

# Implementation of the YMCA Diabetes Prevention Program throughout an Integrated Health System: A Translational Study

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Perm J 2016 Fall;20(4):15-241

E-pub: 10/21/2016

<http://dx.doi.org/10.7812/TPP/15-241>

## ABSTRACT

**Context:** HealthSpan Physicians (HSP), an integrated medical system in Northeast Ohio, partnered with the Young Men's Christian Association (YMCA) of Greater Cleveland to implement a referral system for the evidence-based Diabetes Prevention Program (DPP) throughout HSP. The YMCA of USA employs a cost-effective, customized version of the original DPP in which coaches take the place of in-house clinical staff. Efficacy of the YMCA DPP was shown earlier in the DEPLOY Study.

**Objective:** To improve outcomes of metrics used in the DEPLOY Study.

**Design:** Observational study focusing on engagement, persistence, recruitment, and adherence to the DPP. In August 2014, HSP mailed an invitation to 2200 patients identified as both Medicare eligible and at risk of prediabetes to attend no-obligation information sessions about the DPP. After these sessions, YMCA staff called interested participants and asked them to enroll in and to commit to the program. Motivation and reinforcement were provided to patients through YMCA-provided signs, brochures, and posters; the HSP Web site; and in-person conversations with primary care physicians.

**Main Outcome Measures:** Average weight loss at the end of 16 weeks in the program and average retention through Session 9.

**Results:** Of the 2200 patients contacted, 351 (16.0%) responded by attending the information session, and 228 enrolled in the YMCA DPP (11.3%) and persisted through at least Week 9. This result is an improvement over the 1.7% of eligible enrollees who responded to the DEPLOY Study's mailing.

**Conclusions:** A marketing approach to implementing the YMCA DPP in an integrated medical system results in excellent outcomes.

## INTRODUCTION

As reported by the Centers for Disease Control and Prevention (CDC), more than 86 million patients have prediabetes, defined as impaired glucose tolerance (2-hour plasma glucose level between 140 and 199 mg/dL) or impaired fasting glucose level between 100 and 125 mg/dL.<sup>1</sup> People with prediabetes are at increased risk for development of Type 2 diabetes.<sup>2</sup> Obesity and/or overweight conditions (body mass index [BMI] > 25 kg/m<sup>2</sup>) are major contributing factors to prediabetes and Type 2 diabetes.

However, the progression from prediabetes to Type 2 diabetes can be significantly slowed and/or reduced by patients' adhering

to the protocol of an evidence-based Diabetes Prevention Program (DPP), developed in the mid-1990s with funding from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). In the first 3 years of the randomized, NIDDK-sponsored DPP Outcomes Study, the DPP lifestyle intervention group reduced the number of new cases of Type 2 diabetes by 58% compared with a placebo group.<sup>3</sup> In more than 10 years of randomized trials, the diabetes incidence in high-risk adults was reduced by 34% with intensive lifestyle intervention through the DPP.<sup>4</sup>

The DPP as originally constructed<sup>5</sup> was hard to implement and sustain in busy health care settings, where cost was also a major issue.<sup>6</sup> This problem has called for real-world adaptation, as with the Young Men's Christian Association (YMCA) of the USA's customized 52-week version of the program (16 weekly sessions followed by 9 more sessions during the following 8 months), wherein specially trained lifestyle coaches provide mentoring and support to the participants in group settings.<sup>7</sup> Even with referrals from primary care physicians (PCPs), enrollment and program attendance/adherence has been challenging in YMCA implementation efforts. For instance, in the well-known DEPLOY Study (Translating the Diabetes Prevention Program into the Community)—involving the Indiana School of Medicine and the YMCA of Indianapolis—there was a 1.7% client enrollment resulting from the initial mailing to 7500 Indianapolis households (Figure 1).<sup>6p357</sup>

Although the long-term effects of untreated prediabetes are well-known, education and information-only approaches to clients with prediabetes and to health providers have not resulted in adherence to the three pillars of prediabetes treatment: diet and nutrition change, change in exercise habits, and lifestyle change.<sup>8</sup> Unchecked obesity is a prime predictor of prediabetes, leading to the onset of Type 2 diabetes.

Despite this knowledge in patients and providers alike, the YMCA has experienced difficulty in attracting new clients to the preventive intervention of the YMCA DPP and in securing client adherence to the program protocol.

Here, we report unusually high outcomes in initial attendance, persistence, and weight loss resulting from a marketing approach to implementation of the DPP. This accomplishment was made possible through a partnership between the YMCA of Greater Cleveland and HealthSpan Physicians (HSP), a division of Mercy Health in Northeast Ohio.

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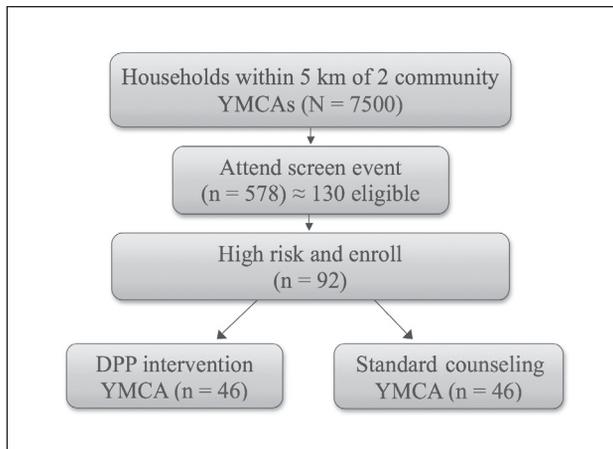


Figure 1. Implementation of the YMCA's Diabetes Prevention Program in the DEPLOY Study.<sup>1</sup>

<sup>1</sup> Ackermann RT, Finch EA, Brizendine E, Zhou H, Marrero DG. Translating the Diabetes Prevention Program into the community. The DEPLOY pilot study. *Am J Prev Med* 2008 Oct;35(4):357-63. DOI: <http://dx.doi.org/10.1016/j.amepre.2008.06.035>.

YMCA = Young Men's Christian Association; DPP = Diabetes Prevention Program.

## METHODS

The initial thrust of the present partnership and translational study between the YMCA of Greater Cleveland and HSP, an integrated medical system, has been to motivate attendance at information sessions. The next goal was to encourage enrollment in the YMCA's DPP and adherence to the program protocol through at least the first nine weeks of the program. Nine weeks' attendance is the CDC-approved standard for persistence in the program, leading presumably to lasting behavior change.<sup>9</sup>

Because of demographic factors (location, income, and employment patterns), the present study was able to attract primarily (95%) African American women with prediabetes in the research cohort. The women were predominately older than age 50 years. Most were Medicare patients.

Obesity, as stated, is a leading indicator of risk for the onset of Type 2 diabetes. As Hamman et al<sup>10</sup> found in a large field study of DPP participants after 3 years of follow-up: "Weight loss was the dominant predictor of reduced diabetes incidence ... For every kilogram of weight loss there was a 16% reduction in risk."

Race is another major contributing variable in efforts to maintain weight loss. Largely because of obesity or overweight conditions, some racial and ethnic groups have a much higher risk for development of Type 2 diabetes. In 2003 to 2004, approximately 30% of non-Hispanic white adults were obese, as were 45% of non-Hispanic black adults and 36.8% of Mexican Americans. In that same period, black women exhibited the highest rates of overweight and obesity, at 58% of the population aged 40 to 59 years compared with about 38% of non-Hispanic white women of the same age.<sup>11</sup> Study after study has shown that both achievement and maintenance of weight loss has been particularly problematic for African American women, and the DPP protocol has been no exception.<sup>12,13</sup> In one controlled study using the DPP among different groups, West et al<sup>14</sup> found that

African American women achieved and sustained roughly half the weight loss experienced by other ethnic groups.

### Pilot Study (Phase 1)

In October 2013, HSP of Northeast Ohio and the YMCA of Greater Cleveland entered into a collaboration in which HSP would refer its eligible clients with prediabetes and the YMCA would conduct its customized version of the program (up to 25 sessions during the course of a year using trained lifestyle coaches). The first 9 weeks of the program focused on engagement, persistence, and recruitment.

In Phase 1 of this project, the pilot phase, the partners relied primarily on the following tactics to attract clients. First, the PCP recommended that his/her client investigate the YMCA DPP, because the client was suspected of having prediabetes. Second, if interested, the patient picked up an engagement brochure in the examination office—which was noted in the patient's record—giving a description of the program's content, plus the time and location of the next informational session. Also provided was a YMCA telephone number to call with questions. We then relied on the patient's own motivation (Stage 2 in the DiClemente and Prochaska "Stages of Change" hierarchy, "Contemplation" of lifestyle change) as to whether the patient would show up for the information session.<sup>15</sup> At this point, HSP engaged in a minimum of 2 telephone calls to repeat the invitation to attend the information session to those who had picked up the informational brochure in either the outer office or the examination room.

Initial efforts were focused on 2 HSP locations, each of which featured a predominately African American population. From October 2013 to July 2014, there were approximately 100 referrals to the information sessions, which resulted in 33 enrollees in the yearlong program. The enrollees provided consent to the tracking measures that were to be used. After 5 months of Phase 1 participation in the YMCA DPP, the following outcomes were reported: 1) 17 patients, or slightly more than 50%, persisted in the program through Week 16, the final weekly session; 2) of these 17 patients, the average weight loss was approximately 4.7% of body weight, which conforms closely to the national average at this stage. The goal for the 16-week period was 7% of body weight lost.

### Phase 2

Because of the perceived success of the pilot effort, the project entered into Phase 2 (August 2014 through November 2015), extended to the entirety of the HSP network of patients in Northeast Ohio.

Thanks to a grant for Medicare-eligible older adults, Phase 2 of the project began in August 2014 with an HSP mailer to 2200 clients who had been identified in the electronic health record as both Medicare eligible and at risk of diabetes. The mailer invited them to information sessions to be held throughout the region. A follow-up mailer was sent to 1200 clients largely duplicative of these same people.

In addition, HSP and the YMCA decided to employ more of a marketing approach, featuring many touchpoints, or "touches" (methods or modes of contact between the organization and the consumer), and direct contact from the Population Management

Department staff. Via a referral form at our Cleveland locations, we captured the names of the clients who were referred to the YMCA DPP, which set into motion the following mechanism. Anyone who showed interest in the program—and was perceived as eligible—was exposed to additional motivators provided through signage, brochures, and telephone follow-up for scheduled sessions, in which the name of the PCP was invoked. A sample phone script follows:

*Hi! I'm calling on behalf of Dr \_\_\_\_, from HealthSpan. In a recent visit, [s/]he noted that you were very possibly prediabetic and were in danger of developing Type 2 diabetes if this condition were not brought under control. Your doctor also mentioned the YMCA's Diabetes Prevention Program, in which trained coaches help you to bring about necessary changes in \_\_\_\_.*

*The next no-obligation information session on the YMCA's Diabetes Prevention Program is scheduled for \_\_\_\_ at either 1 pm or 6 pm. Which session would be most convenient for you to attend?*

*[If needed] We have other sessions ...*

As described by Jay Conrad Levinson,<sup>16</sup> lead author of the best-selling book, *Guerrilla Marketing for Non-Profits*, the idea here is (once a name is captured): "Follow-up, Follow-up, Follow-up!" At HSP, all were involved: the PCP, the clinical staff, and (using the electronic health records) the Population Management Department.

**RESULTS**

The summary impact of Phase 2, in terms of engagement and subsequent enrollment in the YMCA's DPP, was much greater than usually experienced with a direct-mail campaign and resulted in a greater turnout than in previous YMCA joint projects. Outcomes were

1. Of the 2200 Medicare patients identified as having or likely to have prediabetes and encouraged to attend a YMCA information session in their community, 185 attended various information sessions.
2. Of the attendees, 168 evidenced interest in enrolling in the program.
3. After screening, 160 remained eligible and provided informed consent, and 152 formally enrolled in the program.
4. Remarkably, 137 of these persisted in the program through the 9th class or longer. As mentioned previously, the 9th class is the CDC-approved standard for persistence in the program.

With this success, we amplified our efforts, involving supportive follow-up telephone calls from our Population Management Department. We sent a second mailer to 1200 persons from a duplicative group of Medicare clients identified—with the help of our electronic health record—as likely to have prediabetes. These results are displayed in Table 1, with an overall enrollment of 248 persons and a persistence rate through Week 9 of 228 enrollees, or 11.3% of those perceived as eligible for the program. This represents a far greater persistence rate than similar efforts heretofore reported in the DPP literature.<sup>17,18</sup>

Finally, in terms of weight loss, program outcomes exceeded national averages for the YMCA DPP, which are average weight loss at the end of the weekly sessions (week 16) of 4.6% and average retention (persistence) through Session 9 of 83.6%. As can be

seen in Table 2, our corresponding figures were an average weight loss of 5.37% and a persistence rate through Week 9 of 91%.

There were only 20 dropouts in the program after Phase 1 and even fewer (N = 5) after the conclusion of Phase 2. This lower dropout rate in Phase 2 was counterintuitive because of the initially high participation rate. This phenomenon will be the subject of further analysis in forthcoming publications.

Tentatively, we have identified the salient factors in the success of the program as 1) PCP referral, 2) intervention from Population Management with personalized telephone calls, and 3) personalized follow-up from YMCA staff. The follow-up process, designed to maximize marketing touches with the patient, can best be summarized as

- PCP provides the patient referral and fills out referral form
- Population Management employee makes a telephone call to remind the patient of the upcoming information session and encourages attendance
- Patient attends the information session and provides a release of information to obtain BMI and blood test results
- Release documents are sent to Population Management to verify the BMI and qualifying blood test
- Information is sent to the YMCA
- YMCA makes up to three calls to patients who met the enrollment criteria to invite them to enroll in the program; those who did not meet the criteria are not invited to enroll.

**Table 1. HealthSpan Physicians' and the YMCA's Diabetes Prevention Program enrollment data (October 13, 2013 to September 4, 2015)**

Participant category	Group 1 (October 13, 2013)	Group 2 (April 15, 2014)	Total
Patients perceived as eligible and sent a letter	2200 <sup>a</sup>	1220	3420
Attended an information session	186	165	351
Registered initial interest	168	158	326
Remained eligible after screening	160	118	278
Enrolled and attended the first class	152	96	248
Attended the ninth class <sup>b</sup>	137	91	228
Dropped out before the ninth class	15	5	20

<sup>a</sup> Of this total, 1220 patients received an additional duplicate mailing in March 2015 for classes commencing April 15, 2015.

<sup>b</sup> The ninth class is taken as the client's measure of efficacy/changed behavior, according to the Centers for Disease Control and Prevention.

YMCA = Young Men's Christian Association.

**Table 2. Weight loss outcome measures in 228 participants who completed the program (Phase 2)<sup>a</sup>**

Measure	Percentage
Persistence (attended ninth class)	91.0
Percentage of body weight loss	
Mean	5.37
Median	5.57

<sup>a</sup> Program completion was defined as completing a minimum of 9 classes, with some groups still in progress at the time of this writing.

## DISCUSSION

### Cost-Effectiveness

In conceiving cost-effectiveness metrics for the YMCA's DPP, there are at least 3 perspectives to be considered: 1) the cost of "doing nothing"—the cost to the patient and the medical provider/insurer incurred in treating diabetes itself, 2) the cost of the "next best (medicinal)" alternative, and 3) the added years of life expectancy.

With respect to the cost of doing nothing, the American Diabetes Association provides these statistics: "People with diabetes have health care expenditures that are 2.3 times higher (\$13,741 vs \$5853) than expenditures that would be expected for this same population in the absence of diabetes ... [suggesting that] diabetes is responsible for \$7888 in excess expenditures per year for the person with diabetes."<sup>19</sup> This latter figure is exclusive of indirect costs (unemployment, absenteeism, etc), which are considerable.

There is a significant difference in cost of the YMCA's DPP vs the cost of some recently approved weight loss drug treatments, which also result in an average 5% sustained weight loss over time (which is the Food and Drug Administration standard as of October 10, 2015).<sup>20</sup> As of this writing, the Food and Drug Administration has approved 5 weight loss drugs, ranging in cost from orlistat at \$173/month to injectable liraglutide (Victoza) at \$658/month.<sup>21</sup> The latter is approved for weight loss only in patients with Type 2 diabetes, but higher-dose liraglutide marketed as Saxenda was approved for weight management in December 2014 for use in obese adults (BMI of 30 kg/m<sup>2</sup> or greater) or in overweight adults (BMI of 27 kg/m<sup>2</sup> or greater) who have at least 1 weight-related condition such as hypertension, Type 2 diabetes, or dyslipidemia.<sup>22</sup> Alternatively, the full cost of the YMCA of the USA's DPP is \$429/year (\$36 per month), which carries with it a proven 5% average weight loss and is therefore less costly, with fewer risks, than any of the above-mentioned drugs.

Although there are various formulations of added life expectancy, the calculation is pretty much in the eyes of the beholder. At minimum, 29% of all adults with prediabetes progress to a diagnosis of Type 2 diabetes at the rate of 5% to 15% per year.<sup>3,19</sup> According to some experts, Type 2 diabetes reduces life expectancy by 6 to 10 years.<sup>23</sup> Previously cited studies have shown that the DPP, particularly with older adult populations, has been able to reduce the incidence of new cases of diabetes by 71%.

### Phase 3

Because of the perceived efficacy of this project in the Northeast Ohio region, the HSP-YMCA partnership in the YMCA's DPP has been extended statewide, throughout the Mercy\HealthSpan Integrated Medical system and wherever YMCAs are located (approximately 11 regional YMCAs and upward of 200,000 potential prediabetic referrals). On the basis of the Greater Cleveland experience and the learnings that resulted therefrom, we expect even greater rates of enrollment and engagement than those reported above.

In terms of scalability to other integrated health systems, Matt Longjohn, MD, of the YMCA offered the following observation (personal communication, July 14, 2015): "The rapid transformation of our health care system towards accountability and value indicates that the collaboration between HSP and the

YMCA in Ohio will be an attractive model for clinicians, health care systems and policy makers to explore and replicate."

### Limitations

A key limitation of this current study is that it was an observational study and not a randomized clinical trial. The analytic results were not intended to reflect an experimental design. In future and ongoing work as the program expands, we will have the opportunity to conduct a more rigorous stepped-wedge or cluster randomized trial, incorporating controls and taking into account critical factors unobserved in the current analysis (eg, selection, dropout, and intent-to-treat analysis).

### CONCLUSIONS

The earlier DEPLOY study demonstrated that the YMCA possesses both a promising vehicle for the dissemination of the DPP lifestyle intervention and one that is cost-effective. The present study indicates what is possible in an integrated health care system with a concentrated systemwide effort in reaching and engaging those at risk of developing diabetes. Both HSP and the YMCA embraced principles of marketing in which a maximum number of "touches" and follow-up with potential clients was the key ingredient.

Now that the client has been engaged, it remains to be seen how long on average patients will persist in the lifestyle change that has been found to be effective. In our next effort together, HSP and the YMCA are engaging in a pilot study focusing on maintenance of lifestyle change in the YMCA DPP participants. We have designed a project, termed SISTERS,<sup>24</sup> which makes use of avatars in a home setting to encourage exercise and thus weight loss maintenance. We propose to enhance our current capital-intensive, facility-based care delivery system with an in-home digital health-enabled obesity-care delivery system, working in concert with the YMCA DPP. ❖

<sup>a</sup> National Health Officer, YMCA of the USA, Chicago, IL.

### Disclosure Statement

*The author(s) have no conflicts of interest to disclose.*

### Acknowledgments

*The authors would like to acknowledge Adam Perzynski, PhD; Matt Longjohn, MD; and John Boltri, MD, FAAFP for their assistance in the preparation of this manuscript.*

*Kathleen Loudon, ELS, of Loudon Health Communications provided editorial assistance.*

### How to Cite this Article

Adams R, Hebert C, McVey L, Williams R. Implementation of the YMCA Diabetes Prevention Program throughout an integrated health system: A translational study. *Perm J* 2016 Fall;20(4):15-241. DOI: <http://dx.doi.org/10.7812/TPP/15-241>.

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## Carbon in Fat

Every carbon in fat is derived from sugar that man ate or that the cow ate.

Oil or fat is nothing more than congealed candy.

— Rachmiel Levine, MD, 1910-1998, physician and researcher  
in how insulin increases the body's use of blood sugars