Redefining the Team in Team-Based Care:
Role of Public Health

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In North Carolina, our public health infrastructure consists of a state health department and 85 local health departments representing all 100 counties. The state health department, local health departments, health systems, and clinical providers work literally and figuratively as a team to improve the health of our citizens. In this article, we provide examples of the critical role of public health practitioners as part of the broader team addressing health, specifically in the areas of chronic disease, communicable disease, oral health, environmental health, and maternal and child health.

In North Carolina, public health practitioners play a multitude of roles on the health care team, including 1) serving as the architect of environmental interventions to improve health; 2) implementing health improvement initiatives with clinical health practitioners; 3) creating community clinic linkages to improve health; 4) investigating and addressing emerging health threats; 5) using epidemiologic and surveillance data to drive interventions; and 6) serving as safety net providers. In this article, we provide examples of these critical roles of public health practitioners as part of the broader team.

Chronic Disease Prevention

Chronic diseases and conditions such as heart disease, stroke, cancer, type 2 diabetes, obesity, and lung diseases are among the most common, costly, and preventable of all health problems. Half of all American adults have at least one chronic condition, and almost 1 in 3 have multiple chronic conditions [1].

Public health practitioners reduce chronic disease by creating policy, systems, and environmental changes that support tobacco-free lifestyles, healthy eating, and physical activity. For example, in North Carolina, public health practitioners and partners worked to successfully implement the Smoke-Free Restaurants and Bars Law, and in the year following its implementation there was a 21% decline in weekly emergency department visits for heart attacks in North Carolina [2]. To foster environments that support active living, the NC Division of Public Health (NC DPH), in collaboration with the NC Department of Transportation, employs 10 project coordinators across the state who work on Active Routes to School that enable students to safely walk and bike to school. In addition, the coordinators identify opportunities for shared use of school facilities with the community and facilitate Complete Streets, which are streets designed to enable safe access for pedestrians and bicyclists, in addition to motorists. Public health practitioners also support changes at the community level that promote healthy eating. For example, through a partnership with Faithful Families: Eating Smart and Moving More, faith-based organizations in North Carolina have implemented more than 200 policy and environmental changes that support healthy lifestyles.

In addition to these interventions, public health departments improve quality and delivery of clinical services and connect patients and their health care providers to community prevention and management programs. The NC DPH has worked with Duke University and the University of North Carolina to train 155 clinical providers to become Certified Tobacco Treatment Specialists on evidence-based approaches to treating tobacco use. The NC DPH also supports QuitlineNC (1-800-QUIT-NOW); providers can refer patients for nicotine replacement therapy and counseling or patients can call the quitline themselves. QuitlineNC has served over 140,000 North Carolina tobacco users since its inception; 6-month quit rates range from 27% to 47% [3, 4]. To prevent and delay the onset of diabetes, NC DPH supports CDC-recognized programs such as the Diabetes Prevention Program and Eat Smart, Move More, Prevent Diabetes, a 12-month online program. DiabetesSmart works with local health departments that provide diabetes self-management education and support; NC DPH maintains the accreditation and provides implementation assistance. NC DPH also has created the Know It Control It program, a 4-month high blood pressure management program for adults led by trained blood pressure coaches.

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Communicable Disease

Local and state public health practitioners routinely work in partnership with clinicians and others to respond to cases of communicable diseases. This includes not only cases of conditions required to be reported under North Carolina law, but also cases of non-reportable infections that could represent a potential threat to public health [5]. Health departments play several roles in these responses including facilitating diagnosis, conducting epidemiologic investigations, and implementing control measures. Diagnostic support is particularly important for suspected infections with emerging or high-consequence pathogens with which US clinicians are not familiar and for which laboratory testing might not be routinely available, such as hemorrhagic fever viruses, avian influenza, Zika virus, or Middle East Respiratory Syndrome (MERS) coronavirus. Health departments also provide the legal authority and subject matter expertise needed to identify and implement appropriate control measures to prevent transmission.

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Partnerships between clinicians and public health officials have led to the identification of several recent emerging communicable disease concerns, including emerging multidrug-resistant organisms, perinatal and ocular syphilis, and injection drug-associated endocarditis [6-8]. Communicable disease nurses and others at public health departments also work in partnership with clinicians to investigate and control outbreaks of communicable diseases. During 2017, more than 300 outbreaks were reported to local and state health officials in North Carolina. Recent outbreak investigations have included measles associated with a returning traveler, transmission of viral hepatitis in health care settings, and tuberculosis in a neonatal intensive care unit.

Oral Health

Over the last several decades, the oral health of North Carolinians has significantly improved. Much of the gain is a result of water fluoridation through the public water

system [9]. This is a quintessential public health success, showing the impact of a population-level intervention that has produced clinical benefits (reduction in dental caries) at the individual level. However, not all North Carolinians have access to public water systems and, even with access to fluoridated water the increased consumption of refined sugars and processed carbohydrates continues to make dental caries a key public health issue, particularly in children.

Twenty years ago, a community in Western North Carolina saw infants and toddlers with untreated tooth decay and partnered with public health, dentists, physicians, and academia to create a medical-dental collaboration that not only prevents and reduces early childhood caries but also refers high-risk children to a dental home. Today, Into the Mouths of Babes (IMB), is a nationally acclaimed early childhood collaborative practice model in which preventive oral health services are integrated into pediatric primary care. IMB works best with stable linkages between medical and dental practices that ensure continuity of care. Services are provided as part of a well-child visit in the medical home from the time of tooth eruption until age 3½ and consist of 3 equally important parts: 1) oral evaluation, risk assessment, and referral; 2) counseling with primary caregivers; 3) and application of topical fluoride varnish. IMB reduces early childhood caries, reduces the need for dental treatment, and promotes entry into dental homes earlier for those children in greatest need. For children receiving 4 or more IMB visits before age 3, there is an average of 18% reduction in tooth decay and a 21% reduction in hospitalizations for dental treatment [8].

Maternal and Child Health

Public health has also had a long history of addressing the health, safety, and well-being of mothers and children and encouraging a holistic approach to addressing the well-being of families. The Care Coordination for Children (CC4C) program, a collaborative partnership between NC DPH, the Division of Medical Assistance (DMA), and Community Care of North Carolina, working with local health departments, was implemented in March 2011 and is an example of how public health has helped expand and extend the medical home team. The program partners with families caring for children with special health care needs from birth to 5 years of age and those experiencing adverse childhood experiences or toxic stress. CC4C care managers work with families to develop family centered goals to help coordinate community services and remove barriers related to social conditions. Care managers and families, in partnership with the medical home, have helped reduce emergency room visits and hospitalizations.

As with CC4C, the Pregnancy Care Management Program has evolved over time, but the core service has been in existence and provided by local health departments for 30 years. NC DPH partners with DMA and Community Care of North Carolina to implement and oversee the program as a part of the Pregnancy Medical Home model. The program pairs low-income women who have certain medical or psychosocial risk criteria with a social worker or nurse care manager who assists them in addressing the numerous factors that impact low birth weight and preterm birth. Care managers are embedded in prenatal offices and are in close communication with the providers to support the medical care plan. They also keep the providers abreast of social conditions (ie, lack of stable housing, food insufficiency, intimate partner violence, etc.) that may be impacting care and work to alleviate those conditions as much as possible. The current program model emphasizes face-to-face interventions with women in the provider office, patient home, or in the community, which promotes the strongest patient-care manager relationship possible.

Environmental Health

Lead that is unintentionally carried home from workplaces (termed take-home lead) is an example of an environmental public health concern that involves a collaborative response between public health and clinical practitioners. NC DPH conducts surveillance of blood lead levels (BLLs) for possible child lead poisoning using the North Carolina Lead Surveillance System (NC LEAD). When a child's BLL is confirmed to be at or above 5 ug/dL, local health departments, with the support of NC DPH, respond to identify the source and remove lead from the child's environment. This response may consist of clinical management, local health department investigation, and referrals to other social services.

NC DPH also conducts surveillance of adult lead exposure as part of the NC Adult Blood Lead Epidemiology and Surveillance (ABLES) Program. NC ABLES activities include interviews with workers, employers, and physicians; work site evaluations (eg, industrial hygiene consultations); referrals to regulatory partners; and assisting local health departments with response activities. When a take-home lead exposure concern is identified through surveillance, NC DPH works to assist local health departments in responding to protect workers and their families. Such response activities can include systematic review of surveillance data, outreach to and education of employers and workers about take-home lead hazards and how to reduce contamination, follow-up BLL testing of families, conducting health surveys or questionnaires to identify areas for improvement at a workplace, providing recommendations to employers to improve safety action items and plans, and engaging regulatory partners including NC Department of Labor's Occupational Safety and Health Division and the NC Department of Environmental Quality.

Public Health as Providers of Safety Net Care

Local health departments serve as safety net care providers among a multitude of other roles. In this capacity, 51 health departments provide adult primary care, 72 provide child primary care, and 39 provide dental care to adults or

children. In 2016, local health departments provided 3.1 million services for 500,000 unduplicated patients. Of these, 40% were covered by Medicaid and 47% were uninsured [11]. Specific programs like the Breast and Cervical Cancer Control Program provide cancer screenings to over 10,000 women annually [12]. In addition, many local health departments employ enhanced role registered nurses (ERRNs) in areas such as child health, family planning, and STD treatment and care. The ERRN role was established to increase access to preventive care for North Carolina's underserved and at-risk populations. Child health ERRNs, for example, can provide well-child preventive care to children within the 1st month through 20 years of age.

Conclusion

Public health practitioners seek to address the health of populations, often through policy, systems, or environmental changes. Public health practitioners also employ interventions grounded in the socio-ecologic model of health that acknowledge that social and environmental influences, in addition to individual characteristics and behaviors, play a key role in health. As health care financing moves toward value-based payment that focuses on outcomes, public health and health systems have heightened incentive to work as a team to implement health improvement initiatives at all levels of the socio-ecologic model to ultimately improve the health and well-being of North Carolinians. NCMJ

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