Improving Population Health by Incorporating Chronic Disease and Injury Prevention Into Value-Based Care Models

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Today's health system transformation provides a prime opportunity to leverage the capacity of public health to reduce the burden of chronic disease and injury, improve population health, and contain health care costs. Health care settings and organizations should support public health capacity as a key investment in population health.

During this time of health system transformation, health care settings and organizations are preparing to respond to changes in medical reimbursement. There are robust discussions about how best to transfer to value-based care and consider shared-savings models as incentives for providers, all while addressing population health. The transition from fee-for-service care to value-based care is requiring health care settings and organizations to redesign their delivery systems around the issues of quality, outcomes, and cost containment. Improvements in these areas have the potential to lead to a shared-savings concept in which health care providers are rewarded with a portion of the resultant savings. The renewed emphasis on population health has led many entities to add this to their agency's vision.

While the term "population health" is used with increasing frequency, this term has many possible interpretations. The standard definition is "the health outcomes of a group of individuals, including the distribution of such outcomes within the group" [1]. However, the people included in the population being discussed may vary depending on the entity or organization. In a clinical practice setting, the population might include the practice's active patient population. For a hospital, it might include those individuals who use the hospital's health care services. For the public health system in North Carolina, the population includes all members of the community, regardless of whether they have a medical home or health insurance. Use of the term "population health" allows the discussion to encompass social determinants of health, including housing, education, economic opportunity, racial discrimination, and exposure to crime and violence [2].

As the North Carolina health care system evolves, support for and involvement of the public health system is imperative. The health care system is only one partner in the effort to address population health. Generally, patients spend 99.98% of their life outside of the doctor's office, where they make decisions "in the context of … culture, family and community" [3]. Therefore, efforts to improve population health should not focus just on health care settings or be concentrated solely on one-on-one counseling for individual behavior change. Efforts to improve population health must include public health entities that have expertise in many areas: assessing community needs, responding to infectious diseases and other communicable diseases, providing primary prevention interventions, monitoring food and water quality, providing immunizations, providing services for at-risk children, shaping the environment to address risk factors for chronic diseases, providing surveillance data on health risks and health status, providing safety-net medical care, and convening partners and community members to reach consensus on how to address health inequities and social determinants of health.

Nationally, the current investments in public health are inadequate, with "sick care" reimbursement being prioritized over prevention and well-care investments. Over 75% of national health spending is attributed to chronic diseases that are mainly preventable, while less than 5% of national health spending is allocated to public health and prevention [4, 5]. Currently, North Carolina's investment in public health, at $11.73 per person, is the 48th lowest in the nation; the state's total per-capita public health funding, at $50.25, is lower than that of any other Southern state (see Table 1) [6].

A particular need is for chronic disease and injury prevention. Injury and chronic disease—including cardiovascular disease, stroke, cancer, diabetes, and asthma—take a tremendous toll on the health of the state's population and, as such, increase the state's overall health care costs and decrease North Carolinians' productivity. Together, chronic diseases, injury, and violence are responsible for

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TABLE 1.
Per-Capita Funding for Public Health by Source for Southern US States, 2014

State	State resources	Centers for Disease Control and Prevention resources	Health Resources and Services Administration resources	Total per-capita funding
North Carolina	$11.73	$18.32	$20.20	**$50.25**
Florida	$19.25	$17.36	$23.82	**$60.43**
Georgia	$18.48	$23.78	$21.76	**$64.02**
South Carolina	$20.55	$21.78	$26.96	**$69.29**
Virginia	$35.16	$16.09	$18.78	**$70.03**
Tennessee	$43.97	$18.47	$23.90	**$86.34**
Alabama	$59.22	$20.79	$29.97	**$109.98**

Note. Each column is shaded to show variance in funding. The lightest cells represent the least funding and the darkest cells represent the most funding.
Source: Trust for America's Health [6].

nearly three-quarters (74%) of all deaths in North Carolina, or about 63,000 deaths in 2014 (unpublished data). In the same year, the top 4 causes of these deaths were cancer, heart disease, chronic lower respiratory diseases, and stroke. Many of these deaths are predictable and/or preventable because they involve risky behaviors or lifestyles such as tobacco use, unhealthy diets, or physical inactivity [7]. Compared to other states, North Carolina has the 18th highest rate for diabetes prevalence and for deaths from cancer, as well as the 20th highest rate of deaths from cardiovascular disease [8-10].

It is estimated that state medical costs associated with cardiovascular disease will be more than $15.4 billion in 2016. Costs associated with diabetes and cancer in North Carolina are each expected to exceed $6 billion this year. Estimates for cost increases in the period 2010–2020 for these chronic diseases are in the range of 80%–83% (see Table 2) [11]. In 2013, deaths due to injury and violence in North Carolina led to nearly $6.6 billion in medical costs and work loss. Nonfatal injuries resulted in over $5.8 billion in estimated costs for those who were hospitalized and more than $3.4 billion for those who visited emergency departments (see Table 3) [12].

To reduce the burden of diabetes, cardiovascular disease, stroke, injury, cancer, and asthma, as well as to contain related health care costs, the Chronic Disease and Injury (CDI) section of the North Carolina Division of Public Health collaborates with local health departments and other partners. Local health departments use community health assessments (CHAs) informed by local data, partnerships, and strategic planning to guide their prevention efforts. The resulting local and regional action plans ensure that public health investments are focused in areas where there is the most need, that activities are evidence-based, and that decisions are data-driven.

Efforts to address cardiovascular disease, stroke, cancer, injury, diabetes, and asthma focus on prevention. These efforts include improving access to safe and engaging places for physical activity, improving access to nutritious and reasonably priced foods, reducing exposure to secondhand smoke, increasing screening for colorectal cancer among hard-to-reach populations, redesigning transportation around schools to reduce exposure to asthma triggers for at-risk children, assessing county-level specific data for any increased evidence of opioid overdoses, working with local law enforcement to set up driving-while-impaired checking stations, and providing targeted messages for individuals at risk of lung cancer about smoking cessation services. In addition, local and state public health departments manage numerous programs that improve population health: QuitlineNC; asthma trigger home assessments; Eat Smart, Move More, Weigh Less; and 2 diabetes self-management programs (1 for persons with diabetes and 1 for those at risk of developing diabetes).

In addition to local action plans, statewide plans guide North Carolina forward in addressing cancer, heart disease, stroke, diabetes, obesity, asthma, youth suicide, and injuries. The involvement and support from partners that work with the CDI section on these strategic plans are impres-

TABLE 2.
Medical Cost Projections for Cancer, Diabetes, and Cardiovascular Disease, North Carolina, 2010–2020

Year	Cancer	Diabetes	Cardiovascular disease
2010	$4,635	$4,476	$10,796
2011	$4,907	$4,734	$11,421
2012	$5,226	$5,032	$12,145
2013	$5,558	$5,342	$12,902
2014	$5,906	$5,668	$13,692
2015	$6,279	$6,017	$14,545
2016	$6,666	$6,381	$15,432
2017	$7,077	$6,764	$16,367
2018	$7,510	$7,166	$17,356
2019	$7,969	$7,591	$18,402
2020	$8,462	$8,043	$19,525
Percent increase 2010–2020	**82.6%**	**79.7%**	**80.8%**

Note. Costs are reported in millions of dollars.
Source: Centers for Disease Control and Prevention [11].

TABLE 3.
Injuries; Number of Cases; and Medical, Work Loss, and Combined Costs; North Carolina, 2013

	Fatal injuries	Nonfatal hospitalized injuries	Injury-related emergency department visits
Number of cases	**5,962**	**59,957**	**556,718**
Medical cost	$73,839,000	$2,052,264,000	$1,377,315,000
Work loss cost	$6,516,906,000	$3,769,505,000	$2,050,519,000
Combined cost	**$6,590,745,000**	**$5,821,769,000**	**$3,427,834,000**

Note. There may be duplication across categories of cases.
Source: Web-based Injury Statistics Query and Reporting System (WISQARS) [12].

sive. Partners range from other state agencies, such as the Departments of Transportation and Commerce, to key partners within the Department of Health and Human Services including the Office of Rural Health; the Division of Medical Assistance; the Division of Aging and Adult Services; and the Division of Mental Health, Developmental Disabilities, and Substance Abuse Services. External partners who also work tirelessly on public health issues include those such as the American Cancer Society, the American Heart Association, the UNC Injury Prevention Research Center, insurance companies, the North Carolina Hospital Association, academic partners, clinicians, the North Carolina Harm Reduction Coalition, Youth Empowerment Solutions, Safe Kids, the Governor's Highway Safety Program, the Academy of Family Physicians, North Carolina Area Health Education Centers, and Community Care of North Carolina. Policy developments and environmental changes that support healthy behaviors and improvements in health care systems are key strategies in these statewide action plans.

To more effectively decrease the burden of chronic disease and injury and their associated health care costs, support is needed for the implementation of state and local action plans. However, the current climate in North Carolina may preclude increasing state resources to support this long-term planning and implementation approach, as the preference for a more immediate return on investment drives most decisions around resource allocation. The Patient Protection and Affordable Care Act (ACA) emphasized that resources should be devoted to prevention, which makes sense economically, given that upstream prevention of cardiovascular events, stroke, diabetes, obesity, cancer, and traumatic brain injuries from motor vehicle crashes would save millions of dollars in health care costs every year. However, the ACA was not specific as to which organizations should be supported in the prevention role. Historically, local and state public health efforts have provided prevention services to the entire population, including hard-to-reach groups and those with the greatest health inequities and/or health risks. Because of their strengths and expertise, local and state public health workers are valuable assets who can be leveraged to create healthier communities across North Carolina.

Although state funding is limited and it is unclear how ACA prevention resources will be used, the current transformation of the health care system provides a prime opportunity to leverage the capacity of state and local public health departments to reduce the burden of cardiovascular disease, stroke, cancer, injury, diabetes, and asthma; improve population health; and contain health care costs. Addressing these public health issues will require investments outside of doctors' offices. Large health care settings and organizations designing value-based care and shared-savings models should consider supporting public health programs in their catchment area to improve health for all members of a community or region. This may involve adding contracts between a health care organization and local or state public health systems that cover specific public health programs (eg, asthma trigger home assessments or tobacco cessation services). More broadly, investments might expand to provide support for the implementation of local- and state-level public health action plans to decrease chronic disease, injury, and associated causal risk factors.

Cost savings will require dedication and effort, and addressing population health in depth will require long-term investments in order to reach those who are hardest to reach, to improve the health of all members of a community, and to address the needs of populations with the largest health inequities. The evolving system must find a way to include these parameters as part of value-based pricing if the state is going to truly improve population health, decrease the burden of acute medical care, and improve quality of life and productivity in our state. NCMJ

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