Discussion Paper

A Population Health Strategy for Diabetes: New Partners, New Opportunities

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INTRODUCTION

Diabetes challenges the nation's health in many ways. As of 2012, one in 11 Americans was living with the disease (CDC, 2014a), and two in five Americans will be diagnosed with it during their lifetimes (Gregg et al., 2014). In 2009–2012, three in eight adults had prediabetes (CDC, 2014a, p. 3). One in three Medicare dollars is spent on people with diabetes (CMS, 2012), and diagnosed diabetes cost the United States $245 billion in 2012, a figure that had increased by 41-percent increase over the previous 5 years (ADA, 2008, 2013), while undiagnosed diabetes and prediabetes cost an additional $77 billion (Dall et al., 2014).

The high prevalence and cost of diabetes are two reasons why it is important to control diabetes more effectively. Better control of diabetes will require a variety of actions addressing lifestyle and socioeconomic factors, screening and medical management, and public awareness. Only a population health approach will suffice because only population health takes into account health care, public health interventions, and the social and physical environments (Kindig and Stoddart, 2003). Success in addressing diabetes would offer a blueprint of how population health efforts might succeed with other public health problems as well.

There is opportunity for healthcare professionals, public health practitioners, and policymakers to collaborate in efforts to improve diabetes care. This article will highlight the burden of diabetes and current efforts of the various disciplines to manage diabetes mellitus. We will also offer strategy for coordinating efforts in areas of action in public health, health care, outreach, and research and evaluation.

THE BURDEN OF DIABETES

Diabetes burdens both individuals and the population. People living with diabetes face complications that may lead to blindness, foot and leg amputations, and death. Diabetes is a major risk factor for heart attacks, stroke, and kidney disease (Forbes and Cooper, 2013) and is associated with non-alcoholic fatty liver disease (Zoppini et al., 2014), dementia (Crane et al., 2013), depression and emotional distress (Nicolucci et al., 2013), hypertension (Harman et al., 2013), hearing loss (Horikawa et al., 2013), periodontal disease (Lakschevitz et al., 2011), and osteoporosis (NIH, 2012).

The percentage of Americans with diabetes increased almost eight-fold between 1958 and 2013 (CDC, 2014b), and the prevalence of diabetes is projected to increase to the point that it will affect between 21 and 33 percent of adults by 2050 (Boyle et al., 2010). Among youth, the number of individuals with type 1 diabetes is projected to triple, and the number with type 2 is projected to quadruple, between 2010 and 2050 (Imperatore et al., 2012).

A POPULATION HEALTH APPROACH

Importance of Disease Prevention

Besides the prevalence, costs, mortality, and complications of diabetes, another reason for addressing the disease with a population health approach is that it is largely preventable.

Lifestyle intervention can greatly reduce the risk of developing type 2 diabetes (Pronk and Remington, 2015). In one study, for example, the Diabetes Prevention Program provided information about diet and exercise to overweight participants with prediabetes at 27 clinical centers. Members of a lifestyle intervention group also received intensive training in diet, physical activity, and behavior modification, and this intervention reduced the relative risk of developing diabetes by 58 percent (Knowler et al., 2002). A similar intervention in the Finnish Diabetes Prevention Study achieved a 43 percent reduction in the relative risk of developing the disease after 7 years (Lindström et al., 2006). The intervention in the Diabetes Prevention Program was found to be effective under "real world" conditions (in contrast to the conditions typically found in clinical research); in particular, it was delivered in a group setting at two YMCAs and resulted in average body weight decreases of 6 percent in the intervention group and 2 percent in the control group after both 6 and 12 months (Ackerman et al, 2008). A meta-analysis of 25 community studies found that lifestyle interventions resulted in a mean weight loss of 4.7 pounds (Dunkley et al., 2014).

Role of Personal Health Care Professionals in a Population Health Approach

A population health approach to diabetes will involve both health care professionals and public health practitioners. On the health care side, a meta-analysis of 50 high-quality systematic reviews found three types of quality-improvement interventions to be effective in improving diabetes care: patient education and support; provider role changes, such as expanding the roles of pharmacists or nurses or using multidisciplinary teams; and telemedicine (Worswick et al., 2013).

There are currently many changes being made in the health care delivery system to improve how diabetes is addressed at a population level. Medicare now reimburses physicians for coordinating the care of patients with multiple chronic conditions (CMS, 2014a). Insurers are attempting to identify people with diabetes early and provide them with diet- and disease-management services (Kennedy, 2014). Clinicians and providers can access a variety of guidelines for identifying and treating patients with diabetes (e.g., NKF, 2012; Qaseem et al., 2012; AOA, 2014; Li et al., 2011; VA, 2014; Maahs et al., 2014; and CMS, 2014b).

Role of Public Health Practitioners in a Population Health Approach

On the public health side, there are a variety of federal, state, and local actions that can be taken to help control diabetes by altering the underlying factors that make the disease more likely. A systematic review of 61 studies of type 2 diabetes showed that various social determinants of health, such as economic stability and educational status, affect glycemic control, low-density lipoprotein cholesterol levels, blood pressure, and quality of life (Walker et al., 2014). Socioeconomic factors such as low income, employment insecurity, low educational attainment, and poor living conditions have been shown to affect type 2 diabetes outcomes, and individuals with lower income and less education are two to four times more likely than more advantaged individuals to develop diabetes (Hill, 2013). Accordingly, supportive services such as nutrition counseling, transportation assistance, health education, public information, family and workplace engagement, and enhancing access to nutritious foods have a vital role to play in decreasing the toll of diabetes. Furthermore, health departments can help create incentives for restaurants and food stores to offer and promote healthy options, mandate strong nutrition standards in government-run facilities and programs, expand nutrition assistance programs, and allow farmers markets to accept food stamps and other benefits (Pomeranz, 2011; IOM and NRC, 2009; Lederer et al., 2014; and Young et al., 2013).

Public Policy Role in a Population Health Approach

The contributions of federal, state and local policy makers will be crucial to the success of a population health approach to diabetes. An IOM report on obesity prevention recommended various actions that affect diabetes as well as obesity, including conforming agriculture policy to dietary guidelines, funding social marketing efforts on physical activity and nutrition, updating Supplemental Nutrition Assistance Program (SNAP) education, requiring licensed child care providers to provide physical activity opportunities, establishing incentives for health-promoting food and beverage retailing, and improving physical education in schools (IOM, 2012).

CREATING A STRATEGY FOR DIABETES PREVENTION AND CARE

Coordinating Diverse Public and Private Efforts

A broad, effective, and efficient population health strategy for diabetes would mobilize health care and public health resources nationally, statewide, and locally, through coalitions, formal partnerships, and informal arrangements. Among the key public health forces vital to a population health approach to diabetes are the CDC, the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDKD), state and local health departments, and large advocacy organizations, especially the American Diabetes Association (ADA). Other agencies within the Department of Health and Human Services (HHS) equipped to contribute to diabetes control are the Centers for Medicare and Medicaid Services, Agency for Healthcare Research and Quality, Patient-Centered Outcomes Research Institute, Health Resources and Services Administration, Office of Minority Health, Indian Health Service, Administration on Aging, Center for Disability and Aging Policy, Surgeon General, and Office of the National Coordinator for Health Information Technology.

In addition, nontraditional public health partners could leverage forces that are not routinely part of the public health landscape. For example, payers could create incentives for providers to participate in diabetes-related outreach, research, screening, public education, and other population health activities. Hospitals and health systems could provide venues for activities. Business associations could help muster participation from the business community and employers, while labor organizations could recruit union families to participate in screenings and education. Banks and other financial institutions could ensure that real estate and development projects include bike paths, hiking trails, and parks.

Public health partners could include health professional associations, health professions schools, education departments and public school systems, pharmaceutical and other medical research and manufacturing firms, philanthropies, the faith community, YMCA, youth and student organizations, AARP, health advocacy organizations focused on mental health or other issues, women's and veterans groups, community activists, civil rights groups, elected officials, social media networks, arts organizations, communications and marketing professionals, health services researchers, and many others.

Coordinating a population health strategy on diabetes on the local, state, and national levels will require a complex network, rather than a top-down structure. The approaches that are most likely to succeed will involve nimble, flexible planning. An annual conference of leading stakeholders could promote consistency in messages, adjustments based on experience in the field, avoidance of duplication and gaps, and other efficiencies.

Key Components of a Successful and Comprehensive Strategy on Diabetes

For a sufficiently comprehensive strategy on dealing with diabetes, we propose 13 interrelated components, divided among public health action, health care action, outreach, and structural essentials research and evaluation.

Public Health Action

Funding the scaling-up of diabetes prevention Congress provided only $73 million in Prevention and Public Health Fund support to the CDC in fiscal year 2015 to cover both the National Diabetes Prevention Program and diabetes-related grants to state and local entities (HHS, 2015). Because the federal government bears many of the costs of diabetes through Medicare, Medicaid, the VA, and other programs, additional funding for diabetes program is essential.

Obesity prevention and control Obesity and diabetes are closely linked. A greater commitment to curtailing obesity, including in schools and workplaces, is needed. A meta-analysis of 32 studies of school-based programs found that the largest obesity prevention effects arose from programs of longer than 1 year that included nutrition and exercise education, efforts to change attitudes, monitoring of behavior, environmental change, and parental involvement (Sobol-Goldberg et al., 2013). A systematic review of workplace programs identified six promising practices, including combining access to more physical activity with health education (Archer et al., 2011). Even modest improvements resulting from such interventions can be highly cost-effective.

Dealing with social determinants The social determinants of income, education, and access to nutritious food all affect the likelihood of developing diabetes. One in seven U.S. households was food-insecure in 2013 (USDA, 2014). It is unrealistic to expect much progress in preventing diabetes when so many households lack sufficient access to nutritious food. Government food programs like SNAP, the Emergency Food Assistance Program, and Women, Infants, and Children often make a considerable difference for their clients, as do volunteer programs like Meals on Wheels, food banks and food pantries, soup kitchens, and faith community efforts within individual congregations, as well as public–private efforts to improve access to nutritious commodities in urban food deserts.

Health Care Action

Diabetes education of physicians and other health professionals Health professions education is where health professionals learn both the importance of focusing on diabetes and other chronic conditions and how to prevent and treat these conditions. Undergraduate, graduate, and continuing medical education, including education carried out in clinical settings, are all appropriate venues for improved learning about diabetes. Among the deficiencies in physicians' diabetes education is a lack of emphasis on performance improvement (Beaser and Brown, (2013). Team training is especially important, as effective diabetes care is typically interdisciplinary. If substantive changes to the medical school curriculum are difficult to implement, creative teaching approaches, such as use of social media and the involvement of actual patients and family members or professional actors, may be the best option. As a nudge to educators, there should be more diabetes-related content on medical licensure and board-certification examinations and in accreditation standards for medical and osteopathic schools and residency programs.

Team-based care Team-based care is especially useful in managing any disease with powerful social dimensions and diverse complications. Diabetes treatment often involves endocrinologists, primary care physicians, nurses of numerous types, health educators, social workers, dietitians or nutritionists, ophthalmologists or optometrists, podiatrists, pharmacists, dentists, mental health therapists, exercise physiologists, and other health and social service professionals, in addition to the patient and family (ADA, 2014).

Family support and self-management A population health strategy for diabetes would promote patient and family education, engagement, and support. To avoid serious complications, people with diabetes must understand their disease and participate in managing their own care. In a meta-analysis of 20 studies, interventions to enhance diabetes self-management were found to improve quality of life (Cochran and Conn, 2008). A task force of the American Association of Diabetes Educators and ADA has developed diabetes self-management education standards (Funnell et al., 2010) which could serve as a basis for creating measures to qualify self-management education programs for reimbursement.

Health information technology and telehealth Telehealth facilitates the monitoring of patients and communication between patients and health professionals about health signs, while electronic health records and secure messaging can help health professionals stay informed about a patient's status, about clinical guidelines, and about the activities of colleagues on the care team (e.g., Vestal, 2014; Kirkizlar et al., 2013; and West et al., 2010). A systematic review of 16 studies found evidence that the chronic care model of primary care was effective in managing diabetes, typically through disease registries, electronic records, improved coordination, and self-management education (Stellefson et al., 2013).

Prevention-oriented screening standards As a literature review and analysis showed, federally backed screening should be expanded (Villarivera et al., 2012). Medicare, Medicaid, private insurers, and health care systems all should encourage and reimburse screening as a gateway to prevention.

Reimbursement supporting coordination of care and population health Payment mechanisms must be aligned with state-of-the-art diabetes prevention and care. The current trend away from fee-for-service will allow for greater attention to prevention, screening, care coordination, team-based care, patient and family education, and other activities consonant with a population health approach.

Outreach

Community-based efforts Community-based action on diabetes can take many forms, such as local coalitions focusing targeted efforts on a small population (Jenkins et al., 2011), faith-based coalitions of congregations using community-based participatory research (Austin and Claiborne, 2011), the mobilization of community health workers to serve people with diabetes (Brown et al., 2012), and a multi-hospital data-driven effort to identify people with diabetes and provide them with coordinated health services (Janosky, 2013).

Public education Public attitudes toward diabetes often reflect confusion about the seriousness of the disease and the value of diet and exercise (Matthaei et al., 2007). The National Diabetes Education Program of the CDC and National Institutes of Health (NIH) involves numerous partners in evidence-based education projects (CDC, 2014c). One organization seeks to increase public awareness by issuing state and local forecasts of diabetes prevalence (Rowley and Bezold, 2012). A coordinated population health approach would develop and constantly

refine messages and channel them to target audiences through appropriate, efficient media and by using credible messengers. This will require linguistic and cultural competence and flexible messaging platforms (Harris et al., 2013).

Research and Evaluation

Research Biomedical, health services, epidemiologic, and comparative effectiveness research all can expand the knowledge base about diabetes and its control. The NIH annually provides about $1 billion—or about three percent of its total outlays—to fund diabetes research (NIH, 2014; Fradkin and Rodgers, 2013). Also, the Patient-Centered Outcomes Research Institute has sponsored several comparative effectiveness research projects on diabetes (PCORI, 2014a, 2014b). Important findings should be entered into a widely accessible database to build a learning health system for diabetes prevention and care. Such a database could include a registry tracking HbA1c levels and other health signs of most people with diabetes or prediabetes and comparing responses to specific interventions, and combinations of interventions, in populations delineated by age, gender, disease state and complications, and comorbidities (see Mandl et al., 2014; Krumholz, 2014).

Evaluation Evaluation is an essential part of any change strategy in health care or public health. Evaluation facilitates mid-course corrections, can be used to justify public and private funding, is a crucial component of evidence-based strategies, and helps define objectives. For example, annual surveys of leading diabetes clinicians, educators, advocates, and researchers could provide valuable feedback about ongoing outreach efforts.

CONCLUSION

Given the accelerating burden of diabetes, there is a profound need for a coherent strategy combining efforts in health care and public health and greatly expanding prevention, screening, care, research, and public education. Whatever this effort costs, the price of inaction is likely to be much higher: a nation afflicted with devastating prevalence and the human, social, and economic costs of diabetes, the great bulk of which are preventable.

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