

A Coordinated National Model for Diabetes Prevention

Linking Health Systems to an Evidence-Based Community Program

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Background: Twenty-six million U.S. adults have diabetes, and 79 million have prediabetes. A 2002 Diabetes Prevention Program research study proved the effectiveness of a lifestyle intervention that yielded a 58% reduction in conversion to type 2 diabetes. However, cost per participant was high, complicating efforts to scale up the program.

Purpose: UnitedHealth Group (UHG) and the YMCA of the USA, in collaboration with the CDC, sought to develop the infrastructure and business case to scale the congressionally authorized National Diabetes Prevention Program nationwide. Emphasis was placed on developing a model that maintained fidelity to the original 2002 Diabetes Prevention Program research study and could be deployed for a lower cost per participant while yielding similar outcomes.

Design: The UHG created the business case and technical and operational infrastructure necessary for nationwide dissemination of the YMCA's Diabetes Prevention Program (YMCA's DPP), as part of the National Diabetes Prevention Program. The YMCA's DPP is a group-based model of 16 core sessions with monthly follow-up delivered by trained lifestyle coaches.

Setting/participants: A variety of mechanisms were used to identify, screen, and encourage enrollment for people with prediabetes into the YMCA's DPP.

Intervention: Substantial investments were made in relationship building, business planning, technology, development, and operational design to deliver an effective and affordable 12-month program. The program intervention was conducted July 2010–December 2011. Data were collected on the participants over a 15-month period between September 2010 and December 2011. Data were analyzed in February 2012.

Main outcome measures: The main outcome measures were infrastructure (communities involved and personnel trained); engagement (screening and enrollment of people with prediabetes); program outcomes (attendance and weight loss); and service delivery cost of the intervention.

Results: In less than 2 years, the YMCA's DPP was effectively scaled to 46 communities in 23 states. More than 500 YMCA Lifestyle Coaches were trained. The program enrolled 2369 participants, and 1723 participants completed the core program at an average service-delivery cost of about \$400 each. For those individuals completing the program, average weight loss was about 5%. UHG anticipates that within 3 years, savings from reduced medical spending will outweigh initial costs.

Conclusions: Large-scale prevention efforts can be scalable and sustainable with collaboration, health information technology, community-based delivery of evidence-based interventions, and novel payment structures that incentivize efficiency and outcomes linked to better health and lower future costs.

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Background

Twenty-six million U.S. adults have diabetes, and 79 million have prediabetes. In 2002, a Diabetes Prevention Program research study proved the effectiveness of a lifestyle intervention that yielded a 58% reduction in conversion to type 2 diabetes. In 2010, the National Diabetes Prevention Program was created by Congress and provides the overarching architecture to organize nationwide programs to prevent diabetes through changes in lifestyle. This study describes the collaborative, community-based development and scale-up of a coordinated model for a lifestyle intervention diabetes prevention program and discusses strategies for nationwide scaling of this and similar programs.

Diabetes is a chronic and disabling disease that affects 8.3% of the population of the U.S., nearly 26 million adults.¹ The number of people diagnosed with type 2 diabetes has more than tripled since the 1980s.^{2,3} Among adults aged ≥ 65 years, the prevalence of type 2 diabetes is 26.9%.¹ Caring for people with diabetes can be expensive: Cost data from a sample of 10 million commercial health plan members showed that the total cost of care for a known individual with diabetes who interacted with the healthcare system was 2.7 times higher than for individuals without diabetes, averaging approximately \$11,700 in 2009 compared to \$4400 for the remainder of the population.⁴

Another 79 million individuals, about one in every four adults, have prediabetes. The CDC estimates that half of all U.S. adults aged >65 years have prediabetes.¹ Prediabetes is a condition in which individuals have blood glucose levels that are higher than normal, but not high enough to be classified as diabetes.¹ Prediabetes can often be reversed or substantially delayed in its progression to type 2 diabetes. Without intervention, however, many people with prediabetes develop type 2 diabetes. According to one recent study, between one third and two thirds of individuals with prediabetes are likely to develop type 2 diabetes within 6 years, compared to fewer than 5% of those with normal blood glucose.⁵ Only about 7% of Americans living with prediabetes today are aware that they have the condition.⁶ Testing specifically for evidence of prediabetes is not widely conducted, although some health insurers use analytic tools to flag patients who warrant screening for this condition.^{7,8}

The continuing growth of diabetes will have major implications for the growth of healthcare costs in the U.S. and for the overall health of the American people. A 2012 study conducted by the Center for Health Reform and Modernization at UnitedHealth Group (UHG) presented estimates of the projected prevalence of prediabetes and diabetes among adults in the U.S. over the next decade, and of the spending expected to be associated with these

conditions.⁹ Using the *Cost of Diabetes Model* that was developed for the American Diabetes Association¹⁰ and a health promotion micro-simulation model, the study projected that:

- Approximately 100 million people (roughly 38% of the adult population) may have prediabetes, based on fasting glucose concentrations, in 2021, up from 29.7% of adults with prediabetes in 2011.
- Among the U.S. adult population, 53.6% could have either prediabetes or diabetes by 2021, a level higher than the estimated 41.5% today.
- Annual spending on the care of prediabetes or diabetes will rise from \$206 billion this year (approximately 8% of total U.S. health spending) to \$512 billion by 2021.
- Nearly two thirds of that cost increase would likely fall to Medicare and Medicaid.

In 2002, *The New England Journal of Medicine* published results from the Diabetes Prevention Program research study that involved more than 3000 people diagnosed with prediabetes. It showed that a carefully designed, intensive lifestyle intervention reduced the incidence of type 2 diabetes by 58% in individuals with prediabetes who lost just 5% of their body weight and participated in 150 minutes of physical activity per week. The lifestyle intervention was effective in reducing diabetes incidence regardless of ethnicity and was even more effective (71% vs 58%) in those aged >60 years.¹¹ A 10-year follow-up of this study showed reductions in the cumulative incidence of type 2 diabetes with the lifestyle intervention.¹²

The cost of the intervention described in the 2002 Diabetes Prevention Program research study was quite high, due to one-on-one counseling with clinical personnel, averaging over \$2700 per participant over 3 years.¹³ These costs initially complicated efforts to scale up the program to handle growing capacity while maintaining cost effectiveness and functionality.¹⁴ Efforts to make the research study intervention scalable and sustainable were greatly informed by a study conducted by Ackermann et al.¹⁵ That study found that a group-based approach delivered through community organizations (e.g., the YMCA) was effective in reducing body weight and provided a “promising channel for wide-scale dissemination of a low-cost approach to lifestyle diabetes prevention.”¹⁵

Other recent studies also helped inform the redesign of the intervention. A recent meta-analysis showed that a nationwide diabetes prevention program can be delivered by nonmedical personnel resulting in lower costs while achieving clinically significant weight loss.¹⁶ These findings are crucial to the scaling and sustainability of diabetes prevention interventions.

To illustrate the opportunity available if all U.S. adults with prediabetes were to enroll in this type of prevention program, UHG's Center for Health Reform and Modernization also estimated the impact on disease prevalence and healthcare spending.¹⁷ If intensive lifestyle intervention among all prediabetes patients enabled them to replicate results of the 2002 research study, diabetes prevalence could be reduced by 8% by 2020. The UHG report estimated that the number of individuals expected to convert from prediabetes to type 2 diabetes would be reduced by three million over the next decade, with cumulative health system savings of \$105 billion. Of those savings, \$61 billion would accrue to the federal government through a reduction in Medicare and Medicaid spending and insurance subsidies. In practice, reaching all those with prediabetes within 10 years would be infeasible, so the figures are indicative of the size of the opportunity—and the costs of inaction.

What can be done to address the diabetes epidemic and help avoid the vast public and private costs projected to be associated with it? In 2010, Congress authorized the CDC to develop and lead the National Diabetes Prevention Program, which provides the overarching architecture to organize diabetes prevention lifestyle change programs across the country. The present study focuses on the development, scaling up, and results of one such program and recommends strategies for the nationwide scaling up of this and similar diabetes prevention lifestyle change programs.

Purpose

The UHG and the YMCA of the USA (YMCA) were the first organizations to become part of the federally mandated National Diabetes Prevention Program. Together, they have demonstrated that diabetes prevention programs delivered through partnerships that involve payers, community-based organizations, and the government, and are supported by a performance-based payment model, can be successful in improving health outcomes and generating net savings. A particular focus was on developing a scalable intervention that could be deployed for a relatively low cost per participant.

As UHG enhanced their focus on diabetes prevention and control, they initiated the Diabetes Prevention & Control Alliance (DPCA), which was created in 2010 specifically to ally public and private sector partners to prevent and control type 2 diabetes. The DPCA provides the business infrastructure, such as technology, business process, payment adjudication, and data management that support scaling diabetes prevention services nationally. DPCA services include checking and managing program eligibility; filing claims; engaging the physician community; analyzing large HIPAA-protected data sets; and conducting outreach, engagement, and testing

campaigns. The DPCA then creates and operates the infrastructure necessary to deliver these services to as many as 79 million at-risk individuals, manage program quality, and report back to payers. The DPCA is a health services company that works independently and agnostically with multiple payers.

Employers and other payers have joined this program with the expectation that it will help identify individuals with prediabetes and reduce their progression to diabetes as well as the related disease costs.¹⁸ In doing so, they have recognized the imperative to extend the primary care system and create the infrastructure to incorporate these programs from community-based providers into the healthcare system. A flexible technology platform was developed to support numerous delivery partners and payers. In moving to scale the National Diabetes Prevention Program nationwide, the DPCA provided advanced analytics and technology support, including assistance with enrollment, content management, data collection, evaluation, payment, and quality assurance.

Methods

Design

Participants with prediabetes are enrolled in the YMCA's Diabetes Prevention Program (YMCA's DPP), a 12-month community-based initiative. As a service provider, the YMCA's DPP uses the DPCA infrastructure for support with tasks such as managing content and collecting patient data. Local YMCAs are compensated for successful program delivery based on enrollment, program completion and final individual participant outcomes, particularly for weight loss. Nearly 60% of the U.S. population lives within 3 miles of a YMCA facility, and the program can be delivered by YMCA Lifestyle Coaches at many other community settings, making this a convenient program for participants.

The YMCA ensures that each Lifestyle Coach is highly qualified and trained to facilitate participants' achievement of program goals to reduce their risk of developing diabetes. Each Lifestyle Coach is chosen by their local YMCA through an interview process, and vetted by YMCA Master Trainers during training and quality assurance site visits. Lifestyle Coach candidates must have experience in group facilitation; listening skills (i.e., motivational interviewing); and basic knowledge of healthy lifestyle principles.

The YMCA Master Trainers facilitate a 2-day curriculum training where Lifestyle Coach candidates learn from the research behind the YMCA's DPP, receive HIPAA training, learn key messages for each program session, facilitate a portion of the class, and discuss program logistics. YMCA Master Trainers assess each candidate's ability to facilitate the program with a pass/fail status and discuss their findings with the local YMCA Program Coordinator. The Lifestyle Coach selection and training process thus allows the YMCA to ensure consistent, high-quality program delivery. The YMCA Lifestyle Coaches are more readily available and less costly than physicians and other traditional healthcare professionals and potentially more reflective of the participants from a "peer educator" perspective.

Patient engagement continues to be the greatest challenge. Program experience indicates that the primary means to get people into the YMCA's DPP (and to ensure the best use of resources) is to conduct marketing and promotional campaigns that target high-risk individuals and make it convenient for those individuals to be tested for prediabetes. The greatest successes have come from DPCA-led community- and employer-based testing events paired with onsite counseling and enrollment that leverages the "teachable" moment—that is, when the high-risk individual is presented with their blood test result. With this methodology, program enrollment is up to 80%. Other successful efforts involve local connections and referrals generated by local YMCA staff, and by the efforts of physicians, pharmacists and administrative staff. They have a pivotal role in identifying, educating, and referring appropriate members. Strategies to engage physicians and other health professionals include:

- physician forums;
- physician office compensation for testing and outreach; and
- pharmacy testing and outreach.

Setting/Participants

The YMCA's DPP is a 12-month program in which participants with prediabetes strive to make sustainable lifestyle changes that prevent diabetes. The program is conducted at local YMCAs, and in other community settings by YMCA staff, in 46 communities and 23 states. As of January 31, 2012, a total of 2369 individuals participated in the YMCA's DPP and another 1053 were enrolled. Program participants are predominately female and aged >45 years. Specifically, 76% of participants included in this analysis were female; 50% were aged ≥ 55 years; 25% were aged 45–54 years; and the remaining 25% were aged <45 years.

The data collected for this article was based on a secondary data analysis; the information was collected for payment and operations. UHG and the YMCA's DPP does not require IRB approval for secondary data analysis. All participants were aged ≥ 18 years and provided consent to the YMCA's DPP. Participant consent and authorization to collect their data in MYnetico was obtained for general program use, outcome tracking, and routine program delivery.

Intervention

The YMCA's DPP is a 12-month program in which participants with prediabetes strive to make sustainable lifestyle changes that prevent diabetes. The participants aim to lose 7% of their body weight through diet and engaging in physical activities for 150 minutes each week. They meet as a group for 16 core sessions (usually one per week) and then for eight monthly maintenance sessions. The program intervention was conducted from June 2010 through December 2011.

Data were collected on the participants over a 15-month period between September 2010 and December 2011. Data were analyzed in February 2012.

Sessions follow a curriculum aligned with CDC standards. In each session, a trained Lifestyle Coach at the local YMCA teaches strategies for incorporating physical activity and healthy eating into daily life, changing behavior, and identifying and overcoming barriers that may inhibit success and participant progress. The Lifestyle Coach monitors program outcomes including attendance, weight, and weekly tracking of food consumption and physical activity during each session.

Main Outcome Measures

The principal outcome measures examined in this study are as follows:

- community involvement—the number of communities nationwide offering the YMCA's DPP intervention;
- the number of Lifestyle Coaches trained to deliver the intervention;
- participant enrollment—the number of high-risk individuals identified and enrolled;
- participant completion—the number of participants who have attended at least nine core sessions;
- average core session attendance;
- average weight loss for participants completing the core program.

Results

In the first 18 months of operations, the YMCA's DPP was effectively scaled to 46 communities in 23 states where it was reimbursed through private payers, self-insured employers, and CDC funding. More than 500 YMCA Lifestyle Coaches have been trained to administer the lifestyle change program. As of January 31, 2012, a total of 2369 individuals have participated in the YMCA's DPP, and another 1053 are currently active in the core program. As of January 31, 2012, a total of 1723 participants have successfully completed the core program (attended nine of the initial 16 weekly sessions). On average, 89% of participants who attend one session will go on to attend four or more core sessions, and 73% of participants will go on to complete the program (attending at least nine core sessions) at an average service delivery cost of about \$400 per participant.

Table 1 presents participation data and weight-loss results for participants in the YMCA's DPP. The participants are grouped by those who had program fees covered by their health insurance plan and those who either funded the program on their own or received grant subsidies from the YMCA and/or the CDC. Participants receiving coverage for the program through their health insurance plan achieved slightly better outcomes, with an average attendance of 13.06 sessions (among those completing at least four sessions) and average weight loss of 5.22% (among those completing the program). The aggregate results to date are an average weight loss of 4.77% with an average attendance rate of 12.35 (of 16) sessions.

Although the program has been operating for only 18 months, the results reflect attendance and weight loss similar to that of the original 2002 Diabetes Prevention Program research study. Further, results seem to be improving over time. For all participants who completed the core program in 2011, the average weight loss was 5.04%, compared to 3.12% for those who completed the core program in 2010. Finally, the program continues to

Table 1. YMCA Diabetes Prevention Program (YMCA's DPP) participation and weight loss results

Metric	Insurance	Grant/self-pay	Total
Total participants enrolled, <i>n</i>	727	1642	2369
Total participants attended (four or more core sessions), <i>n</i> (%) ^a	650 (89.4)	1454 (88.6)	2104 (88.8)
Total participants completed (nine or more core sessions), <i>n</i> (%) ^b	562 (77.3)	1161 (70.7)	1723 (72.7)
Average core session attendance	13.06	12.03	12.35
Average weight loss, %	5.22	4.55	4.77

^aBased on data for participants who have attended four or more core sessions

^bBased on data for participants who have attended nine or more core sessions

All data are for core classes that were completed as of January 31, 2012.

grow—as of August 31, 2012, more than 8000 participants have enrolled in or completed the program.

Overall, the intervention achieved the intended health outcomes consistent with the original 2002 Diabetes Prevention Program research study for the population (about 5% weight loss, which was correlated with a 58% reduction in conversion to type 2 diabetes) on a national scale at reduced costs. With these results, the DPCA anticipates that the savings from reduced medical spending will outweigh the initial costs of the intervention within 3 years, thus creating a positive “return on investment” even as it improves the health and well-being of enrollees. To achieve these results, it is critical to enhance the capacity to identify high-risk individuals and their providers, continue to use a performance-based provider reporting and payment system, and create and test additional participant/provider engagement strategies.

Discussion

The original 2002 Diabetes Prevention Program research study demonstrated that significant reduction in the risk of progressing from prediabetes to diabetes could be achieved, but also raises the question: **Why was so little done by the wider healthcare community in the years following the publication of the research study results to bring the new intervention to scale and to ensure it had a broad impact on population health?** The absence of such action illustrates one of the challenges associated with healthcare innovation: new drugs or clinical treatments generally spread much faster than new organizational models to deliver other types of interventions. Recognizing that fact, and embracing their role as an activator of new models of prevention and care, the DPCA, the YMCA, and the CDC collaborated to initiate the YMCA's DPP and to scale the lifestyle change intervention nationwide.

Even with this success, lifestyle change programs such as the YMCA's DPP remain unavailable to most Americans with prediabetes, most notably the Medicare and

Medicaid populations. Medicare does not currently provide reimbursement for such interventions, nor does it cover HbA1c testing for the diagnosis of prediabetes. Given the potential savings for the healthcare system, Medicare's adoption of these services on behalf of the millions of enrollees who can benefit from them is crucial. This involvement could include reimbursing interventions modeled on the YMCA's DPP, using trained “extenders” such as the YMCA's Lifestyle Coaches and other trained lay health staff. And just as private payers are developing “value-based” insurance designs that encourage patient engagement and lifestyle changes, policymakers could consider testing similar models as part of a redesigned benefit in fee-for-service Medicare or Medicaid.

Employer wellness programs could continue to deploy incentives that could address prediabetes. The 2010 health reform law includes new provisions that allow financial incentives tied to health promotion and wellness that represent up to 30% of the cost of employee coverage. The Secretaries of Labor and Health and Human Services have the ability to increase wellness rewards to 50% of the cost of coverage. These incentives should be available to promote diabetes prevention and diabetes management, especially for enrollees in fee-for-service Medicare and Medicaid. Enrollees in the new state insurance exchanges also should see meaningful financial incentives to stay healthy or to maintain compliance with chronic care treatment programs. Savings to Medicare may depend on investments in preventing prediabetes and diabetes for the population aged <65 years.

Patients and their care providers will, of course, be central to efforts to address the diabetes challenge. But making a major impact on the prediabetes and diabetes epidemic also requires health plans and Medicare and Medicaid to identify beneficiaries who might benefit from these interventions; to work broadly with a range of organizations in their communities to implement and sustain these new models of care coordination, behavioral support, and community involvement, including

the use of actionable information and well-designed payment incentives; and to discover additional ways to stimulate improvements in the quality and appropriateness of care. To be most effective, these actions by payers will need to be matched by a policy agenda that supports the design and funding of new models of care.

Conclusion

The program delivery model developed by the DPCA, the YMCA, and the CDC provides a persuasive example of a modest investment in a large-scale prevention effort that not only is needed and valued but also holds the promise of sustainability by combining (1) efforts to identify adults who are at the highest risk now of developing type 2 diabetes in the future; (2) lower-cost, community-based delivery of an evidence-based lifestyle change intervention; (3) management of the National Diabetes Prevention Program by the CDC that includes a national recognition system to ensure program fidelity; and (4) a novel payment structure that supports the YMCA in delivering the intervention but incentivizes efficiency and outcomes that are linked to better health and lower future costs.

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