



Solving the Puzzle to Lasting Impact of the National Diabetes Prevention Program

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Diabetes Care 2020;43:1994–1996 | <https://doi.org/10.2337/dci20-0031>

To address the burden of type 2 diabetes, the Centers for Disease Control and Prevention (CDC) launched the National Diabetes Prevention Program (National DPP) in 2010 (1). The program promotes weight loss through lifestyle change, based on remarkable findings of 58% reduced cumulative incidence over 3 years in an efficacy trial (2). Major successes include reaching hundreds of thousands of at-risk individuals nationwide, robust outcomes, and widespread insurance coverage (1,3), but more work is needed to ensure lasting impact, and retention plays a critical part. This Commentary briefly reviews the new retention study by Cannon et al. (4), linkage to other critical pieces, and future directions. In considering solutions to a complex national problem, I seek to contribute my uniquely broad experience with the National DPP working as a lifestyle coach, securing funding, overseeing delivery, reaching disadvantaged populations, serving on state workgroups, rate setting, becoming a Medicare supplier, advocating to payers and legislators, and authoring over 20 peer-reviewed articles on the program. Beginning with doctoral training on a preceding translational study (5), I now lead a large pragmatic trial a decade later to improve retention with presessions to the National DPP (6). I am also ashamedly familiar with diabetes risks

and lost over 50 pounds in my own personal journey with lifestyle change.

With rigorous analysis of 41,203 participants across 581 organizations, Cannon et al. show incremental attrition that leaves only a third (32%) remaining by month 10 of the yearlong intervention (data not presented for months 11–12) (4). Racial/ethnic minority and younger individuals, and those lacking successful lifestyle change, drop out disproportionately more. The findings help replicate my early studies on retention gaps for these groups (7–9), while novel strengths include illustrating the time-based attrition patterns in which dropout is especially high after the first and mid-year sessions. Limitations include focusing on in-person programs, whereas online delivery has become the predominate modality (1) yet may have similar retention challenges (1,10). Cannon et al. call for studies identifying barriers to retention in racial/ethnic minority and younger participants, as well as strategies to facilitate early successes and continued attendance after 6 months. My group's newly published findings address the former issues (11,12); however, the latter remains unsolved.

Evidence from this work and others increasingly suggests that redesign of the National DPP curriculum is needed, perhaps involving more than adoption of

ancillary strategies. For one, the results by Cannon et al. (4) could be interpreted as depicting that the content is insufficiently engaging. Moreover, despite focusing on $\geq 5\%$ weight loss, 72% of participants do not achieve this goal, including half of those retained for ≥ 9 months (1). In fact, only 17% of the original lifestyle intervention participants were known to achieve all the program goals, including low-fat diet and ≥ 150 weekly minutes of physical activity, even with intensive support (13). Additionally, the 15-year outcomes report shows considerable weight regain, and 55% of the lifestyle group participants developed diabetes by this point (14). These findings should give us pause. If we explained these results to potential participants, how many would enroll at all? As is, we may inadvertently set most participants up for “failure,” both short term (lack of program completion and goal achievement) and long term (weight regain and subsequent incidence), which may contribute to learned helplessness (15) and dissuade future behavior change attempts (including managing diabetes after onset). Thus, an opportunity may be updating the National DPP curriculum to bolster more lasting outcomes for the majority.

Incorporating a Health at Every Size (HAES) approach (16) may help redirect

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See accompanying article, p. 2042.

the National DPP’s focus from temporary weight loss to sustained lowering of glycemia through guidance on intuitive eating (i.e., eating in response to internal cues) and reframing physical activity as a tool for well-being. A HAES approach supplants specific dietary prescriptions, of importance given new consensus that various eating plans reduce risk, with or without weight loss, and that individualization is needed (17). HAES-aligned interventions show better retention than traditional weight loss programs (18), with implications for the National DPP. Quarterly monitoring of glycated hemoglobin with point-of-care instruments could provide biofeedback during the yearlong program, or participants could seek laboratory testing. Considerable evidence also suggests metformin lowers risk, including as an adjunct treatment to lifestyle intervention, yet its use to prevent diabetes is infrequent (19) and largely unaddressed in the CDC-published curricula (<https://www.cdc.gov/diabetes/prevention/resources/curriculum.html>). Participants could be encouraged to discuss metformin with providers upon enrollment, which may further support continuity for those

unable to complete the program. Overall, promoting a range of preferred behaviors and treatment strategies that lower glycemia on an individual basis may better align with precision medicine initiatives (20) than a one-size-fits-all approach. As a patient-centered intervention, a HAES-based model may also be more appealing, personally relevant, and achievable, thus intrinsically motivating retention. Flexible engagement models (i.e., distance learning and combined virtual plus in-person delivery) should also be explored further to address commonly reported logistical barriers to engagement (11,12) and adapt to the COVID-19 era.

More broadly, improving retention and effectiveness, alongside concurrent gains in reach and sustainability, appear key to the lasting impact of the National DPP. As shown in Fig. 1, reach, retention, effectiveness, and sustainability are interconnected and, like a puzzle, must fit together simultaneously to impact diabetes prevalence. Regarding reach, millions of at-risk individuals likely need intervention, as 34% of U.S. adults have prediabetes (21). Retention is considered essential to effectiveness (thus the focus of the analysis by Cannon et al.)

and may relate to maintaining risk reduction behaviors long term, which in turn is critical to lifelong prevention. As a health psychologist, I have learned to advise making changes today only if you foresee sticking with them through age 80, because realistic goals are those sustainable long term, while unsustainable change has limited benefits and unachieved goals can inflict lasting damage. Finally, sustainability is critical, requiring huge volume and spread of suppliers delivering payer-covered services to ensure wide reach, which is the core premise of population health interventions. Securing these pieces at the same time is undoubtedly challenging and likely demands the continued collaboration of cross-sector stakeholders that enabled successes to date (22).

Using personal experience in science is extremely cautioned. At the same time, I am among the majority for whom the National DPP’s current guidance appears ineffective, as reinforced by this analysis. Although I initially lost much weight (twice) through low-fat diet and physical activity, long-term success came with a HAES approach that is more compatible with a busy life and the reality that full-fat

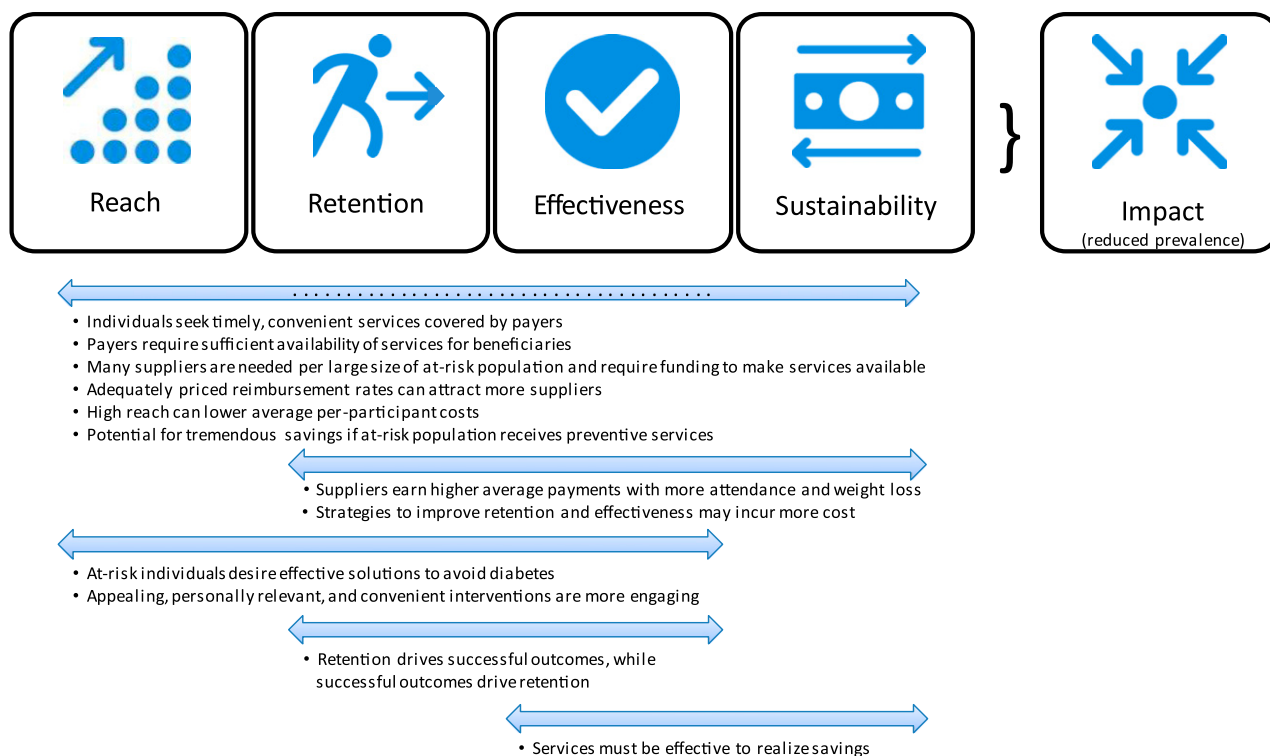


Figure 1—Key factors for achieving population health impact with the National DPP. Public domain icons accessed from <https://www.unocha.org/story/ocha-releases-humanitarian-icons-help-covid-19-response>.

food tastes better. Nonetheless, my scientific commitment with the National DPP was to espouse its evidence-based guidelines. The tipping point has come now that more evidence favors developing alternative recommendations. There is urgency for this change and others as the momentum driving the National DPP's defining successes could become lost. Over 3,000 organizations provided the National DPP between 2012 and 2019 (1), yet only half remain active in 2020 (23). Moreover, despite the incredible, unprecedented achievement to establish Medicare coverage in 2018, we now see an alarming supplier shortage (24). Low reimbursement rates afford short-term benefits to payers (25) but likely leave a missed opportunity for substantial long-term savings from reduced diabetes prevalence by limiting access. And even with access, outcomes are imperiled, especially for disadvantaged populations with the greatest need (1,3). The work of Cannon et al. ultimately highlights these interconnections and pushes us all to do better. The National DPP could well be considered "too big to fail," in which case we must work together quickly to shore it up and solve this puzzle for good.

Funding. Manuscript preparation was supported by a grant from the National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health (R01DK119478). The author has received past and present grant support from the CDC for other work related to the National DPP.

The contents of this publication are solely the responsibility of the author and do not represent views of the funding organizations.

Duality of Interest. No potential conflicts of interest relevant to this article were reported.

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