be used.
- Free health care can lead to overuse of medical services, and hence raise overall cost.
- Publicly-funded medicine leads to greater inefficiencies and inequalities.
- It is alleged that uninsured citizens can simply pay for their health care. Even indigent citizens can still receive emergency care from alternative sources such as non-profit organizations. Some providers may be required to provide some emergency services regardless of insured status or ability to pay, as with the Emergency Medical Treatment and Active Labor Act in the United States.

Impact on medical professionals

Proponents of universal health care contend that universal health care reduces the amount of paperwork that medical professionals have to deal with, allowing them to concentrate on treating patients.

Impact on Medical Research

Those in favor of universal health care posit that removing profit as a motive will increase the rate of medical innovation. Those opposed argue that it will do the opposite, for the same reason.

Health economics

Health economics is a branch of economics concerned with issues related to scarcity in the allocation of health and health care. For example, it is now clear that medical

debt is the principle cause of bankruptcy in the United States.^[1] In broad terms, health economists study the functioning of the health care system and the private and social causes of health-affecting behaviors such as smoking.

A seminal 1963 article by Kenneth Arrow, often credited with giving rise to the health economics as a discipline, drew conceptual distinctions between health and other goals.^[2] Factors that distinguish health economics from other areas include extensive government intervention, intractable uncertainty in several dimensions, asymmetric information, and externalities.^[3] Governments tend to regulate the health care industry heavily and also tend to be the largest payer within the market. Uncertainty is intrinsic to health, both in patient outcomes and financial concerns. The knowledge gap that exists between a physician and a patient creates a situation of distinct advantage for the physician, which is called asymmetric information. Externalities arise frequently when considering health and health care, notably in the context of infectious disease. For example, making an effort to avoid catching a cold, or practicing safer sex, affects people other than the decision maker.

Scope

The scope of health economics is neatly encapsulated by Alan Williams' "plumbing diagram" dividing the discipline into eight distinct topics:

- What influences health? (other than health care)
- What is health and what is its value
- The demand for health care
- The supply of health care
- Micro-economic evaluation at treatment level
- Market equilibrium
- Evaluation at whole system level; and,
- Planning, budgeting and monitoring mechanisms.

Health care demand

The demand for health care is a derived demand from the demand for health. Health care is demanded as a means for consumers to achieve a larger stock of "health capital." The demand for health is unlike most other goods because individuals allocate resources in order to both consume and produce health.

Michael Grossman's 1972 model of health production has been extremely influential in this field of study and has several unique elements that make it notable.^[5] Grossman's model views each individual as both a producer and a consumer of health. Health is treated as a stock which degrades over time in the absence of "investments" in health, so that health is viewed as a sort of capital. The model acknowledges that health care is both a consumption good that yields direct satisfaction and utility, and an investment good, which yields satisfaction to consumers indirectly through increased productivity, fewer sick days, and higher wages. Investment in health is costly as consumers must trade off time and resources devoted to health, such as exercising at a local gym, against other goals. These factors are used to determine the optimal level of health that an individual will demand. The model makes predictions

over the effects of changes in prices of health care and other goods, labour market outcomes such as employment and wages, and technological changes. These predictions and other predictions from models extending Grossman's 1972 paper form the basis of much of the econometric research conducted by health economists.

In Grossman's model, the optimal level of investment in health occurs where the marginal cost of health capital is equal to the marginal benefit. With the passing of time, health depreciates at some rate δ . The interest rate faced by the consumer is denoted by r . The marginal cost of health capital can be found by adding these variables: $MC_{HK} = r + \delta$. The marginal benefit of health capital is the rate of return from this capital in both market and non-market sectors. In this model, the optimal health stock can be impacted by factors like age, wages and education. As an example, δ increases with age, so it becomes more and more costly to attain the same level of health capital or health stock as one ages. Age also decreases the marginal benefit of health stock. The optimal health stock will therefore decrease as one ages.

Cost Determination

A large focus of health economics, particularly in the UK, is the microeconomic evaluation of individual treatments. In the UK, the National Institute for Health and Clinical Excellence (NICE) appraises certain new and existing pharmaceuticals and devices using economic evaluation.

Economic evaluation is the comparison of two or more alternative courses of action in terms of both their costs and consequences (Drummond et al.). Economists usually distinguish several types of economic evaluation, differing in how consequences are measured:

- Cost minimisation analysis
- Cost benefit analysis
- Cost-effectiveness analysis
- Cost-utility analysis

In cost minimisation analysis (CMA), the effectiveness of the comparators in question must be proven to be equivalent. The 'cost-effective' comparator is simply the one which costs less (as it achieves the same outcome). In cost-benefit analysis (CBA), costs and benefits are both valued in cash terms. Cost effectiveness analysis (CEA) measures outcomes in 'natural units', such as mmHg, symptom free days, life years gained. Finally cost-utility analysis (CUA) measures outcomes in a composite metric of both length and quality of life, the Quality-adjusted life year (QALY). (Note there is some international variation in the precise definitions of each type of analysis).

A final approach which is sometimes classed an economic evaluation is a cost of illness study. This is not a true economic evaluation as it does not compare the costs and outcomes of alternative courses of action. Instead, it attempts to measure all the costs associated with a particular disease or condition. These will include direct costs (where money actually changes hands, e.g. health service use, patient co-payments and out of pocket expenses), indirect costs (the value of lost productivity from time off work due to illness), and intangible costs (the 'disvalue' to an individual of pain and

suffering). (Note specific definitions in health economics may vary slightly from other branches of economics.)

Market equilibrium

Health care markets

The five health markets typically analyzed are:

- Health care financing market
- Physician and nurses services market
- Institutional services market
- Input factors market
- Professional education market

Although assumptions of textbook models of economic markets apply reasonably well to health care markets, there are important deviations. Insurance markets rely on risk pools, in which relatively healthy enrollees subsidise the care of the rest. Insurers must cope with adverse selection which occurs when they are unable to fully predict the medical expenses of enrollees; adverse selection can destroy the risk pool. Features of insurance markets, such as group purchases and preexisting condition exclusions are meant to cope with adverse selection.

Insured patients are naturally less concerned about health care costs than they would if they paid the full price of care. The resulting moral hazard drives up costs, as shown by the famous RAND Health Insurance Experiment. Insurers use several techniques to limit the costs of moral hazard, including imposing copayments on patients and limiting physician incentives to provide costly care. Insurers often compete by their choice of service offerings, cost sharing requirements, and limitations on physicians.

Consumers in health care markets often suffer from a lack of adequate information about what services they need to buy and which providers offer the best value proposition. Health economists have documented a problem with supplier induced demand, whereby providers base treatment recommendations on economic, rather than medical criteria. Researchers have also documented substantial "practice variations", whereby the treatment a patient receives depends as much on which doctor they visit as it does on their condition. Both private insurers and government payers use a variety of controls on service availability to rein in inducement and practice variations.

The U.S. health care market has relied extensively on competition to control costs and improve quality. Critics question whether problems with adverse selection, moral hazard, information asymmetries, demand inducement, and practice variations can be addressed by private markets. Competition has fostered reductions in prices, but consolidation by providers and, to a lesser extent, insurers, has tempered this effect.

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Further reading

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