

Prevention: A Statewide Perspective

Jeffrey P. Engel, MD

The Parallel Worlds of Pathos and Prevention

The practice of medicine as it is commonly known to the consumer, the public, or the patient, is one devoted to disease and suffering. Indeed, medical school and postgraduate medical curricula are full of *pathos* (from the Greek for suffering), headlined by basic science courses entitled *pathophysiology*, *psychopathology*, and *pathology*, followed by years of clerkships, residency training, and fellowships in hospitals and clinics. Thus a system evolved that relied on costly disease diagnostics and treatment resulting in each American spending roughly \$7,500 for health care in 2007.¹

Concomitantly in the realm of public health practice, a different paradigm emerged. Bolstered by the tremendous discoveries of vaccination and pasteurization, and the impact of modern sanitation, governments realized that they could achieve a dramatic decline in infectious disease morbidity and mortality using the influence of law. Using this approach, small pox was eradicated from the world, paralytic polio was eliminated from most nations, and safe food, clean water, and indoor plumbing led to the disappearance of typhoid fever and hookworm. The core public health functions at the state and local level enforced mandated environmental health standards and immunizations that resulted in the prevention of the major causes of disease and death amongst the entire population. This system of prevention comes with a much smaller price tag with every American spending about \$150 per year.²

With the decline of infectious disease morbidity and mortality in the 20th century, the new killers of cardiovascular disease and cancer became the major causes of disease and death. In the past 25 years, an insidious epidemic of obesity in children and adults has struck the nation and state with the downstream effect of secondary insulin resistance, diabetes, and other obesity-related complications. It is apparent, despite the great progress made (and money spent), in clinical medicine and public health, that the health of the United States population remains poor, and we in the health care profession have been asleep at the switch.³

What lessons have been learned from the last 100 years of disease-oriented clinical medicine and its *pathos* of heart attack, stroke, cancer, etc., in contrast to prevention-

oriented public health (sanitation, pasteurization, and immunization)? Can the burden of chronic diseases of today be addressed and reduced by methods used to control infectious diseases of the past?

Population Health and Public Health

From the experiences of the disease model of clinical medicine and the prevention model of public health has sprung the merged vision of population health. Driven by chronic diseases, the obesity epidemic, and the runaway

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costs of health care, leaders in health policy have recognized that health promotion and wellness has to replace a disease model and that this can only be done by working at both the individual and community level through prevention.⁴

An individual's health is certainly determined by an uncontrollable genetic predisposition to disease. However, other critical determinants such as behavior, access to and quality of clinical care, the environment of the community, and the public and health policies made by government and community leaders profoundly effect health outcomes and are amenable to a preventive approach.⁵ Public health agencies at the state and local level play an important role in these controllable domains of disease determination of population health.

Local health departments provide both individual primary care (especially in women's and children's health) and serve

Jeffrey P. Engel, MD, is the North Carolina state health director. He can be reached at jeffrey.engel (at) dhhs.nc.gov.

as leaders in their communities in promoting population health. State and local public health agencies work together through health education, surveillance (community health assessments), case management, environmental interventions, and health policy and law, using lessons learned from the control of infectious diseases of the past.³

The Role of the Division of Public Health in Disease Prevention: Intervention and Surveillance

At the state level, the Division of Public Health (DPH) has always focused on prevention to improve population health. Building on the successes of infectious disease prevention, interventions targeting the upstream (or controllable) social and environmental determinants of disease are implemented, and surveillance is used to measure outcomes and success. The sections of Epidemiology, Women's and Children's Health, Oral Health, and Chronic Disease and Injury Prevention use a holistic lifespan view to promulgate best practices in disease prevention and control and health promotion. DPH, through its integrated programs, provides technical assistance and training to state and local partners based on the core mission of prevention.

The North Carolina Institute of Medicine's *Prevention Action Plan*, the result of the work of the NCIOM Task Force on Prevention, provides evidenced-based strategies or interventions that can be used at the community level to improve population health.⁶ The Task Force began by prioritizing the top 10 preventable risk factors that contribute to the leading causes of death and disability in the state (see Table 1). To make the *Plan* actionable, communities determine which population health area they wish to target (e.g., tobacco cessation, physical activity, or nutrition) and DPH will assist partner organizations in selecting and implementing the recommendations from the *Prevention Action Plan* that best suit their community needs.

One of the most fruitful statewide efforts for prevention has been with the Department of Public Instruction (DPI). Pre-kindergarten to 12th grade public education offers a tremendous opportunity for interventions and the *Prevention Action Plan* provides many recommendations for the school environment. DPH and DPI have long collaborated on prevention efforts including the state-funded school nurse funding initiative and school-based health centers, as well as initiatives in physical activity, nutrition, and tobacco control.

Implementing an evidence-based community intervention from one or several of the recommendations from the *Prevention Action Plan* is only part of the journey towards

improved population health. We must also know where we are and be able to tell if we are doing any good. Surveillance, defined as the systematic collection and measurement of disease outcomes and the timely dissemination of the information to those who need to know, is essential in monitoring and controlling disease.³ The effectiveness of a community-based intervention is determined by surveillance. In the past, infectious disease surveillance succeeded because the mandatory reporting laws of communicable diseases ensured timely reports of cases by physicians and laboratories. Chronic disease surveillance is much more passive and less real-time, using data sources such as death certificates, hospital discharge databases, or telephone interviews such as the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System.⁷ The North Carolina State Center for Health Statistics collects, analyzes, and disseminates health outcomes data from all of these sources for use by communities.

Table 1.
10 Leading Health Domains for Prevention
(State and National Level)

National Leading Health Indicators (Healthy People)⁸	State Prevention Action Plan Preventable Risk Factors⁶
1. Physical activity	1. Tobacco use
2. Overweight and obesity	2. Diet and physical inactivity, leading to overweight or obesity
3. Tobacco use	3. Risky sexual behaviors
4. Substance abuse	4. Alcohol or drug use or abuse
5. Responsible sexual behavior	5. Emotional and psychological factors
6. Mental health	6. Exposure to chemicals and environmental pollutants
7. Injury and violence	7. Intentional and unintentional injuries
8. Environmental quality	8. Bacterial and infectious agents
9. Immunization	9. Racial and ethnic disparities
10. Access to health care	10. Socioeconomic factors

Chronic disease surveillance must also include measuring risk factors, not just disease outcomes, to monitor success of prevention and the effective design of intervention strategies. Examples include, for a disease outcome like infant mortality, the prevalence of pregnant women who smoke, or, for obesity, the time spent on physical activity or the number of fast food meals per week.

Healthy People 2020 and Healthy Carolinians

The movement for a report card of the nation's health began with a Surgeon General's report in 1979. Since then, the Office of Disease Prevention and Health Promotion of the US Department of Health and Human Services has adopted the Healthy People campaign.⁸ Using a decade-cycle approach, leading health indicators are selected and reported by state

(see Table 1, page 53). Systematic reports began with Healthy People 2000; we are currently completing the 2010 cycle and preparing for Healthy People 2020. This is essentially the national surveillance system for population health.

Using the Healthy People national reporting system on leading health indicators as a guideline, North Carolina began its endeavor in 1994 with the creation by Executive Order of the Governor's Healthy Carolinians Task Force. The Office of Healthy Carolinians soon followed in DPH and now consists of a regional network of health educators that provide technical assistance, training, and certification to local Healthy Carolinians partnerships. Today, Healthy Carolinians is a robust state and local integrated effort to improve population health.⁹ Led by the Governor's Task Force, the Healthy People indicators are selected for the state (i.e., for 2000, 2010, and 2020), the Office of Healthy Carolinians assists local efforts to address the indicators, and the local partnerships implement the interventions and monitor the results.

There are about 70 local Healthy Carolinians partnerships statewide. Partnerships are led by local health departments and governments, hospitals and health systems, and community-based organizations. A certification process ensures quality and sustainability. The Office of Healthy Carolinians trains and assists local partnerships with community health assessments which help determine what indicators a community should focus on and then provide the surveillance system to monitor progress.

Looking ahead for the next several years, Healthy Carolinians and DPH will select the Healthy People 2020 goals. The *Prevention Action Plan* recommendations will provide the evidence-based interventions for both state and local population health improvement. Implementation of the interventions can be both statewide (e.g., policy and law, DPI-related interventions) and local (e.g., teen pregnancy prevention, fall prevention among the elderly).

Challenges

Perennially, North Carolina ranks in the bottom third of the 50 states for overall health outcomes.⁵ The socioeconomic determinants of disease—poverty, rural isolation, lack of access to health care, health disparities, and high school dropout rates—contributed to North Carolina's 37th place ranking that has not changed appreciably in the past 20 years.⁵ Further, North Carolina is in the bottom 12 states in terms of public health spending, at \$50 per person in 2009.¹⁰ The economic recession has resulted in further budget reductions to DPH and local public health.

Nevertheless, well-implemented prevention efforts embedded in communities can result in improved population health with relatively little cost. Clean air regulations that ban smoking in public places have been shown to result in decreased hospital admissions for asthma, chronic bronchitis exacerbations, and acute myocardial infarctions. Raising the cost of a pack of cigarettes reduces youth smoking rates. A comprehensive sexuality education curriculum in public schools reduces unintended pregnancies and sexually transmitted infections. These three examples, all part of the *Prevention Action Plan*, can guide communities and governments to make the wisest choices given the limited resources.

The lessons learned from the past 100 years in infectious disease control by public health can be applied to the chronic diseases threatening us today.³ Evidence-based, cost-effective interventions at the population level, clearly articulated in well-vetted guideline reports like the *Prevention Action Plan*, provide leaders with the roadmap to healthier communities and a healthier state. Moving from a culture of *pathos* and disease to one of prevention and wellness is the ultimate goal, and we should look to our past successes to get us there. **NCMJ**

REFERENCES

1. National Center for Health Statistics. *Health, United States 2008 with Chartbook*. Hyattsville, MD; Centers for Disease Control and Prevention: 2009.
2. Kinner K, Pellegrini C. Expenditures for public health: assessing historical and prospective trends. *Am J Public Health*. 2009;99(10):1780-1791.
3. Frieden TR. Asleep at the switch: local public health and chronic disease. *Am J Public Health*. 2004;94(12):2059-2061.
4. The triple aim. Institute for Healthcare Improvement website. <http://www.ihl.org/IHI/Programs/StrategicInitiatives/TripleAim.htm>. Accessed December 19, 2009.
5. America's Health Rankings. United Health Foundation website. <http://www.americashealthrankings.org/2009/about.aspx>. Accessed December 19, 2009.
6. North Carolina Institute of Medicine. *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009.
7. Behavioral Risk Factor Surveillance System. Centers for Disease Control and Prevention website. <http://www.cdc.gov/brfss/>. Accessed December 19, 2009.
8. Office of Disease Prevention and Health Promotion, US Department of Health and Human Services. Healthy People. Healthy People website. <http://www.healthypeople.gov/>. Accessed December 20, 2009.
9. Office of Healthy Carolinians, North Carolina Division of Public Health. Healthy Carolinians website. <http://www.healthycarolinians.org>. Accessed December 20, 2009.
10. Trust for America's Health. *Shortchanging America's Health*. Washington, DC; Trust for America's Health: 2009.