

Public Health: What Really Protects Our Health

by Melvin Kohn, MD, MPH

What is public health?

It may be easier to start with what public health is not. Public health is not synonymous with providing healthcare for poor people or healthcare access for all. While these are laudable goals, they address the care of individuals, rather than the health of a population. Even if we could wave a magic wand and give everyone access to healthcare, we would still have a great deal of public health work to do.



Public health focuses on the idea that disease and injury result from the interaction of the physical and social environment with a

host (i.e., an individual) and a disease agent (such as a bacterium). Consequently, the public health system works to prevent adverse health outcomes by examining not just the individual and the disease agent, as the healthcare system does, but also the environment. This paradigm has a proven track record. Since 1900, advances in public health and medical care have increased the average human lifespan in the U.S. by about 30 years. Epidemiologists attribute 25 of those 30 years to advances in public health, not in healthcare.

A doctor who diagnoses tuberculosis treats the patient for that infection. The public health system, on the other hand, works to identify how that person contracted tuberculosis and to protect others who may be exposed. As part of that investigation we might screen workers or customers where the patient works, identify policies or practices that need changing, and perhaps invoke regulatory powers to do so. Public health staff also will work with healthcare providers and the

public to rapidly identify all potential contacts and ensure that they are tested and adequately treated. Treatment for tuberculosis is complex; inadequate treatment may cause the development and spread of deadly, drug-resistant strains of tuberculosis. Finally, public health investigators place that individual case of tuberculosis in a larger picture and examine trends in incidence and risk factors in the local community, in Oregon, in the United States, and in the world. Public health personnel track the incidence of tuberculosis, aggregate

Tobacco Use in Oregon

Tobacco use is the leading cause of preventable illness and death in the U.S. and Oregon. In 1996, Oregonians voted for a tobacco tax increase, dedicating 10% of the revenues for tobacco-use prevention. The CDC has hailed the statewide Tobacco Prevention and Education Program (TPEP) as a national model. The program uses a variety of strategies to attack tobacco on three fronts: preventing tobacco use by youth, helping smokers quit, and protecting people against secondhand smoke. The fact that TPEP uses multiple strategies, not just one, plays a key role in its success.

Since TPEP's inception in 1996, per capita consumption of tobacco in Oregon has declined 29%, about twice the national rate of decline. This drop amounts to 1.5 billion fewer cigarettes sold in Oregon in 2001 compared to 1996. The percentage of Oregon adults who currently smoke has decreased 12%. The percentage of 8th graders who reported smoking in the previous 30 days dropped 44%, and for 11th graders the decrease was 30%. Oregon's Smoke Free Workplace Law, enacted January 1, 2002, protects 95% of workers in indoor workplaces from secondhand smoke and will discourage more people from smoking. TPEP also believes that the recent passage of the cigarette tax increase referred to the voters by the legislature also will reduce consumption, especially among younger Oregonians, and prevent many kids from becoming smokers.

The Center for Tobacco Free Kids estimates the tobacco industry spends \$9.7 billion nationally and over \$100 million in Oregon every year marketing its products. Meanwhile, Oregon's TPEP, operates on a budget of \$8.5 million annually, to counter the marketing of a product that, when used as directed, kills.

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that information, and use it to develop sound policies for prevention. For instance, because an increasing percentage of tuberculosis cases in Oregon now occur in the foreign-born, special outreach to these populations is therefore

Public health workers use public health surveillance as the “radar screen” to track and anticipate health problems. Surveillance involves the ongoing collection, analysis, interpretation, and dissemination of information about

health events. These data help us know, for example, which foods pose the biggest risk to health, how and when people are most likely to be affected, and what health risks may result from disasters such as floods.

The traditional core of public health surveillance includes a list of diseases that states require laboratories and clinicians to report to the local public health authority. Oregon requires the reporting of botulism, syphilis, and tuberculosis, as well as 49 other diseases and

critical. All of these activities prevent the spread of tuberculosis, and fall outside the bailiwick of a single healthcare provider treating an individual patient.

Public Health Surveillance

Accurate assessment of the community's health is the basis for public health decision-making.

any outbreaks or occurrence of other diseases of public health importance. Surveillance personnel also collect risk factor information for disease and injury, including tobacco use, physical activity, seat belt use, and unprotected sexual activity, among others. Because clinicians are traditionally poor reporters, the public health

system currently relies heavily on laboratory reporting, surveys, and review of medical records. The key to making surveillance more accurate is minimizing the burden of accurate reporting and maximizing clinicians' and laboratories' commitment to reporting disease.

Understanding the distribution of diseases and risk factors allows us to monitor, for example, trends such as tobacco addiction and smoking among children, and whether or not we should declare victory or devote more resources to these problems. In another example, surveillance of drowning deaths among youth in Oregon in 1999 shows that 10 of the 17 youth who drowned that year did so in cold, swiftly flowing bodies of water. Without surveillance data it would be hard to know where we should begin to prevent drowning in Oregon, and difficult to muster the community action that is necessary to make changes.

In public health we specialize in analyzing health data in a way that leads to prevention activities. For example, in a recent analysis of death certificates, we found that the five leading recorded causes of death in Oregon in 1999 were heart disease, cancer, stroke, chronic lower respiratory disease, and unintentional injuries. While this analysis tells us the ailments doctors treated just before the patient died, it does not directly help us prevent these deaths. In a seminal paper in 1993, public health practitioners at the Centers for Disease Control, the lead federal public health agency, looked upstream to identify and quantify the “actual” causes of these deadly diseases. They found that tobacco use and obesity cause more preventable deaths than any other causes. (Please see sidebars on *Tobacco Use and Obesity*. -ed.)



Improved Relationships with Partners and E. coli O157

In August 2002 there was an E. coli O157 outbreak related to animal exposure at the Lane County Fair. During that outbreak we wanted to remind doctors that antibiotic treatment of these infections may be associated with the development of deadly complications. This is in contrast to many other causes of diarrhea, which can be safely treated with antibiotics. In an E. coli O157 outbreak situation, therefore, patients should be tested to ensure that their illness is not due to E. coli O157 before antibiotics are prescribed. In order to get this information out to doctors across the state we created communication channels with our public health partners in different communities. We broadcast information using a fax system made available by the Oregon Medical Association, as well as e-mail networks of emergency room directors, infectious disease specialists, and hospital infection control practitioners.

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Public Health

The Past and Future of Public Health

The public health model now increasingly relevant to the health of Oregon, the nation, and the world took a back seat to medical care in recent decades.

With the discovery of antibiotics, people thought that we were on the threshold of conquering infectious diseases. This overconfidence led to funding cutbacks and deterioration of many critical components of the public health infrastructure in the U.S. Then the AIDS epidemic burst on the scene, presenting a new disease challenge.

AIDS breaks down the immune system; this breakdown can lead to the reactivation of latent tuberculosis infections. Because of the erosion of our public health infrastructure, many health departments were unable to address the increase in tuberculo-

sis cases precipitated at the beginning of the AIDS epidemic. The downward trend in tuberculosis incidence in the US turned upward. This reversal also fostered the emergence of deadly, drug-resistant strains of tuberculosis. The public health system found itself not only fighting a new disease, AIDS, but also fighting a growing threat it had thought under control. Challenges like these posed by the AIDS epidemic have helped reinvigorate funding for public health. In the last 30 years the public health system has expanded its scope to include other disease threats besides communicable diseases and child health. The public health system now addresses chronic diseases—such as cancer, heart disease, and diabetes—that increase in importance as the US population ages; injuries, both intentional (e.g. suicide and intimate partner vio-

Enhancing working relationships among emergency response, law enforcement communities, and local clinicians will improve our response to the next crises due to either an E. coli O157 outbreak or a bioterrorist crises.

Patient Safety and Medical Errors

Medical errors threaten both our safety and our pocketbooks. The November 1999 report of the Institute of Medicine (IOM), stated that as many as 44,000 to 98,000 people die in hospitals each year as the result of medical errors, and that these errors cost \$17-29 billion in lost income, disability and healthcare costs. In addition to the health burden, suffering, and the costs of treatment, medical errors drive up medical care costs by increasing malpractice litigation and insurance costs.

In the past public concern focused primarily on negligence by clinicians as the cause for medical errors. While even the most competent and hardworking clinicians can make errors, research has shown that patient safety can nevertheless be protected if the medical industry puts systemic safeguards in place. For example, the installation of computer systems for prescribing medication can prevent pharmacy errors because of illegible handwriting. Moreover, those computer systems could include alarms that will signal an

illogical value, such as an incorrect dose of medication, or potential problems with other medications prescribed for the patient. The aviation industry, where complex human decisions are also integral, has implemented systems and tools that support optimal outcomes. The key to devising solutions is an accurate assessment of the problem. However, because clinicians and patients link patient safety with concerns about professional liability, collecting data on errors and “near misses” is difficult. Public health’s ability to track and analyze health threats with an eye to prevention could help address patient safety issues.

Several bills related to adverse event reporting and professional liability reforms are currently pending in the United States legislature, and some may be introduced in the upcoming legislative session in Oregon. These bills, if passed, have important implications for our ability to address patient safety concerns.

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The Obesity Epidemic

Obesity is on the rise in Oregon. In the past ten years obesity among Oregon adults has doubled from 11% to 22%. Oregon—and Alaska—have the dubious distinction of being the first states west of the Rockies to have a prevalence of obesity greater than 20%. Oregon's children are particularly in trouble: 28% of 8th grade students and 21% of 11th grade students are currently overweight.

According to the Centers for Disease Control (CDC), an estimated 300,000 deaths occur each year in the U.S. due to obesity, second only to the 400,000 deaths associated with tobacco use. In 2000, the CDC estimated the total cost of obesity as \$117 billion: \$61 billion direct medical care costs and \$56 billion indirect costs due to lost productivity and premature death. Type 2 diabetes, coronary heart disease, and hypertension account for most of the cost. Roland Sturm, the author of a Rand Corporation study on the subject, concludes that if you are obese, you add \$395 to your annual healthcare costs (of \$1500) and age 20 years.

There are at least two major contributors to the increase in obesity: changes in food intake and decreases in physical activity. We spend about one-half of our food budgets and consume about one-third of our calories outside the home, in places where healthy food choices may be limited. Super-size portions of food abound—from giant muffins and cookies to “You can get the larger size soft drink, popcorn, fries...for just a few cents more!” Vending machines in offices and schools generally contain only candy, cookies, chips, and soft drinks.

We're also much more sedentary than in the past. We use labor-saving devices of all kinds, sit at computers for hours, watch lots of TV, and rarely walk anywhere. The Surgeon General, American Heart Association, and CDC all recommend at least 30 minutes of moderate physical activity, five or more days a week. Only 28% of Oregon adults meet that recommendation. Twenty-one percent of Oregon adults report no leisure-time physical activity at all.

While the individual is certainly responsible, the widespread nature of this epidemic suggests that outside forces shape individual choices about what and how much to eat, and about how much to engage in physical activity. The food choices available to us at schools, work, the supermarket, and restaurants counter our attempts to change our eating habits. How much we choose to eat is affected by the aggressive marketing of larger portion sizes. The designs of our neighborhoods limit safe, attractive, and accessible places to be physically active. Therefore, public policy changes and advocacy can play a major role in addressing the obesity epidemic. (Please see sidebar, *Obesity, Paradigm, and Facts -ed.*)

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lence) and unintentional (e.g. car crashes and drowning); and environmental health threats such as pesticide or lead poisoning. A new area for public health is patient safety (*See sidebar on Patient Safety and Medical Errors. -ed.*)

While the AIDS epidemic was a challenge that shaped and helped fund public health in the 1980s, last fall's anthrax attacks vividly demonstrated that a strong public health infrastructure is a matter of national security. The renewed aware-

ness of the role of public health system and help prepare us for future public health threats.

The anthrax attacks also illustrate the need for partnerships between public health and the healthcare system, hazardous material teams, and law enforcement, among others. Alone, the public health system cannot distribute all the antibiotics and vaccines needed for those who might be exposed to anthrax; nor can we investigate and respond to every discovery of suspicious white powder. Oregon's governor has created the Governor's Security Council, to help coordinate the many agencies and groups needed to respond to a bioterrorist attack and to other disasters.



ness of the role of public health has improved the relationship between healthcare practitioners and public health. In the wake of last fall's anthrax attacks, many healthcare providers and the organizations that represent them have expressed a great willingness to work

As a result of the anthrax attacks, Congress earlier this year allotted funds to all states, based on their population, for enhancing their capacity to respond to “bioterrorism, other outbreaks, public health threats and emergencies.” Oregon's share amounts to \$14.2 million, the largest single federal appropriation ever earmarked for public health in Oregon.

Public Health

Through a joint decision-making process, the state health department and local public health agencies allotted \$6.2 million of Oregon's bioterrorism dollars to local health departments, to be distributed using a formula based on population. Based on the idea that the best defense against a bioterrorist attack is a public health system that can rapidly detect and respond to an attack, Oregon will use its public health funds for both bioterrorism-specific tasks and more "everyday" threats. For example, enhancing working relationships among emergency response, law enforcement communities, and local clinicians will improve our response to the next crises due to either an E. coli O157 outbreak or a bioterrorist crises. For many local health departments, this will mean a major increase in funding from the state for communicable disease control. For example, in Hood River County, state funds will increase more than twenty times.

If we manage these new resources effectively, we will dramatically transform the public health system in Oregon in the next few years, with the power to substantially improve the health of Oregonians.



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The Structure of the Public Health System

At the federal level, the Centers for Disease Control (CDC) is the leading public health agency. State health departments comprise the next level of authority; in Oregon, the Department of Human Services, Health Services. Finally, county public health departments comprise the third level of public health authority. Of course, other agencies contribute to public health at all three of these levels. These include the Environmental Protection Agency and the National Highway Traffic Safety Administration at the federal level, and the Department of Environmental Quality and the Department of Transportation at the state level, among many others.

The resources available at each level complement one another. The CDC can provide a world expert on a disease such as hepatitis A. The local health department knows how to mount a vaccination campaign for a hepatitis A outbreak in a specific community. The state health department acts as a technical resource for local health departments, a focus for statewide assessment activities—particularly those that may not be feasible on a small, local level—and a communication broker between local health departments and the CDC.

Nurses are traditionally the backbone of the public health system, particularly at the local level, where agencies typically employ only a few doctors. Epidemiologists, statisticians, behavioral scientists, health educators, data analysts, and skilled administrators are also critical components of the public health workforce. Much of the funding for this workforce typically comes from the federal government, in the form of grants and cooperative agreements. In some states, general fund revenues add substantially to the pot, but this is not the case in Oregon.

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