

ANALYTICAL METHOD OF PUBLIC HEALTH

MODULE FIVE (6) ASSIGNMENT



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1. **THE DEFINITION BELOW ARE THE TERMS USED IN PUBLIC HEALTH FIELD OF PROFESSION AND THEY ARE AS FOLLOWS.**
2. **Epidemic**

Is the occurrence in a community or region of cases of an illness, specific health-related behavior, or other health-related event clearly in excess of normal expectancy. Both terms are used interchangeably; however, epidemic usually refers to a larger geographic distribution of illness or health-related events.

1. **Epidemiology**

The word epidemiology comes from the Greek words’ epi, meaning on or upon, demos, meaning people, and logos, meaning the study of. In other words, the word epidemiology has its roots in the study of what befalls a population. Many definitions have been proposed, but the following definition captures the underlying principles and public health spirit of epidemiology:

Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems.

Epidemiology is a scientific discipline with sound methods of scientific inquiry at its foundation. Epidemiology is data-driven and relies on a systematic and unbiased approach to the collection, analysis, and interpretation of data.

1. **Chronic disease**

Is a disease that is marked by long duration or frequent recurrence, usually incurable but not immediately fatal.

1. **Morbidity**

Morbidity is any physical or psychological state considered to be outside the realm of normal well-being. The term morbidity is often used to describe illness, impairment, or degradation of health, especially when discussing chronic and [age-related diseases](https://www.verywellhealth.com/age-related-diseases-2223996) which can worsen over time. The higher your morbidity, the shorter your [lifespan](https://www.verywellhealth.com/what-is-the-human-life-span-2223929) may be that if you were healthy.

Illness or lack of health caused by disease, disability, or injury.

1. **THE FIVE OBJECTIVES OF EPIDEMIOLOGY**

To investigate nature / extent of health-related phenomena in the community / identify priorities

To study natural history and prognosis of health-related problems

To identify causes and risk factors

To recommend / assist in application of / evaluate best interventions (preventive and therapeutic measures)

To provide foundation for public policy

1. **HE THREE TYPES OF EPIDEMIOLOGIC STUDIES**

**Descriptive Epidemiology**

Examining the distribution of a disease in a population, and observing the basic features of its distribution in terms of time, place, and person. We try to formulate hypothesis, look into associations?

Typical study design:

community health survey (synonyms: cross-sectional study, descriptive study)

**Analytic Epidemiology**

Testing a specific hypothesis about the relationship of a disease to a specific cause, by conducting an epidemiologic study that relates the exposure of interest to the outcome of interest (? Cause-effect relationship)

Typical study designs: cohort, case-control, experimental design

**Intervention Studies** Intervention studies are the exception to the rule that epidemiologists do not do experiments. These studies are conducted in very much the same way as those of laboratory experiments on animals. They are usually done to test a new treatment for a disease, such as a chemotherapy drug for cancer, or a preventive measure, such as a vaccine. In a clinical trial, one group is exposed to the intervention, while a *control group* is not

exposed. The investigators then watch and wait to see whether the response of the treatment group is different from that of the control group. Of course, only a limited number of interventions lend themselves to being tested in clinical trials for ethical reasons or because a trial is too difficult to conduct.

1. **THE PROBLEMS ASSOCIATED WITH EPIDEMIOLOGIC STUDIES INVOLVING HUMANS**

**Sources of Error**

News reports of new health studies can often be confusing. Sometimes there are conflicting reports on the health effects of various substances. Coffee is reported to cause heart disease; then it is reported that there is no such effect. Oat bran is reported to prevent cancer; then it is reported to make no difference. Fish is good for your heart; fish is full of toxic chemicals that may cause harm. All these contradictions tend to make people distrustful of the news and uncertain about how to protect their health. Since most of these news reports are based on epidemiologic studies, it is useful to understand possible sources of error in such studies and how to look for the truth in the reports.

**Proving Cause and Effect**

For the most part, epidemiologic studies, no matter how well designed to avoid error, cannot prove cause and effect. In fact, that is why epidemiologists usually speak of risk factors rather than causes. However, there are several factors that can be combined to make the cause-and-effect relationship almost certain.

First, as discussed previously, a study with a large number of subjects is more likely to yield a valid result than a small study. Second, the stronger the association measured between exposure and disease—the higher the relative risk or odds ratio— the more likely that there is a true cause-and-effect relationship. For example, the Reye’s syndrome case-control study found a 42.7 odds ratio from exposure to aspirin during a viral infection. The British case-control study linking birth control pills to breast cancer found only a 2.3 odds ratio, while the Nurses’ Health Study—a cohort study—found at most a 1.5 relative risk of breast cancer from oral contraceptives. The much stronger association found in the Reye’s syndrome study makes it highly probable that aspirin causes the syndrome in children, while the breast cancer results could possibly be due to some to error or alternative explanation.

**Ethics in Epidemiology**

Most epidemiologic studies are observational and have little potential for harm. There are exceptions, however, especially in the conduct of intervention studies. Nowadays, strict ethical limitations apply in any study involving humans. These rules were developed in reaction to abuses such as those by Dr. Joseph Mengele, who conducted medical experiments on concentration camp prisoners during World War II. Ethical abuses have not been limited to Nazi war criminals, however. At one time, medical researchers in the United States were not overly concerned with the rights of the experimental subjects, who were often poor patients or captive populations such as prisoners or inmates of mental institutions. That changed in 1972, when news of the Tuskegee syphilis study shocked the nation.

**Conflicts of Interest in Drug Trials**

Epidemiologic studies are complicated enough, with many opportunities to make honest errors in interpreting them (as described earlier in this chapter), but when millions of dollars are at stake, which is the case with clinical trials of new prescription drugs, it is increasingly obvious that conflicts of interest often affect reported results. Randomized controlled trials are required by the U.S. Food and Drug Administration (FDA) before any new drug can be approved for use in the United States. Pharmaceutical companies conduct these studies to establish the safety and efficacy of a drug and submit the results to the FDA in search of the agency’s approval. Often, the results of these studies are also submitted for publication to medical journals; such a publication in a reputable journal adds to the credibility of a drug’s effectiveness.

1. **THE FOLLOWING BELOW ARE THE THREE GUIDING PRINCIPLES OF ETHICAL RESEARCH INVOLVING HUMANS**

**Independent review**

To minimize potential conflicts of interest and make sure a study is ethically acceptable before it starts, an independent review panel should review the proposal and ask important questions, including: Are those conducting the trial sufficiently free of bias? Is the study doing all it can to protect research participants? Has the trial been ethically designed and is the risk–benefit ratio favorable? The panel also monitors a study while it is ongoing.

**Informed consent**

Potential participants should make their own decision about whether they want to participate or continue participating in research. This is done through a process of informed consent in which individuals (1) are accurately informed of the purpose, methods, risks, benefits, and alternatives to the research, (2) understand this information and how it relates to their own clinical situation or interests, and (3) make a voluntary decision about whether to participate.

**Respect for potential and enrolled participants**

Individuals should be treated with respect from the time they are approached for possible participation — even if they refuse enrollment in a study — throughout their participation and after their participation ends. This includes:

* respecting their privacy and keeping their private information confidential
* respecting their right to change their mind, to decide that the research does not match their interests, and to withdraw without a penalty informing them of new
* information that might emerge in the course of research, which might change their assessment of the risks and benefits of participating
* monitoring their welfare and, if they experience adverse reactions, unexpected effects, or changes in clinical status, ensuring appropriate treatment and, when necessary, removal from the study
* informing them about what was learned from the research
* into the inner cervix with age.

1. **THE MEANING WHEN AN EPIDEMIOLOGIST SAYS THERE IS “INTERDEPENDENCE’ BETWEEN FACTORS**

It is the state of being dependent upon one another when finding the factors that influence or contributed to the spread of disease or causes of the diseases or infections when studying the factors

It means that there is a relationship between the factors that contributed to or influence the cause of the study of objects or factors

1. **FACTORS THAT CAN LEAD TO AN EPIDEMIC IN THE COMMUNITY**

**Population growth and urbanization**

Population growth is to a large extent an effect of decreased childhood mortality, and improved living conditions and health care. More than 50% of the world's population live in urban areas, and this proportion keeps increasing ([1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0001), [93](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0093)). The reasons for migration from rural to urban areas vary, but it is common to migrate in the hope of better jobs or lifestyle. On average, people living in African cities are healthier than in the countryside ([94](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0094)), but statistics are seldom based on subdivision and the health situation is often worse in poorer areas ([95](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0095)).

Cities create ecosystems with higher temperatures and less seasonal changes ([78](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0078), [96](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0096)). This elongates vector transmission seasons, increasing risk of vector-borne diseases. Population growth and urbanization causing increased densities of people have been associated with the evolution of Dengue virus, which prior to this development may have been of minor impact ([97](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0097)). However, vectors are not always equally distributed in an urban area, but can occur in higher densities in lower income areas ([98](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0098)).

**Hunting and bushmeat**

Hunting may have an impact on diseased risks through several mechanisms. Hunting increases the interface between humans and wildlife, may expose humans to wildlife vectors, and may have effects on biodiversity and cause decreases of disease reservoirs, as in the case of deer in North America, with subsequent decrease in Lyme disease ([101](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0101)); or may increase reservoirs, if the predators are removed ([102](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0102)).

The habits of bushmeat consumption are known risk factors for disease transmission. Bushmeat is an important source of food, and especially proteins, in areas such as the Congo basin. The handling and trade with bushmeat includes direct contact of multiple people in the value chain with the pathogens of the wild animals ([103](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0103)) and the products are brought to an increasing urban market ([104](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0104)) where outbreaks can be caused, such as the recent outbreaks of Ebola in Kampala, Uganda. Hunting is desired by people for the products and sporting activity, but inevitably increases the human–wildlife interface and changes the fauna and biodiversity in ecosystems.

**Globalization**

Although globalization brings along opportunities for knowledge transfer, cultural and scientific exchanges, and rapid aid responses, the increasing globalization has also been suggested to be a reason for increased transfer of pathogens into new areas. Historically, major transition periods when people travelled, and a mixing of populations were achieved, have been followed by large disease outbreaks and spread of pathogens ([73](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0073)). This has been especially marked when travel is accompanied by large-scale societal dislocation as is the case for wars, and colonialization. In addition to human travels, millions of animals are transported annually, both legally and illegally, and only a minor portion is subject to disease control ([74](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0074)). This may also affect wildlife, and trade with exotic and pet animals is most likely one of the causes behind the global spread of amphibian chytridiomycosis ([22](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0022)). Moreover, pathogens do not necessarily need to be transported within a host but can also be transported in, for example, ballast water, in the example of cholera ([75](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4663196/#CIT0075)).

In summary, globalization has both desired and undesired effects. On the one hand, it brings new pathogens and vectors to previously naïve populations or vice versa and facilitates rapid worldwide dissemination of diseases. On the other hand, it is essential for today's trade and economies and highly desired by the part of the world's population with economic means for travelling.

**Temporary Population Settlements**

Rehabilitation operations that follow a disaster are usually set up in crowded temporary camps or settlements. Provision of safe drinking water, sanitation and other basic services often lack at these places. This results in a rise in the incidence of infectious diseases like dysentery, measles, whooping cough, tuberculosis, scabies and other skin diseases.

**Pre-existent Diseases in the Population**

The diseases already occurring in the area are most likely to emerge as epidemics when the area is struck by a disaster. An epidemic of non-existent disease in that area is unlike to be seen after such disasters.

**Ecological Changes**

During natural disaster like floods and cyclones, ecological changes occur. It causes increase in the breeding sites for mosquitoes. This results in an increase in the cases of malaria. Open defecating and decay and decomposition of organic material increases insect breeding and thereby increases the transmission of disease like conjunctivitis, diarrhea, dysentery, enter virus infections, and parasitic diseases.

**Resistance Potential of the Host**

The nutritional and immunization status of the host population determines to a large extent its susceptibility to communicable disease. Children with poor nutrition are more likely to get infected with communicable disease and the incidence of measles, whooping cough, diphtheria and tuberculosis is likely to be higher if they are not immunized earlier.

**Damage to Public Utility and Interruption of Public Health Services**

Public utility services like water supply and sewage if damaged may cause large-scale contamination and subsequent introduction of diseases in the population. Interruption of ongoing health programmes in the area may also lead to resurgence of diseases.

**Weather and climate changes**

Changes in weather and the climate can drive some animals carrying viruses to different areas, where they could spread disease to people. A perfect example of this is the 1993 outbreak of Hantavirus in the Four Corners region of the U.S. An El Nino weather event in 1992 brought higher than average rainfall to the area. With more rainfall came more plants, and with more plant life came an increase in the local rodent population. As the weather returned to normal and that new habitat vanished, the enlarged rodent population suddenly needed to find additional sources of food and shelter, finding their ways into homes and spreading Hantavirus to nearby residents. Due in part to raising public awareness of the need to rodent-proof homes in the region, the outbreak ended.

**Changes to the viruses themselves**

Sometimes, a change in a virus itself allows it to become an epidemic. The flu virus is a great example of how mutations can allow viruses to spread widely among populations. The influenza virus changes on a regular basis as small mutational changes happen (called genetic drift). This is the basis for why we need to develop a new flu vaccine for general use each season. It is also the challenge that vaccine developers face in creating effective countermeasures to seasonal strains of flu. And, on occasion, the type of change seen in circulating strains of the virus come about from bigger shifts in the virus (called genetic shift) leading to some strains of flu that have the potential to cause pandemics

1. **THE DIFFERENT BETWEEN PREVALENCE AND INCIDENCE**

Incidence and prevalence are terms commonly used in describing disease epidemiology.

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|  | ***Prevalence*** | ***Incidence*** |
| ***Definition*** | is the total number of cases existing in a defined population at a specific time. | is the rate of new cases of a disease in a defined population over a defined period of time. |
| ***Measuring*** | Prevalence measures how much of some disease or condition there is in a population at a particular point in time. | Incidence measures the rate of occurrence of new cases of a disease or condition. |
| ***Calculation/Rate*** | prevalence is calculated by dividing the number of persons with the disease or condition at a particular time point by the number of individuals examined. specified time per 100 persons of exposure to the number of populations in the specified time | Incidence is calculated as the number of new cases of a disease or condition in a specified time period (usually a year) divided by the size of the population under consideration who are initially disease free. |
| ***Cases of diseases*** | Old cases of diseases | New cases of diseases |

***Incidence to Prevalence***

The relationship between incidence and prevalence depends greatly on the natural history of the disease state being reported. In the case of an influenza epidemic, the incidence may be high but not contribute to much growth of prevalence because of the high, spontaneous rate of disease resolution. In the case of a disease that has a low (or zero) cure rate, but where maintenance treatment permits sustained survival, then incidence contributes to continuous growth of prevalence. In such cases, the limitation on prevalence growth is the mortality which occurs in the population. Obviously, prevalence will continue to grow until mortality equals or exceeds the incidence rate.

An example of this relationship is shown below.  The disease incidence is 100 per year. Mortality rate is 20% per year. As seen, prevalence grows until the death rate equals the incidence.

1. **THE IMPORTANCE OF DATA IN PUBLIC HEALTH.**

**Using Data in Public Health Delivery**

Data is essential to reliable and valid public health research. However, data from studies will only be useful if used, analyzed, and applied in a timely manner. Data can be used to evaluate program impact, to determine appropriate public health interventions, to monitor progress, to determine populations to target for an intervention, to determine barriers to care, and to influence public policy.

**Data for Evaluating Program Impact**

Data is critical to evaluate the effect or impact of a program. For instance, a study conducted at Kilimanjaro Christian Medical Centre (KCMC) measured the rates of children attending follow-up appointments after paediatric cataract surgery before and after an intervention was implemented. The study found that before the intervention, in 2003-2004, 154 children had cataract surgery at KCMC. Of those children, 67% came for their 2-week postoperative follow-up appointment, while only 43% came for their 10-week follow-up appointment.  Since cataract surgery alone will have limited value if follow-up care is poor, the medical center implemented specific changes to improve follow-up. A high-quality counselling service was implemented, and a tracking system was developed which recorded each child’s next scheduled follow-up appointment and contact information. If a child did not appear for a scheduled follow-up appointment, then a parent or contact person was called. In 2006, 185 children had cataract surgeries, and post-intervention data showed that 89% of children came for their 2-week follow-up appointment, while 83% came for their 10-week follow-up. Upon comparing the %age of children in 2006 who attended their follow-up appointments to the %age of children who went in 2004, the data shows a 22% increase for the 2-week follow-up and a 40% increase for the 10-week follow. Therefore, the data from this study demonstrates how the intervention was successful in improving postoperative follow-up rates of paediatric cataract surgery.

Data can also be used to demonstrate that an intervention is not effective or does not have its intended result. For example, an 8-year study investigated whether a low-fat diet high in fruits and vegetables would reduce cardiovascular disease. Though researchers hypothesized that a low-fat diet would reduce the incidence of cardiovascular disease, their data showed otherwise. Of the 19,541 women assigned to eat a low-fat diet, 0.63% developed coronary heart disease, while 0.28% developed stroke. Of the 29,294 women assigned to a control group, 0.65% developed coronary heart disease, while 0.27% developed stroke. The data shows very little difference between the %age of women who developed coronary heart disease and stroke in the control group and low-fat diet group. Thus, the data from this study led the researchers to conclude that a dietary intervention that reduced total fat intake did not significantly reduce risk for cardiovascular disease and that other lifestyle and dietary interventions need to be studied.

**Data for Appropriate Public Health Interventions**

Cervical cancer rates vary worldwide, though it is estimated that 85% of the cases occur in low-income or middle-income countries.  Similarly, it is estimated that 85% of deaths from cervical cancer occur in developing countries. This variance is largely attributable to developing countries’ lack of infrastructure and financial resources to establish a cytology screening program. Therefore, a study was implemented to determine if visual inspection with acetic acid, which is a more cost effective and appropriate intervention for developing countries, would provide results comparable to more advanced technological screening methods.  The study determined the sensitivity, specificity, and positive predictive value of visual inspection with acetic acid and colposcopy in order to compare the effectiveness and accuracy of the interventions to detect cervical cancer. Probabilities such as sensitivity and specificity are important to consider when comparing tests and analysing data.  Sensitivity is the probability that a test gives a positive result when a disorder is present.  Specificity is the probability that a test gives a negative result when the person tested is healthy. The positive predictive value is the probability that a disorder is present when the test gives a positive result (the number of people correctly diagnosed as positive divided by the total number of true positives and false positives).”

**Data Monitors Progress**

Data is also needed and can be used to monitor progress towards a goal or target. For example, for the Millennium Development Goals, accurate and up-to-date data is essential in order to record progress and determine what countries are on track to meet the goals.  Data from a World Health Organization publication demonstrated the progress that has been made towards achieving Millennium Development Goal 4, which aims to reduce by two thirds the under 5 mortality rates between 1990 and 2015. The report found that child mortality continues to fall, and in 2008, the total annual number of deaths in children under 5 fell to 8.8 million.  This represents a 30% decrease from the 12.4 million estimated in 1990. Though this demonstrated decrease in mortality rate is encouraging, the data also illustrates the need for public health efforts to continue focusing on combating child mortality since a 30% decrease is far from the goal’s target of a 66.7% decrease.

**Using Data to Target Population-Based Interventions**

Data is also critical for determining which groups of people have the highest surgical need. Though most of the global burden of surgical disease falls among the world’s poorest, only a small %age of surgical interventions occurs in lower income countries. Research shows that of the 234.2 million major surgical procedures performed worldwide annually, the poorest third of the world’s population only received 3.5% of the surgical interventions.  In addition, countries that spend less than $100 per person on health care were found to have an estimated rate of major surgery of 295 procedures per 100,000 people per year.  In contrast, countries that spend more than $1,000 have a rate of 11,110 procedures per 100,000 people per year. This data documents the lack of surgery in poor countries, and reveals the need to make surgical interventions more accessible to the poor in developing countries. Though the data demonstrate the tremendous disparity that exists, the data also show the potential improvements that could be realized if such inequity was addressed.

Data can also be used to show where insecticide-treated malaria nets (itns) for children are most needed. Though great improvements in insecticide-treated malaria nets coverage have been documented, there are still specific countries and areas which have a large demonstrated need. In 2000, only 2.3 million (1.8%) African children living in stable malaria conditions were protected by an ITN. The number increased to 20.3 million (18.5%) in 2007, leaving 89.6 million children unprotected. Of these unprotected children, 54% were living in only seven African countries (Nigeria, Demographic Republic of Congo, Uganda, Sudan, Mozambique, Côte d’Ivoire, and Cameroon), and 25% were in Nigeria alone. This data suggest that attention should be targeted to increased use of itns in these areas of Africa. The data also reveals that 25.5% of children living in areas with no malaria risk were protected by ITN, while only 18.5% of those living in areas with stable malaria risk were protected by ITN.  The data indicates that coverage rates are lowest in areas with the highest risk of malaria transmission (where they are needed most) , and improved targeting might therefore be required to reduce this disparity.

**Data Determines Barriers to Care and Reveals Patient Perceptions**

In order to design interventions that will have the greatest impact, it is important to determine barriers to care and to assess patient perceptions.  The Indian organization 1298 used data to determine barriers to care.  Developed in Bombay, India, 1298 strives to provide high quality ambulance services, and the organization utilizes a sliding-scale method to determine fees. Those who elect to be transported to the public hospital for treatment do not have to pay at all. However, the organization realized that India’s poorest people were still not utilizing their services as much as other richer segments of the population. Therefore, in order to understand why 1298 was not reaching those living below the poverty line, researchers conducted 100 one-on-one interviews in Mumbai slums. They found that 49% of the people interviewed would not call 1298 because it cost too much, 19% did not know the number, and 14% said that it took too long for an ambulance to arrive. In addition, as of 2009, 60% of respondents said they would take a rickshaw to the hospital, while only 15% would take an ambulance. This data shows that in order for 1298 to increase their uptake rates among India’s poorest, they should focus on making it clear that their services are free for those who can’t afford them.  Additionally, the data revealed that the phone number needed to be advertised.

**Data and Public Policy**

As demonstrated by needle exchange programs, data can be used to influence public policy and to demonstrate the need or potential impact of a policy.   There are a variety of transmission modes for HIV.  In Russia, 83% of HIV infections come from needle sharing.  In Ukraine, 64% of HIV infections occur from needle sharing, while the %ages are 74% in Kazakhstan, and 72% in Malaysia. In the United States, needle sharing directly accounts for more than 25% of AIDS cases. In order to prevent needle sharing, there is a proven solution: needle exchange programs which provide injectors with clean needles in exchange for their used ones. Data from a 99-city study showed that HIV. Rates among injecting users in cities with needle exchange programs dropped 19% per year, while cities without needle exchange had an 8% increase per year.  Other studies show that HIV infection among drug addicts drops once clean-needle programs are implemented. A study by Don Des Jarlais, a researcher at Beth Israel Hospital in New York, found that HIV rates in New York City dropped more than 75% after city and community activists expanded clean-needle programs in the early 1990s. Despite this evidence, many politicians and policy makers refuse to support these programs.  However, data from these aforementioned studies can be used to influence current policy related to needle exchange and demonstrate the need and benefit of these programs.

**Conclusion**

It is important to use data in public health delivery, and data can be used in many ways and for a variety of critical purposes. Data is crucial to demonstrate and evaluate the impact of an intervention, monitor progress towards a goal, determine barriers to care, and influence public policy.

**References**

Moore M, Gould P, Keary BS. Global urbanization and impact on health. Int J Hyg Environ Health. 2003;206:269–78. [[PubMed](https://www.ncbi.nlm.nih.gov/pubmed/12971682)] [[Google Scholar](https://scholar.google.com/scholar_lookup?journal=Int+J+Hyg+Environ+Health&title=Global+urbanization+and+impact+on+health&author=M+Moore&author=P+Gould&author=BS+Keary&volume=206&publication_year=2003&pages=269-78&pmid=12971682&)]

Satterthwaite D, McGranahan G, Tacoli C. Urbanization and its implications for food and farming. Philos Trans R Soc B Biol Sci. 2010;365:2809–20. [[PMC free article](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2935117/)] [[PubMed](https://www.ncbi.nlm.nih.gov/pubmed/20713386)] [[Google Scholar](https://scholar.google.com/scholar_lookup?journal=Philos+Trans+R+Soc+B+Biol+Sci&title=Urbanization+and+its+implications+for+food+and+farming&author=D+Satterthwaite&author=G+McGranahan&author=C+Tacoli&volume=365&publication_year=2010&pages=2809-20&)]

G. Taubes, “Epidemiology Faces Its Limits,” *Science* 269 (1995): 164–169.

A. Aschengrau and G. R. Seage III, *Essentials of Epidemiology in Public Health* (Sudbury, MA: Jones and Bartlett, 2003), 286.

S. Hite, *Women and Love: A Cultural Revolution in Progress* (New York, NY: Alfred A. Knopf, 1987), described in V. Cohn and L. Cope, *News and Numbers: A Guide to Reporting Statistical Claims and Controversies in Health and Other Fields*, 2nd ed. (Ames, IA: Iowa State University Press, 2001), 154–156.

R. Seltser and P. E. Sartwell, “The Influence of Occupational Exposure to Radiation on the Mortality of American Radiologists and Other Medical Specialists,” *American Journal of Epidemiology* 81 (1965): 2–22.

R. A. Wilson, *Feminine Forever* (New York, NY: M. Evans and Company, 1966).

G. Kolata, “Hormone Studies: What Went Wrong?” *The New York Times*, April 22, 2003.

J. E. Manson and K. A. Martin, “Postmenopausal Hormone-Replacement Therapy,”*New England Journal of Medicine* 345 (2001): 34–40.

G. Kolata, “Citing Risks, U.S. Will Halt Study of Drugs for Hormones,” *The New York Times*, July 9, 2002.

G. Kolata, “Reversing Trend, Big Drop Is Seen in Breast Cancer,” *The New York Times*, December 15, 2006.

F. Grodstein et al., “Understanding the Divergent Data on Postmenopausal Hormone Therapy,” *New England Journal of Medicine* 348 (2003): 645–650.

M. Stampfer, “Commentary: Hormones and Heart Disease: Do Trials and Observational Studies Address Different Questions?” *International Journal of Epidemiology* 33 (2004): 454–455.

G. E. Pence, *Classic Cases in Medical Ethics: Accounts of the Cases That Shaped and Define Medical Ethics*, 5th ed. (Boston, MA: McGraw-Hill, 2008).

Kishiki, E., Shirima, S., Lewallen, S., et. al. “Improving postoperative follow-up of children receiving surgery for congenital or developmental cataracts in Africa.” AAPOS. 13.3 (2009). Accessed on 19 January 2011.

Kane, M. “Evaluation of the Project to Support PAV (Expanded Program on Immunization) in Northern Mozambique, 2001-2008: An Independent Review for VillageReach With Program and Policy Recommendations.” Accessed on 12 January 2011.

Howard, B., Van Horn, L., Hsia, J., “Low-Fat Dietary Pattern and Risk of Cardiovascular Disease.” JAMA. 295. 6 (2006). Accessed on 19 January 2011.

“National Cervical Cancer Coalition.” Accessed on 24 January 2011.

Lagrèze, W. “Vision Screening in Preschool Children. Do the Data Support Universal Screening?” Deutsches Arzteblatt International. 107. 28-29. (2010); 495-499. Accessed on 14 October 2010.

Belinson, J., Pretorius, R., Zhang, W., et . al. “Cervical Cancer Screening by Simple Visual Inspection After Acetic Acid.” Obstetrics & Gynecology. 98.3 (2001): 441-444. Accessed on 24 January 2011.

“Part 1 Health-related Millennium Development Goals.” Accessed on 20 January 2011.

Chandra, A. “Using Health and Family Data from the National Center for Health Statistics to Study Health Disparities.” National Center for Health Statistics. [PowerPoint]. Accessed on 19 January 2011.

Khalil, I. “Comment on ‘Addressing the Millennium Development Goals From a Surgical Perspective.’” Surgical Care Delivery and World Health. 145.2 (2010): 160. Accessed on 29 October 2010.

Weiser, T., et. al. “An Estimation of the Global Volume of Surgery: A Modelling Strategy Based on Available Data.” Lancet. 372. (2008): 139-44. Accessed on 1 November 2010.

Ozgediz, D. “Population Health Metrics for Surgery: Effective Coverage of Surgical Services in Low-Income and Middle-Income Countries.” World Journal of Surgery. 33.1 (2009): 1-5. Accessed on 2 November 2010.

Noor, A., Mutheu, J., Tatern, A., and et. al. “Insecticide-treated net coverage in Africa: mapping progress in 2000-07.” The Lancet. (2008). Accessed on 21 January 2011.

Johar, G., and Harries, J. “Dial 1298 for Ambulance Marketing EMS in Mumbai.” The Jerome Chazen Case Series. Accessed on 21 January 2011.

Rosenberg, T. “The Needle Nexus.” NY Times Magazine. (2009). Accessed on 24 January 2011.

Stewart, C. “Why Obama Isn’t Funding Needle-Exchange Programs.” Time. (2009). Accessed on 24 January 2011.