



## *Let's Get Something Straight*

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### Public Health or Pubic Health: Is There a Difference?

“The depredations of the global HIV pandemic have been a humbling experience for the scientific infectious disease community and the public health authorities. This can hardly be compared with the human suffering induced by this alien surprise, and what may still lie ahead. However, it may yet have some salutary effect if it alerts us to still further hazards that we face as a species in our competition with microbial competitors, who crowd us at the summit of the terrestrial food chain.” – Joshua B. Lederberg (May 23, 1925-February 2, 2008) (1)

“A slow sort of country!” said the Queen. “Now, *here*, you see, it takes all the running *you* can do, to keep in the same place.” Lewis Carroll (January 27, 1832-January 14, 1898) (2)

Public health is the practice of managing threats to the health

of the entire community (village, town, city, country, hemisphere, or world, perhaps other worlds). In other words, public health is community health. Public health involves evaluating (measuring, appraising) and monitoring community health and at-risk populations so that health problems can be identified. Public health also involves devising public policies intended to solve health problems, promoting health, health care, and disease prevention, and evaluating the success of those programs, particularly as they impact societies. Such specialties as seatbelt use, food safety, anti-smoking laws, caloric intake, vaccination programs, violence, suicide, psychiatric disorders, drug abuse, diet, and water fluoridation come under the auspices and responsibility of public health programs and public health workers.

Numerous definitions of “public health” have been offered but, in the end, all are about the same. Protection and promotion of the public’s health is, arguably, as important as anything any government can do and without which that government is illegitimate. Subspecialties include primary health services, environmental conditions, social and cultural, behavioral and occupational health, and the means applied to evaluate them, the economic factors – epidemiology [the branch of medicine dealing with the incidence and prevalence of disease in large populations and with detection of the source and cause of epidemics of infectious diseases] and biostatistics. Definitions are the dull part. The real action is in the streets and in the fields, in homes and in the workplace, in hospitals and in so-called hospitals, any-

where that people are at risk of becoming ill in mind or body, for example during wars.

When Dr John Snow clarified the source of a cholera epidemic in the Soho neighborhood of London in 1854, the field of epidemiology was established (3). Soho, a neighborhood in Westminster, had been a disgustingly unsanitary place, with cattle wandering about, slaughterhouses, skinning and tanning businesses, grease pits, and feces, all overlying a sewerage system that was essentially non-functional. Not simply non-functional but a hazard to human health. Still, as that was the usual condition of the day, it was accepted without much notice. The facilities were like a time bomb and that bomb went off four times between 1831 and 1854 in England, as evidenced by cholera epidemics. These were being attributed to “atmospheric miasmas,” as had yellow fever in the United States during that time and other diseases in other places. John Snow, an anesthesiologist, had published a paper hypothesizing that cholera was spread by contaminated water; his report was met with doubt by the medical profession and by governmental authorities. No surprise there. Therefore, the great inhibitor of progress, doing nothing, was used to solve the problem. In 1853 10675 people died of cholera. In 1854 a few cases were de-

tected in late August and then, at the end of the month, what Snow called “the most terrible outbreak of cholera which ever occurred in the kingdom” was observed in Soho.

During the next days many people living on or near what was then called Broad Street died. By September 10, 500 cases were recorded and the case-fatality rate was above 12%. Snow used this opportunity to study his hypothesis that the disease was spread by contaminated water, in particular sewer water. His meticulous epidemiologic studies of the locations of the homes of cholera victims in the neighborhood led him to suspect the public water pump on Broad Street as being the source of pollution. By microscopy, he identified particles in the water from the pump and convinced local authorities to take the pump out of use, which they (or he) did, by removing the pump handle. Unbeknownst to them at the time, the epidemic already was declining but inactivating the pump coincided with an even greater decline in the number of cases. Understanding of the natural history of cholera in Soho was not simple, but basically Snow's studies before, during, and after the epidemic provided information which had been lacking. In honor of this event and of Dr Snow, the John Snow Society has been established to promote his life and works. “Membership

is open to anyone who wishes to celebrate the memory of John Snow. International membership is encouraged, the only requirement being that you visit the John Snow pub – located on the site of the original pump [now called Broadwick Street] – on any trip to London!” (4). So, if you are in London, drop by the pub and raise a glass to John Snow. Just be sure to wash your hands in tribute.

If the epidemiology of cholera can be studied, so can the epidemiology of any infectious disease, and if infectious diseases can be studied epidemiologically, so can the epidemiology of any disease, so that by now tens of thousands of epidemiologic studies have been made of infectious and non-infectious diseases. First, there are the facts to accumulate, such as the number of deaths with this same cause that occur in a given year. From these totals, and knowing the sizes and characteristics of various populations, it is possible to determine attack rates, which are the cumulative incidences of infection in a particular number of people over a period of time. The crude death rate, the total number of deaths per 1000 individuals, can be calculated, as can the infant mortality rate, the perinatal mortality rate, the maternal mortality rate, age-specific mortality rate, sex-specific attack rates, and or any other rate one would want to determine.

Such statistics provide a picture of who is being affected, when they are being affected, how severely they are being affected, and other indicators of the classic “who, what, when, where, why, and how” of classical epidemiology and newspaper writing. Statisticians love epidemiology, although they might find it even more fascinating to get out in the sun and rain, eat some really bad food, and see for themselves how these data are accumulated. Given the thousands of recognized and potential causes of illness or death, there is work to be done, and more work is necessary for the study of some diseases than for the study of others.

Monty Python (“Life of Brian”) (5):

*Ex-Leper:* Okay, sir, my final offer: half a shekel for an old ex-leper?

*Brian:* Did you say “ex-leper”?

*Ex-Leper:* That’s right, sir, 16 years behind a veil and proud of it, sir.

*Brian:* Well, what happened.

*Ex-Leper:* Oh, cured, sir.

*Brian:* Cured?

*Ex-Leper:* Yes sir, bloody miracle, sir. Bless you!

*Brian:* Who cured you?

*Ex-Leper:* Jesus did, sir. I was hopping along, minding my own business, all of a sudden, up he comes, cures me! One minute I’m a leper with a trade, next minute my livelihood’s gone. Not so much as a by-your-leave! “You’re cured, mate.” Bloody do-gooder.

As that hilarious sextet suggested, some good deeds go unappreciated and well-based suggestions go unheeded. Those reading this column undoubtedly know enough about rabies to avoid it but many throughout the world do not have a clue as to what causes it or how to avoid it and some of those people become infected and die horribly. The same can be said for scores of diseases. Education is the only answer for such situations but education is the answer for many situations and yet is not generally appreciated and applied. We humans make the same mistakes over and over and eventually pay the price for it. For example, the least productive human activity is war, yet we continue to start wars and rarely seem to end them, they appear merely to stop, perhaps when the collective testosterone level decreases past some set-point. No one seems to lack weapons when they want to kill people, yet governments have difficulty finding enough money to provide adequate health services. Members of the human population acquire diseases that could be avoided, including sexually transmitted diseases, rabies, yellow fever, influenza, mumps, measles, cholera and other gastrointestinal disorders, hepatitises, conjunctivitis, and hundreds of others. Infections causing strep throat, “common colds,” and hantaviral and other infections are more difficult to

avoid and to prevent, but simple measures, such as hand-washing and common sense (“avoidance”), can go a long way toward preventing what are euphemistically called “years of potential life lost” (YPLL), a mathematical way to express the fact that people die prematurely. It might be better, in some instances, to express it as years of potential life lost due to stupidity or ignorance (YPLLDISI). Well, we can’t blame the victim in most cases. It is governments that have responsibility for education. Expecting that technologic advances will solve all our problems is simply a delusion at this time. Even if educated to a problem, it is only natural that people forget. They have enough problems to consider, such as finding clean water, food, and a source of heat. Carcinomas, genetic disorders, and newly emerged diseases are, for the most part, unavoidable. Kissing a chicken on the equivalent of chicken lips (these days, chickens are essentially self-duplicating artificial life forms, but their pathogens are not) or having sex with a rhinoceros likely is non-risk averse.

The modern plague caused by human immunodeficiency virus (HIV), Acquired Immune Deficiency Syndrome (AIDS), is an example of ignorance + ignoring + gambling with one’s life and with the lives of others. HIV/AIDS has become the fourth most common cause of human deaths, killing 2.8 mil-

lion people world-wide (4.9% of all deaths) and ranking only behind ischemic heart disease, cerebrovascular disease, and lower respiratory infections and ahead of tuberculosis, malaria, lung cancer, traffic accidents, and diabetes (6). At present, 0.11% of the global economy is spent on health care (0.14% of what is spent on oil and 50% of what is spent on "defense"). The problem is, there is no central source of information regarding global outlays of funds for prevention and health care. This is a remarkable and egregious deficiency! All countries spend money, whine about how costly it is to support and maintain good public health, and budget for unknown problems, but we do not know what those problems will be or how much money will be required so that unexpected natural events can be "planned for," albeit inaccurately, to be sure. The World Bank has data and the World Health Organization has data but these have not been merged, so we do not know what we are up against or how much we are spending. If my household budget was as well planned for, my wife and I might soon be living under a bridge.

In addition to HIV, the list of sexually transmitted diseases is long: bacterial vaginosis; chlamydial infections (the most commonly reported notifiable disease in the USA; in 2006 > 1 000 000 chlamydial in-

fections were reported); lymphogranuloma venereum; gonorrhea (358 366 cases reported in the US. in 2006); genital herpes (360 000 initial visits to physicians from 1966 to 2006); human papillomavirus infection (>100 papillomaviruses, of which at least 30% are known to cause disease. About 20 million Americans are currently infected with human papillomaviruses, and another 6.2 million become newly infected with them each year. These viruses can cause cervical cancer, but there is now a vaccine available to prevent such infections.); syphilis; trichomoniasis; viral hepatitis, pubic lice – and the list grows; sexual activity is practically an Olympic sport in some quarters. Reporting in the USA is excellent, if inevitably incomplete, and one can safely assume that sexually transmitted diseases occur world-wide at high rates, so that they are the most common and costly diseases in the world. As Mark Twain said, "The only way to keep your health is to eat what you don't want, drink what you don't like, and do what you'd rather not." If it is tasty or enjoyable, it probably is not good for you. Sex is one of the few things that are enjoyable and good for you, but it can come with a steep price.

It is not as though sexually transmitted diseases are the only infectious diseases we must worry about, of course. There is tuberculosis (and now extensive-

ly drug-resistant tuberculosis, a very difficult form of this infection), malaria, yellow fever, diarrhea, influenzas of various kinds, and a plethora of very important and less important diseases, for example those caused by ebolaviruses. It should be noted that a "less important disease" is one that doesn't kill you or anyone you know, ie, a disease that occurs far from where you are. That such diseases may be fatal or may cause untold suffering of other humans has been minimized by funding agencies, although that grievous situation is slowly being addressed (see "PLoS Neglected Tropical Diseases," a new journal, at <http://www.plosntds.org/home.action>). Arthritis, gout, schistosomiasis, streptococcal diseases, peptic ulcers and Buruli ulcer, dengue hemorrhagic fever, onchocerciasis, intrauterine dwarfism, dermatofibrosarcoma protuberans, plague, arboviral encephalitides, autism, Alzheimer disease, psychiatric illnesses (probably the greatest problem we have; widespread and not at all uncommon), and others, from A-alpha-lipoprotein neuropathy to zygomycosis (<http://www.mic.ki.se/Diseases/Alphalist.html>) threaten us, albeit most usually not at high rates. It looks rather hopeless, doesn't it? The suggestion by Joshua Lederberg, that there is no guarantee that humans will ultimately survive our competition with microorganisms, makes one want to look

much more critically at Charles Darwin's suggestion that humans are blessed in some way, and will survive, no matter what. American President Thomas Jefferson, in a letter to Constantin Francois Chasseboeuf Boisgiraux Volney, a noted French author and philosopher, suggested, "It is our cloudless sky which has eradicated from our constitutions all disposition to hang ourselves, which we might otherwise have inherited from our English ancestors." (7) Jefferson thought that Americans were and would be very fortunate not to have diseases found elsewhere. The airplane took care of most of that good fortune; an enlarged population, global climate change, misspent riches, and politics are taking care of the rest of it.

Public health? Pubic health? Certainly, we had best take care

of the most important (most common?) diseases first, but that is like extinguishing a large fire before extinguishing the smaller ones nearby. Lack of adequate (someone else must define "adequate") support for public health is a social problem, one requiring a social solution. Treating those who are easily accessed or who are wealthy or who are well-connected politically is not the answer. Providing second- (or third-) rate health care is not the answer. Ignoring problems is not the answer. These diseases, and those yet to evolve and emerge as we impinge on natural areas, continue to use un-renewable resources, and generally put into disorder that which was in a natural order, will not end soon, of course.

The good news is that our atrocious actions provide job se-

curity for public health workers. Most of all, this is important work. Extinguishing or mitigating the suffering of any human is or should be the highest of human goals.

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