



# From Programs to Policy and Back Again: The Push and Pull of Realizing Type 2 Diabetes Prevention on a National Scale

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The U.S. Centers for Disease Control and Prevention (CDC) estimates that about 1.9 million Americans develop diabetes yearly; most of them have type 2 diabetes, and almost one-third remain undiagnosed for several years (1). The Diabetes Prevention Program (DPP) provided strong evidence that lifestyle behavioral counseling interventions can prevent or delay about half of these new cases (2). Unfortunately, 15 years after the DPP, most people at high risk for developing diabetes have not been offered such an intervention (3). This gap separates millions of high-risk Americans from the most evidence-based solution currently known to prevent type 2 diabetes.

In 2010, Congress authorized the CDC to launch the National Diabetes Prevention Program (National DPP), which supports organizational and workforce development, quality monitoring, and evaluation of efforts to scale up delivery of DPP-like lifestyle intervention programs nationally (4). As of April 2017, the National DPP registry listed 1,379 organizations offering DPP-like interventions across all 50 states, including 47 online-only programs and 1,332 organizations delivering face-to-face interventions (4). These numbers underscore the incredible growth in our nation's capacity to provide DPP-like interventions.

In this issue of *Diabetes Care*, Ely et al. (5) report findings of an evaluation of the

first 14,747 adults who completed  $\geq 1$  National DPP visits through one of 220 registered organizations between February 2012 and January 2015. Strengths of this evaluation include the large sample size and inclusion of data for all National DPP participants; limitations include lack of a control group and no information about weight changes or other outcomes for participants who stopped attending the program. Still, this evaluation offers an important first glimpse of the success of National DPP's scale-up since 2010.

Over a 12-month period after their first visit, National DPP participants completed a median of 14 of 22 possible lessons and about half continued attending beyond 6 months. Mean weight loss was 4.2%, with more than one-third achieving a weight loss goal of  $\geq 5\%$ . These results are consistent with previously published studies that evaluated DPP-derived lifestyle interventions offered in clinical or community settings (6), providing reassurance that such programs remain effective when delivered on a national scale.

The National DPP also seems to be reaching a diverse audience that is, on balance, representative of U.S. adults with prediabetes. In the analysis by Ely et al. (5), 80% of participants were  $\geq 45$  years of age, 80% were women, and 75% had a baseline BMI  $\geq 30$  kg/m<sup>2</sup>. Ely et al. provide race/ethnicity information only for National DPP participation in the three

dominant racial/ethnic groups in the U.S. (i.e., Hispanic, non-Hispanic black, or non-Hispanic white), indicating that about 20% of those participants are non-Hispanic black and 14.6% are Hispanic. By deriving similar estimates for the U.S. population with prediabetes using the National Health And Nutrition Examination Survey (NHANES) and U.S. census data (7–9), about 67% of U.S. adults with prediabetes are  $\geq 45$  years of age, 49% are women, 40% have a BMI  $\geq 30$  kg/m<sup>2</sup>; among those in the three largest racial/ethnic groups, 13% are non-Hispanic black and 15% are Hispanic. Thus, the National DPP reaches diverse participants and, relative to the entire U.S. population with prediabetes, engages proportionately more adults who are aged 45–64 years, women, obese, or non-Hispanic black.

As the scale-up of the National DPP has helped to “pull” adults with prediabetes toward community-accessible DPP-like interventions nationally, overall participation falls far short of the 84.1 million people who are estimated to have prediabetes today. Though the National DPP is exerting meaningful individual-level benefits for its participants, its modest “reach” limits its overall effectiveness at a population level. Fortunately, several promising health policies are ramping up to create a “push” toward greater National DPP participation. In August 2014, the U.S. Preventive Services Task Force (USPSTF) recommended

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that all overweight or obese adults with  $\geq 1$  cardiovascular risk factor (including prediabetes) be offered intensive lifestyle interventions (10). This recommendation has important policy implications as federal law now requires most health payers to provide full coverage for evidence-based preventive services recommended by USPSTF (11,12). In 2015, the USPSTF issued a second recommendation that clinicians perform screening to identify abnormal blood glucose for all adults aged 40–70 years who are overweight or obese—further advising that clinicians offer or refer those with abnormal blood glucose to intensive behavioral counseling interventions to promote a healthful diet and physical activity (13). Together, these two recommendations have the potential to increase the identification of adults with prediabetes and the flow of health system resources to support their participation in DPP-like interventions.

Both private and public health payers have begun implementing policies to reimburse for the National DPP (14,15). A recently published 3-year evaluation estimated that Medicare beneficiaries who received the YMCA’s DPP experienced health care expenditures that were \$1,456 lower per person over the first year (14). In March 2016, the Chief Actuary of the Centers for Medicare & Medicaid Services certified that expansion of the “Medicare DPP” would improve quality of patient care and was unlikely to increase costs (16). In mid-2016, the Secretary of Health and Human Services announced that the Centers for Medicare & Medicaid Services would expand coverage of the Medicare DPP beginning in January 2018 to all fee-for-service beneficiaries nationally who had a blood test indicating prediabetes.

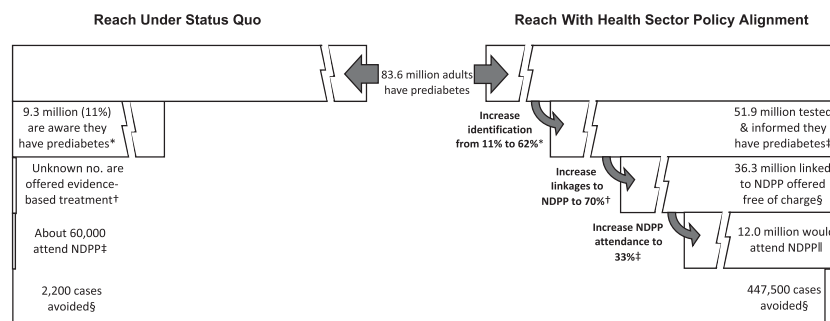
Medicare’s DPP payment policy will lean heavily on the National DPP, requiring that organizations seeking Medicare reimbursement be recognized by the National DPP (16). We might assume that the 16.6 million Medicare Part B enrollees with prediabetes today will develop type 2 diabetes at a rate of about 18.4% over 10 years with no intervention (17). If we use the DPP’s estimate of a 58% risk reduction for every 5 kg (about 5%) of weight loss (18) and we apply this risk reduction only to the 43% of older adult participants who lose  $\geq 5\%$  body weight as reported by Ely et al. (5), then the Medicare DPP policy has the potential

to prevent 761,550 cases of type 2 diabetes in the next decade. Although it is unrealistic to assume that the National DPP will reach all Medicare beneficiaries with prediabetes, now is the time to consider how best to marry the National DPP’s growing organizational and workforce capacity with complementary policies that support type 2 diabetes prevention at multiple levels. Since U.S. adults express a strong interest in avoiding diabetes (19,20) and we have an evidence-based treatment that cuts in half one’s chances of developing type 2 diabetes with little risk for harm, it is reasonable to aim for policy solutions that maximize the uptake of high-risk individuals into the National DPP. What remains unclear is how to best implement those policy solutions in a fashion that will maximize the number of prevented cases of type 2 diabetes for the lowest possible cost for our society.

Consider for a moment the maximal effectiveness and overall cost of offering the National DPP to all 83.6 million U.S. adults with prediabetes (1). If we assume an average rate of progression to type 2 diabetes of 18.4% over 10 years (17), then about 15.4 million people will develop type 2 diabetes over the next decade. Further, if we assume a relative risk reduction of 58% for those who achieve  $\geq 5\%$  weight loss (18) and apply that reduction to the 35% of participants

who reach that goal with the National DPP (5), then we would anticipate preventing up to 3.1 million (20%) of those new cases. Past studies show that community or health system delivery of DPP-like interventions cost an additional \$424 per person receiving the intervention (21), thus requiring \$35.5 billion in additional spending during the first year alone to reach the entire high-risk population of 83.6 million adults. Although the outcomes are clearly of high value, funding such expenditures through the health care sector would require either higher budgets achieved by increasing health plan premiums or other forms of financing, or reductions in payments for other clinical services. Such decisions seem unlikely in the current political climate.

In light of these resource constraints, it is likely that health sector funding will need to target narrower subpopulations that are more likely to transition to type 2 diabetes in the near term (22). Such an approach might still follow population-based screening for abnormal glucose, but intensive National DPP intervention resources might be focused toward persons with higher HbA<sub>1c</sub> or fasting plasma glucose. This approach is somewhat analogous to clinical practice recommendations for abnormal cholesterol management, for which low-intensity, briefer lifestyle counseling is offered to all high-risk patients and more intensive



**Figure 1**—Estimates for reach and population-level effectiveness of the National DPP under status quo and with alignment of health sector policies to increase identification and participation. \*From the CDC report (2013) that 11.1% of U.S. adults with prediabetes are aware that they have it (3); by contrast, 62% of adults report having been tested for (and are aware of having) high LDL cholesterol (25,26). †There are no population estimates of the “linkage rate” to National DPP for screen-detected adults with prediabetes; by contrast, linkage to high-intensity treatment for abnormal blood cholesterol is about 70% of identified high-risk patients (25,26). ‡Current National DPP enrollment to date estimated from program growth as provided by Ely et al. (5); prior community effectiveness trials have demonstrated participation by 30–50% of adults referred to community DPP interventions after being made aware that they have prediabetes (6). §See text for details; assumes 18.4% of adults with prediabetes identified by HbA<sub>1c</sub> will have type 2 diabetes in 10 years (17), 5% weight loss via the National DPP is associated with a 58% reduction in the development of type 2 diabetes (18), and 35% of National DPP participants reach  $\geq 5\%$  weight loss (5).

evidence-based treatment (in this case, “statins”) are reserved for those at the higher end of the risk spectrum (23,24). Recent reports show that about 62% of adults with elevated LDL cholesterol report having been tested by a health care provider and are aware; about 70% of those high-risk people report taking treatment (25,26). If we applied these same rates to diabetes prevention (Fig. 1), we might anticipate that awareness of prediabetes would increase from about 9.3 million currently to about 51.9 million people; similarly, offering of treatment might increase to about 36.3 million. Prior community effectiveness trials report that about 30 to 50% of high-risk adults referred to DPP-like interventions participate (27), so we might expect National DPP enrollment to increase to 12.0 million people, which could result in the avoidance of about 450,000 new cases of type 2 diabetes. In contrast to the scenario of treating all 84.1 million people with National DPP, this approach, constrained by the limits of health system-based implementation of clinical preventive services, has lower total costs (about \$5.1 billion for National DPP payments in the first year) but may miss many younger and minority patients who are less likely to complete routine clinical preventive services (25).

Regardless of where lines are drawn for health system funding of diabetes prevention services, one key point to take away is that true population-based prevention cannot be achieved by the health care sector alone. Many argue that only policy, systems, and environmental changes can reverse the underlying economic and social forces that have caused type 2 diabetes to swell across our population. Unfortunately, to date, such solutions have proved difficult to enact and also remain largely unproven. Unlike targeted anti-tobacco policies that have helped to curtail lung cancer incidence and mortality over the past two decades, we have yet to identify a precise etiologic mechanism underlying the development of type 2 diabetes, such as a specific food, drink, toxin, or infectious agent that might allow for focused policy action. Instead, we are left with less precise strategies such as altering access to high-calorie foods and beverages or making physical activity resources more accessible in communities or workplaces. Unlike tobacco

policies, these approaches leave no one to blame for the diabetes epidemic, and they ultimately still require individuals to make a behavioral change. Though we must continue to pursue a more “complete” solution to the population health burden of type 2 diabetes, until we have effective policy, we must rely on the evidence at hand that practical and accessible programs such as the National DPP can provide a level of support most of us require to be resilient in our lifestyle choices while the world around us continues to promote type 2 diabetes.

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