

**ORIGINAL RESEARCH**

# DPPFit: Developing and Testing a Technology-Based Adaptation of the Diabetes Prevention Program (DPP) to Address Prediabetes in a Primary Care Setting

Jessica L. Stewart, PhD, MPH, Christos Hatzigeorgiou, DO, Catherine L. Davis, PhD, and Christy J. W. Ledford, PhD

**Objective:** The objective of this study was to adapt the National Diabetes Prevention Program (N-DPP) into a pragmatic tool for primary care settings by using daily text messaging to deliver all N-DPP content, supplemented by Fitbit technology to provide behavioral strategies typically delivered by personnel in traditional programs. Test the mobile health (mHealth), technology-based N-DPP adaptation (DPPFit) in primary care patients with prediabetes using a remote intervention based on the traditional 16 core sessions of the DPP.

**Methods:** A pilot study with pre/post survey analysis of aggregate data were used to determine changes in weight, physical activity, sedentary behavior, and associated diabetes risk outcomes among study participants (n = 33). In this study, participants were issued Fitbit devices and provided the remote intervention over 16 weeks via automated text messaging technology, which followed the content of the DPP core education sessions.

**Results:** Data analysis from baseline to 6-month follow-up demonstrate mean weight loss of 3.3 kg (95% CI: -6.2 to -0.5;  $P = .026$ ), reduction in body mass index by 1.25 points (95% CI: -2.1 to -0.4;  $P = .005$ ), a significant average increase of 2 days in self-reported physical activity per week (95% CI: 0.4 to 3.6;  $P = .015$ ) and an average 10% decrease in sedentary time ( $P = .007$ ).

**Conclusions:** The remote DPPFit intervention demonstrates a promising and practical approach to the management of prediabetes in a primary care setting. The results support the use of the DPPFit program and application to achieve meaningful outcomes in a population with prediabetes. A randomized controlled trial with a larger sample is warranted. (J Am Board Fam Med 2022;35:548–558.)

**Keywords:** Diabetes Prevention Program (DPP), Lifestyle, Metabolic Syndrome, mHealth, Primary Health Care, Technology, Telemedicine, Translational Research

The threat of diabetes mellitus to community health, coupled with the economic impact on health

systems, demands immediate attention. Type 2 diabetes mellitus (T2D) is the focus of the present study and prevention programs worldwide. In 2019, the International Diabetes Federation (IDF) estimated that 463 million people had diabetes, with 90% having T2D.<sup>1</sup> The projected prevalence of diabetes worldwide is expected to grow to 578 million by the year 2030.<sup>2</sup> The prevalence of those at-risk of developing T2D is expected to grow to 8% (454 million) by 2030.<sup>2</sup> This forecast is alarming.

Lifestyle modifications can prevent or delay the onset of diabetes,<sup>3–5</sup> more effectively than

This article was externally peer reviewed.  
Submitted 20 October 2021; revised 8 February 2022; accepted 14 February 2022.

From the Division of Epidemiology, Department of Population Health Sciences, Augusta University, Augusta, GA (JLS); General Internal Medicine, Department of Medicine, Medical College of Georgia, Augusta University (CH); Georgia Prevention Institute, Medical College of Georgia, Augusta University (CLD); Department of Family Medicine, Medical College of Georgia at Augusta University (CWL).

**Funding:** This study was not part of any extramural funding opportunity and has no funding to declare.

**Conflict of interests:** CJWL is Assistant Editor of the *JABFM*.

**Corresponding author:** Jessica Lynn Stewart, PhD, MPH, Augusta University, 1120 15<sup>th</sup> Street, AE-1039, Augusta,

GA, 30912, Office: 706-721-5704 (E-mail: [jesstewart@augusta.edu](mailto:jesstewart@augusta.edu)).

metformin in the Diabetes Prevention Program (DPP) trials.<sup>5</sup> The DPP's individualized and resource-intensive strategies showed that a modest 7% decrease in body weight was significantly related to reduced diabetes incidence, where each kilogram of weight loss is equal to a 16% diabetes risk reduction.<sup>6</sup> Moderate physical activity greater than or equal to 150 minutes a week was the second strongest negative predictor of diabetes incidence.<sup>6</sup>

Following the risk reduction results of the DPP, the US Congress authorized the Centers for Disease Control and Prevention (CDC) to establish a National Diabetes Prevention Program (N-DPP) to provide communities across the United States as a form of the evidence-based program.<sup>7</sup> With this congressional mandate, the CDC established and monitors the Diabetes Prevention Recognition Program (DPRP; [https://nccd.cdc.gov/DDT\\_DPRP/Registry.aspx](https://nccd.cdc.gov/DDT_DPRP/Registry.aspx)), a formal registry of N-DPP programs nationwide.<sup>8</sup> Although the CDC's initiative evolves and includes more than 1 acceptable curriculum, the 16 core sessions from the DPP trials serve as the foundation of all N-DPP curricula and the current adaptation.<sup>7</sup> The efficacy demonstrated in the DPP, and through the N-DPP, remains a challenge to implement in primary care, where both personnel and time limit implementation of diabetes prevention initiatives.<sup>9-10</sup> Where resources are an issue, N-DPP adaptations for primary care and other real-world settings are not reaching the DPP-established benchmarks for weight loss.<sup>9</sup>

In 1999, the cost for the first year of the DPP trials was estimated at \$1,399 per participant, with some cost reductions in group delivery of the N-DPP program.<sup>11</sup> The most significant barrier, and expense, to adapting DPP delivery to the community practice setting is the reliance on personnel to deliver the intervention material and serve as the model and reinforcer of performance accomplishments in goal setting.<sup>12</sup> The common theme is the need for someone other than the patient to be responsible for the prevention program delivery. Unfortunately, these personnel intensive strategy impedes our ability to meet the growing needs of community care and patient populations.<sup>13</sup> The present study seeks to determine the necessity of personnel to deliver the N-DPP by instead adapting the full lifestyle intervention to mobile health (mHealth) delivery. This adaptation uses consumer wearable devices (Fitbit®) in combination with the mobile Fitbit® application (app) to recognize

performance accomplishments,<sup>12</sup> support goal setting, and afford self-monitoring of food and physical activity by the individual.

mHealth technologies offer an opportunity to assist both family medicine patients and clinicians to address prediabetes by enacting diabetes prevention steps in the family medicine clinic. Rapid advances have occurred in relatively low-cost wearable devices that assist consumers in monitoring their physical activity and becoming more active.<sup>14-16</sup> A growing body of research has successfully incorporated fitness devices into technology-oriented lifestyle interventions to increase physical activity, reduce obesity, and manage chronic health conditions.<sup>17-19</sup> This automated tracking and recording of physical activity reduces the burden of traditional self-monitoring and provides an ongoing record of performance accomplishment, the most influential source of individual self-efficacy.<sup>12</sup> The present adaptation leverages fitness tracker technology and the accompanying apps to reduce the burden of manually tracking food and physical activity. Further, by relying on the technology to provide user feedback and SMS/MMS to deliver the intervention content, DPPFit may be the first adaptation of the N-DPP that does not use personnel to deliver the intervention or behavioral strategies (e.g., logging performance accomplishments or providing feedback about performance).

This study's primary purpose was to adapt the DPP, and subsequent N-DPP, into a pragmatic tool for clinical settings by using automated text messaging to deliver all written content, supplemented by Fitbit® technology to provide behavioral strategies typically delivered by personnel in traditional programs. The secondary purpose was to test the feasibility and acceptability of the mHealth, technology-based N-DPP adaptation (DPPFit) among patients at risk of developing T2D. The remote 16-week intervention delivered the same content, behavioral guidance, and education of the 16 DPP core sessions.

## Research Design and Methods

### *Overview of Study Design*

The present pilot of this intervention used a pretest/post-test design, assessing changes in participants from baseline to the 6-month follow-up.

### **Study Population and Setting**

All 33 participants in the study were patients at a general internal medicine primary care clinic in Augusta, Georgia. Recruitment occurred from December 2019 through January 2020, using medical records, primary care manager (PCM) referral, or in response to a recruitment flyer posted in the clinic. All patients had been told they had prediabetes and were interested in how to reduce their risk of developing T2D.

Prediabetes status was defined as HbA1c values 5.7%–6.4% and/or fasting plasma glucose (FPG) 100–125 mg/dL.<sup>20</sup> Exclusion criteria included a history of diabetes, bariatric surgery, prior or current medication use to treat glucose intolerance (e.g., biguanides or sulfonylureas), or prescription weight loss pharmaceuticals. Women with a history of gestational diabetes mellitus who met all other criteria were not excluded. All patients had to be cleared by their PCM for participation and were excluded for any comorbidities that increased risk during physical activity (e.g., chronic heart failure or history of heart disease). Participants had to have a smartphone device to use throughout the study.

Baseline visits were conducted by the first author and the research team in the clinic, where potential participants were consented and issued a Fitbit® activity tracker. At baseline, the Fitbit® was set up by an investigator, and each participant downloaded the Fitbit® mobile app to his or her personal cell phone. Demographics, socioeconomic status, anthropometric measures, and survey instrumentation were collected at baseline for all consenting participants. To account for anyone diagnosed with T2D during the study, diabetes history and diagnoses were queried in baseline and post-test surveys.

### **DPPFit Intervention**

The foundation of the N-DPP is a 12-month program focused on 2 primary goals: losing weight (5%–7%) and being active (150 physical activity minutes/week). The first 6 months of the intervention focus on core concepts of the prevention program delivered in 16 sessions. The goal of the present research was to follow the 16 core sessions of the DPP by providing the program content in a more pragmatic way through SMS/MMS text messages delivered daily to participants. For example, week 1 of the intervention includes daily SMS/MMS messages corresponding to the DPP Participant Workbook Session 1.

All consenting participants agreed to receive daily text messages over the next 16 weeks, which would include hyperlinks to additional information or media files in addition to text. An outline of the 16-week intervention and session topics, which followed the core sessions of the DPP, were provided to participants at baseline. Participants were enrolled on a rolling basis. The DPPFit intervention was delivered remotely over the ensuing 16 weeks and utilized technology-based methods to substitute for the behavioral strategies delivered by lifestyle coaches (e.g., reinforcement of performance accomplishment).

### *Fitbit Technology*

The role of the wearable technology was to supplement the SMS/MMS daily messages so that the behavioral strategies from the DPP could more fully be realized in this remote intervention format (See Table 1). One example of how the Fitbit® app refines certain DPP activities is logging and tracking food. In the traditional DPP, participants are instructed to look up fat gram counts and record their food consumption. In DPPFit, participants were instructed to enter food consumption in the Fitbit® app, where fat and calorie intake were automatically calculated. Table 1 details how wearable technology and the Fitbit® mHealth app were used to reinforce and supplement evidence-based behavioral strategies.

Participants received a 16-week technology-based intervention that used wrist-worn Fitbit® Blaze™ physical activity monitoring devices (San Francisco, CA) paired with the accompanying Fitbit® app, a mobile phone app that connects to the wearable device. As the app collected information from the wearable throughout the day, participants could monitor minutes of physical activity and received instant feedback on their activity through the Fitbit® app. Daily, Fitbit® users could record food items and beverages consumed in an electronic food diary as part of the Fitbit® app. Users were able to track minutes of physical activity per day enabling them to receive feedback on their activity. Fitbit ‘how-to’ hyperlinks related to setting goals, tracking activity, and logging food were provided via SMS/MMS messaging. This content supplemented educational content from the DPP core sessions and was delivered along the timeline of the DPP scope and sequence. The research team instructed participants to wear the trackers throughout the study and to call

**Table 1. Behavioral Strategy Adaptations from National-Diabetes Prevention Program to DPPFit**

Behavioral Strategy	N-DPP*	DPPFit
Setting and evaluating goals	Session 1 recorded into participant notebook. Revisited throughout 16 core sessions.	Weight loss goal, PA daily/weekly goals (to be set in individual Fitbit® user application [app]); revisit through daily text at frequency of DPP
Self-management strategies for behavioral change	Session 11	Week 11 SMS/MMS texts
Self-monitoring of diet	Calorie counting, fat gram logs, food diary	Fitbit® app – food log
Self-monitoring of physical activity	Physical activity log	Fitbit® tracker and Fitbit® app
Accountability	Lifestyle coach delivers 16 sessions over 6-month period, in groups or 1 on 1.	Daily SMS/MMS texts
Problem solving, barriers to change	Session 9	Week 9 SMS/MMS texts
Addressing relapse in lifestyle changes	Session 12	Week 12 SMS texts
Increasing self-efficacy	Session 11, session 16	Week 11, week 16 SMS/MMS texts

Abbreviations: PA, physical activity; MMS, multimedia messaging service; N-DPP, National-Diabetes Prevention Program; SMS, short message service (in the present study, both SMS and MMS refer to text messages). Session number refers to the 16 session-core of the DPP.

the study team for any technical assistance. This study did not obtain outcome data from the Fitbit® devices or app. The wearable technology acted as a feedback mechanism for participants to know if they were meeting personal goals, which would inform participant perceptions of mastery and self-efficacy. In this way, the fitness tracker and Fitbit® app were substitutes for personnel to deliver and support behavioral components of the DPP. The participant interaction with and use of the wearable technology were treated as confidentially as any interactions would be with a health coach or clinician.

To our knowledge, this is the first use of the DPP intervention that did not use personnel, remote or in person, to deliver the 16-week content. As such, the method used to deliver the DPP program content was central to this technology-based adaptation. The messaging platform allowed for storage of group and template content and scheduling future messages.

#### *Project Broadcast©*

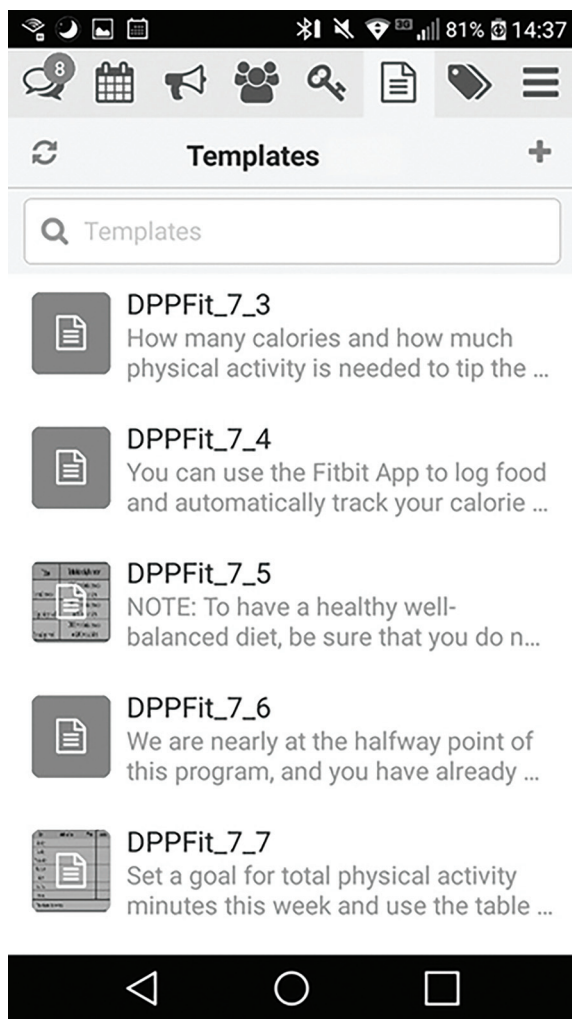
Project Broadcast© is one of several mass media apps marketed to allow users to send mass SMS/MMS texts (i.e., broadcasts) to contacts anonymously between contacts and by generating a new number where the messages will originate. The platform also allows users to create messaging templates that can be used to preschedule messages, in this context, a total of 16 weeks of messages

scheduled in advance. For purposes of this study, broadcasts sent Monday to Friday were scheduled for 9:00 AM local time, while Saturday and Sunday messages were at 10:00 AM local time. The messaging app provides delivery confirmations of outgoing messages but not read receipts. To confirm the sending of the prescheduled text messaging templates (SMS/MMS), a study team member was included in each of the two start dates. This also allowed the study team to view how the message content appeared to recipients. The Project Broadcast© app was independent of the wearable technology and mHealth app used by participants and was only used by the study team to deliver the educational content. A template designating each day of the 16-week study was developed and saved in the Project Broadcast© app (See Figure 1). A total of 113 templates were created. In addition to the 112 days of the study (16 weeks by 7 days a week), a DPPFit\_0 template notified participants the day before the start of the intervention to save the number to their phone contacts (See Figure 2). See Table 2 for examples of the message content and how they supported the overall behavioral strategies. A complete list of the messaging templates is available as Online Appendix.

#### *Intervention Cost*

The cost to transmit each daily SMS/MMS message is \$0.02. The messaging platform's total cost

**Figure 1. Screenshot of messaging templates in project. Broadcast App.**

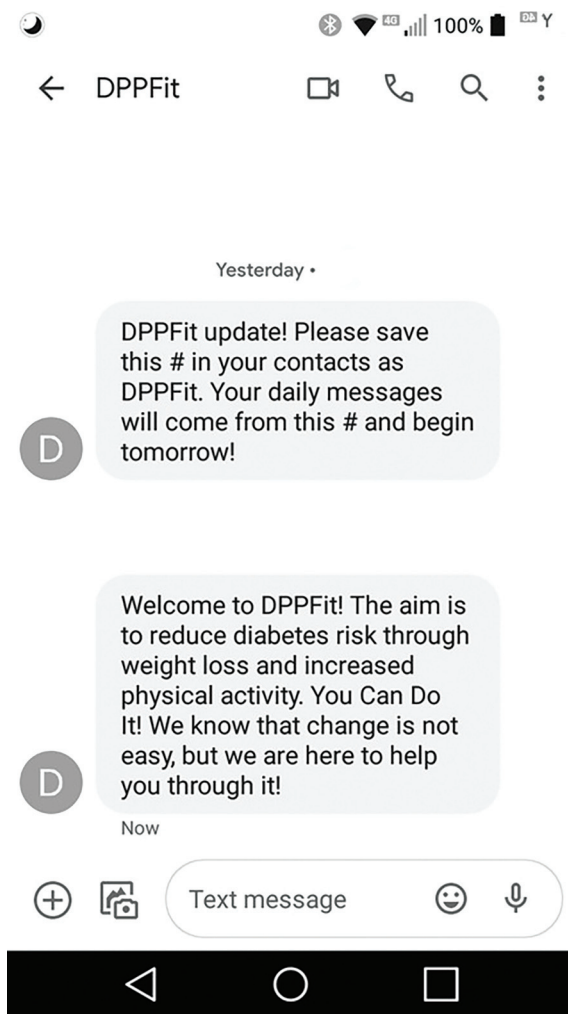


for 113 days of messages (1 is welcome text; the next 112 days are the 16-week intervention) is \$2.26 per participant. All Fitbit® devices use the same Fitbit® app interface, which is freely available. Therefore, the Fitbit® wearable cost is the primary cost for each DPPFit participant. The newest Fitbit® trackers range from \$69.95 for the Inspire 2™ up to \$179.95 for the Charge 5™. Some clinic patients may already own a fitness tracker.

**Instrumentation**

During the baseline visit, participants completed a survey, including questions about socio-economic demographics, medical history, and self-reported physical activity.<sup>21</sup> Total minutes and of physical activity and, independently, sedentary time were

**Figure 2. Screenshot of DPPFit days 0 and 1 messages.**



collected from the survey, as well as days a week of physical activity by type (i.e., vigorous, moderate, walking), defined as at least 30 minutes of activity on that day. Any day of the week where at least 30 minutes of activity were reported The Finnish Diabetes Risk Score (FINDRISC) was used to classify diabetes risk after the baseline visit.<sup>22-23</sup>

FINDRISC was selected for its extensive validation studies among patients with prediabetes and T2D.<sup>22-24</sup> Scores range from 0 to 20 and were calculated for each consenting participant using information collected from the electronic medical record and baseline biometric/survey measures.<sup>22-23</sup> Consistent with prior research, a cutoff of 9 was used to determine those at risk, where 9 to 12 was considered moderate risk with 2.2% 10-year risk of developing T2D, and ≥13 was considered high risk with a 14.1% 10-year risk of developing T2D.<sup>22</sup> This

**Table 2. Use of Technology and mHealth App to Deliver Behavioral Strategies\***

DPPFit Component	Details	Behavioral Strategy
Week 1, day 3	Cue to action: Use Fitbit® to track DPPFit goal of 150 activity minutes per week	Self-monitoring of physical activity; cues to action
Week 1, day 7	Hyperlink: How to set goals in the Fitbit® application (app)	Setting and evaluating goals; self-monitoring of physical activity
Week 2, day 1	Hyperlink: How to log and track food in Fitbit® app	Self-monitoring of diet
Week 5, day 6	Hyperlink: How to connect with friends in the Fitbit® community	Social support; cues to action; self-efficacy
Week 5, day 7	Hyperlink: How to use Fitbit® to challenge yourself or other to be physical active.	Cues to action; accountability; self-efficacy; self-monitoring of physical activity
Week 7, day 4	Cue to action: Use Fitbit® app to measure calorie balance.	Cues to action; self-monitoring of diet and physical activity
Week 13, day 3	Hyperlink: Understanding heart rate tracking and aerobic fitness with Fitbit®.	Self-monitoring of physical activity increasing self-efficacy
Week 15, day 6	Hyperlink: How to use Fitbit® for guided breathing exercise to relax	Problem-solving; perceived barriers; stress management; self-management strategies for behavioral change
Week 16, day 4	Hyperlink: Ways to stay motivated - Fitbit® app competitions	Increasing self-efficacy; self-management strategies for behavioral change
Using Fitbit® Tracker/App	Learning to use both the device and app to support healthy changes.	Increasing self-efficacy; self-management strategies for behavioral change; social support

\*See Online Appendix for complete content of text messaging templates.

metric allowed us to classify participants as high or moderate risk based on the most widely utilized, low-cost, methods available.<sup>23</sup>

**Statistical Analysis**

All statistical analysis was performed using SAS 9.4 software (SAS Institute). Statistical significance was assessed using an  $\alpha$  level of 0.05. Descriptive statistics for all variables were determined including frequencies and percentages for categorical variables, means and standard deviations and 95% confidence intervals (CI) for continuous variables, and medians and interquartile ranges for ordinal variables. A repeated measures mixed model analysis was used for examining differences from pre- to post-intervention in weight, physical activity, and sedentary behavior.

**Results**

Baseline measures of diabetes risk, demographics, and socio-economic status are displayed in Table 3. Overall, the majority of participants were female (82%), African American (49%), had completed undergraduate or graduate degrees (76%), were employed (76%), and partnered or married (73%).

The measures of diabetes risk in Table 3 include anthropometric and clinical characteristics for the 33 study participants. The mean age was 44.4 years (standard deviation [SD]  $\pm$  8.5), with an average FINDRISC mean of 13.6 (SD  $\pm$  2.6), where 64% of the participants were considered high-risk and 36% were moderate.<sup>23</sup> Mean hemoglobin A1c level was 5.9 (SD  $\pm$  0.28).

Controlling for demographics and FINDRISC, the main outcomes are summarized in Table 4, including changes in weight, body mass index (BMI), blood pressure, self-reported physical activity, and sedentary behavior. There was a significant decrease from baseline to 6-month follow-up in total weight (-3.3 kg,  $P=.026$ ) and in overall BMI (-1.25 kg/m<sup>2</sup>,  $P=.005$ ).

Table 4 also shows results for the physical activity outcomes from baseline to follow-up. There were several statistically significant increases in physical activity. There was a 2 day increase in moderate days of physical activity a week between baseline and follow-up (95% CI: 0.4 to 3.6;  $P=.015$ ) and a 1.5 day increase in vigorous days a week of physical activity (95% CI: 0.1 to 2.9;  $P=.035$ ) between baseline and follow-up. There were increases in physical activity minutes per week (62 minutes,  $P=.039$ ), as well as days a week of

**Table 3. Baseline Measures of Diabetes Risk, Demographics, and Socioeconomic Status**

Variable	Mean (SD)	Variable	% (n)
Age in years	44 (8.5)	Sex	
FINDRISC (0 to 20)	13.6 (2.6)	Male	82 (27)
		Female	18 (6)
FINDRISC by Category, as % (n)		Race	
Moderate risk: 9 to 12	36.4 (12)	African American/Black	48.5 (16)
High risk: 13 to 20	63.6 (21)	Asian	8.6 (3)
Clinical Measures		Caucasian/White	39.4 (13)
		Multiracial	3.0 (1)
Glucose (FPG; mg/dL)	99.3 (17.4)	Education	
HbA1c (%)	5.9 (0.28)	High school degree	6.0 (2)
		Some university/College	18.2 (6)
Systolic BP (mm Hg)	129.5 (13.5)	College degree	45.5 (15)
Diastolic BP (mm Hg)	83.2 (10.4)	Graduate degree	30.3 (10)
Total cholesterol	180.4 (43.4)	Household Income	
Triglycerides (mg/dL)	117.2 (65.1)	<\$40,000	21.2 (7)
		\$40000-\$80,000	33.3 (11)
LDL (mg/dL)	110.9 (37.4)	> \$80,000	39.4 (13)
HDL (mg/dL)	50.5 (14.3)	Employment Status	
HDL: <i>females</i>	54 (12.7)	Employed (Part-time/Full-time)	75.8 (25)
		Unemployed (< 1 year)	3.0 (1)
HDL: <i>males</i>	37 (12.6)	Homemaker	6.1 (2)
		Disabled	
Anthropometric measures		Student	6.1 (2)
Weight (kg)	106.4 (26.7)		9.1 (3)
BMI (kg/m <sup>2</sup> )	38.0 (8.9)	Relationship Status	
Waist circumference (cm)	113.7 (18.1)	Partnered/married	72.7 (24)
		Dating/In relationship	6.1 (2)
Waist circumference: <i>females</i>	112.4 (19.3)	Single	18.2 (6)
Waist circumference: <i>males</i>	119.2 (10.4)	Widowed	3.0 (1)

Abbreviations: BMI, body mass index; BP, blood pressure; cm-centimeters; FINDRISC, Finnish Diabetes Risk Test; FPG, fasting plasma glucose; Hb1Ac, hemoglobin A1c; HDL, high-density lipoproteins; LDL, low-density lipoproteins; SD, standard deviation.

both moderate (2 days,  $P = .015$ ) and vigorous (1.5 days,  $P = .04$ ) activity. There was a significant decrease in sedentary time, from 509.5 minutes per day at baseline, to 388 minutes per day at follow-up ( $P = .007$ ).

### Discussion

The novelty in the present pilot of DPPFit is that it delivers the content of the N-DPP 16-week intervention without the need for dedicated personnel (e.g., educators, lifestyle coaches). The combination of the daily text messages of DPP content and use of the Fitbit® to deliver behavioral strategies may provide meaningful changes in health outcomes such as weight loss, increased activity, and decreased sedentary time. Several meta-analyses

have attempted to quantify this gap between clinical trial efficacy and real-world effectiveness.<sup>9,10,25-27</sup> Dunkley et al concluded that at the same follow-up time point, real-world adaptations have had a third of the impact on weight outcomes as the DPP, and about half of the Finnish Diabetes Prevention Study's weight outcome.<sup>26</sup> Thus, DPPFit could exceed these outcomes in a practical, scalable way to reach many people.

In a 2012 meta-analysis by Ali et al, which included only high-risk participants from the United States, the mean percentage of weight change from the 26 studies (n = 2916) was -4% (95% CI: -5.2 to -2.8).<sup>11</sup> In another meta-analysis of 22 studies (n = 5500) which was not limited to the United States,<sup>10</sup> the -2.6% weight change was like the -3% change in weight in the present study. Even a 1 kg loss in

**Table 4. Pre- and Post-Intervention Effect: Biometrics and Self-Reported Physical Activity Outcome from the International Physical Activity Questionnaire**

	Baseline Mean (SE)	~6 Months* Mean (SE)	Difference <sup>†</sup> Mean difference (95% CI)	F statistic	p-value
Weight (kg)	108.6 (4.8)	105.3 (4.9)	−3.3 (−6.2 to −0.5)	6.62	0.026
BMI (kg/m <sup>2</sup> )	38.8 (1.8)	37.6 (1.9)	−1.3 (−2.1 to −0.4)	11.05	0.005
Systolic BP (mm Hg)	131.0 (2.9)	129.1 (2.4)	−1.9 (−7.2 to 3.5)	0.54	0.470
Diastolic BP (mm Hg)	84.7 (2.2)	77.9 (2.1)	−6.8 (−10.3 to −3.3)	16.8	<0.001
IPAQ					
Walk (days/week)	2.9 (0.7)	4.0 (0.8)	1.1 (−1.0 to 3.2)	1.15	0.297
Moderate (days/week)	0.8 (0.3)	2.8 (0.7)	2.0 (0.4 to 3.6)	7.03	0.015
Vigorous (days/week)	0.6 (0.2)	2.1 (0.6)	1.5 (0.1 to 2.9)	5.51	0.035
Total PA (minutes/days)	75.1 (14.5)	137.5 (26.5)	62.4 (3.5 to 121.3)	5.01	0.039
Sedentary (minutes/days)	509.5 (48.7)	389.9 (39.0)	−121.6 (−206 to −37)	9.07	0.007

\*Mean follow-up was 6 months, ranging from 4.5 to 8 months from baseline. Means and standard errors from model for baseline and follow-up values (time effect: 0 to 6 months).

<sup>†</sup>Mean change with 95% CI. Analysis controlled for demographic and diabetes risk using the Finnish Diabetes Risk Test.

Abbreviations: BMI, body mass index; BP, blood pressure; CI, confidence interval; IPAQ, International Physical Activity Questionnaire; SE, standard error.

weight may significantly reduce the risk of diabetes incidence by 16%.<sup>6</sup> While only 19% of the DPPFit cohort met the goal of  $\geq 5\%$  of total weight loss, 69% of those that did not meet the weight loss goal still achieved the physical activity goal.

Independent of weight loss, increasing moderate physical activity to the recommended  $\geq 150$  minutes a week reduces the risk of future diabetes incidence.<sup>6</sup> Reporting of physical activity is not as consistent in DPP translations as the outcome of weight, and often varies in its expression of activity (i.e., days per week; minutes per day per week). For the 69% of the DPPFit sample that did not meet the weight goal, but did meet the physical activity goal, they could see a 44% lower incidence of diabetes.<sup>6</sup>

Independent of physical activity, several studies have documented the link between sedentary lifestyles and metabolic disorders, insulin resistance, and subsequent diabetes incidence.<sup>28–30</sup> Efforts to increase physical activity do not equate to decreases in sedentary time. It is important to demonstrate this independence from physical activity goals, in establishing sedentary time reductions as significant to overall diabetes risk reduction.<sup>28–30</sup> In the measurement of sedentary behavior across all 3 treatment arms in the DPP clinical trials, researchers found that for each hour spent watching television, the risk of developing diabetes increased by 3.4% (hazard ratio = 1.034, 95% CI: 1.004–1.065). Sedentary time reduction was not an original goal of the DPP trials, nor was any aspect of the

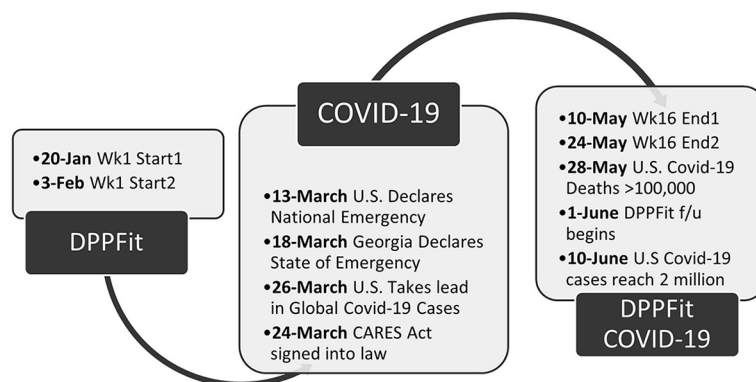
intervention specifically designed to address sedentary behaviors.<sup>30</sup> The significant decrease in sedentary time in the DPPFit study may be a result of the short follow-up time but could result from the use of wearable devices that alert users to move.

DPPFit was a response to meet the needs of physicians attempting to address diabetes prevention for their patients. It is clear now that DPPFit may also meet the needs of a population at risk for diabetes who are unable to attend traditional prevention programs. One strength of this study was a fortuitous intersection of methods and timing. The 16-week remote pilot study of DPPFit started just before the COVID-19 pandemic affected the United States (See Figure 3). By mid-March 2020, the United States and the state of Georgia had declared a public health emergency. The COVID-19 pandemic has created opportunities for remote work, telemedicine, and technology-based approaches to contactless care.<sup>31–33</sup> As a result, Americans are increasingly interacting virtually, reducing face-to-face interactions. The DPPFit intervention is remote and designed to require minimal contact to meet the reality of time constraints on family medicine clinics. The timing of this intervention through the emergence of the COVID-19 pandemic demonstrated the ability of virtual intervention delivery to persist through a public health emergency.

As a nonrandomized pilot study, selection bias is a study limitation. Participants were recruited either by referral from their PCM, or if identified by



**Figure 3. Timeline of the DPPFit intervention and the Covid-19 pandemic in the US.**



their medical record data and inclusion criteria, they were cleared for participation by the PCM. Access to medical records was approved for recruitment purposes only, so there was no analysis of those enrolled versus others who were recruited but did not enroll. While the COVID-19 pandemic did not disrupt the intervention delivery, the study was limited in how and when follow-up data were collected. For example, the study did not describe whether participants had previously used Fitbits or were at ease with the mobile technology. Another limitation concerned the self-report of the baseline and follow-up survey instruments. The present study cannot measure the impact of sustained behaviors over time. Follow-up research should extend beyond 6 months and assess sustained behavior change at regular intervals (i.e., 12, 18, and 24 months). Further research is needed to address these limitations through use of a randomized controlled design, more thorough screening, surveying participants on prior use and comfort with technology, and understanding participant use after the intervention ends.

Some limitations were cost-reducing methods, and therefore are also strengths of the present study. Following consent into the study, the FINDRISC provided a more comprehensive diabetes risk index<sup>23</sup> without the use of costly glucose tolerance-based testing. This use of a validated risk test is both a strength for lowering the overall cost of the intervention and a limitation in terms of the absence of clinical measures of glucose tolerance and risk.

Leveraging technology as a substitution for personnel effort and resources may also be a cost-saving method to delivering the DPP in family medicine patients. The integration of Fitbit<sup>®</sup> technology is particularly appealing as there are dozens

of Fitbit devices that are compatible with its app, allowing users with varying levels of purchasing power to take advantage of the Fitbit mHealth interface. It is clearly a strength that this intervention costs as little as \$102.21 (\$2.26 text messages plus \$99.95 Fitbit device) with a fitness tracker and requires less time effort from family medicine clinic staff, lowering the cost of personnel resources. Clinic patients already using Fitbits will only need to sign up to receive the automated text messages, at a cost of \$2.26 per patient. For comparison, the CDC estimates the average cost of participation in the N-DPP around \$417 per person.<sup>34</sup>

In conclusion, the outcomes of the initial pilot study demonstrate a scalable strategy for the N-DPP as DPPFit and provide practical tools for clinicians and communities. As an adaptation, DPPFit is not intended to compete with the N-DPP classes, but rather parallel these initiatives and offer options to patients unable to connect with existing programs. The remote and technology-based format of DPPFit may be suitable as an alternative option where barriers to access or participate in the N-DPP render it inaccessible.<sup>35</sup> The results from this study suggest that remote dissemination of intervention materials, supplemented by activity and food tracking technology, may be both a feasible and acceptable way to deliver diabetes prevention in primary care settings.

---

Steven S. Coughlin, PhD served as the faculty advisor of this research study and continues to contribute mentorship and guidance to advance this important work. We would also like to thank the co-investigators on the original study who were not involved in this manuscript, but were nonetheless significant contributors: Jack Ellis, DO; Judith Anglin, PhD; and Jennifer Waller, PhD.

To see this article online, please go to: <http://jabfm.org/content/35/3/548.full>.

## References

- International Diabetes Federation. IDF Diabetes Atlas, 9th Ed. Brussels, Belgium; In I. Edition (Ed.). 2019.
- Saeedi P, Petersohn I, Salpea P, et al; IDF Diabetes Atlas Committee. Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: results from the International Diabetes Federation Diabetes Atlas. *Diabetes Res Clin Pract* 2019;157:107843.
- Pan X-R, Li G-W, Hu Y-H, Wang J-X, et al. Effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance: the Da Qing IGT and Diabetes Study. *Diabetes Care* 1997;20:537–44.
- Tuomilehto J, Lindström J, Eriksson JG, et al. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med* 2001;344:1343–50.
- Knowler WC, Barrett-Connor E, Fowler SE, et al; Diabetes Prevention Program Research Group. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* 2002;346:393–403.
- Hamman RF, Wing RR, Edelstein SL, et al; for the Diabetes Prevention Program Research Group. Effect of weight loss with lifestyle intervention on risk of diabetes. *Diabetes Care* 2006; 29:2102–7.
- Centers for Disease Control and Prevention. About the National DPP. Available at <https://www.cdc.gov/diabetes/prevention/about.htm>. Accessed December 21, 2021.
- Centers for Disease Control and Prevention. 2021. Diabetes Prevention Recognition Program standards and operating procedures. Available at <https://www.cdc.gov/diabetes/prevention/pdf/dprp-standards.pdf>. Accessed January 5, 2022.
- Whittemore R. A systematic review of the translational research on the Diabetes Prevention Program. *Transl Behav Med* 2011;1:480–91.
- Aziz Z, Absetz P, Oldroyd J, Pronk NP, Oldenburg B. A systematic review of real-world diabetes prevention programs: learnings from the last 15 years. *Implement Sci* 2015;10:172.
- Ali MK, Echouffo-Tcheugui JB, Williamson DF. How effective were lifestyle interventions in real-world settings that were modeled on the Diabetes Prevention Program? *Health Aff (Millwood)* 2012; 31:67–75.
- Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev* 1977;84:191–215.
- Rosenstock IM, Strecher VJ, Becker MH. Social learning theory and the Health Belief Model. *Health Education Q* 1988;15:175–83.
- Cadmus-Bertram LA, Marcus BH, Patterson RE, Parker BA, Morey BL. Randomized trial of a Fitbit-based physical activity intervention for women. *Am J Prev Med* 2015;49:414–8.
- Coughlin SS, Stewart J. Department of Clinical and Digital Health Sciences, College of Allied Health Sciences, Augusta University, Augusta, GA,. Use of consumer wearable devices to promote physical activity: a review of health intervention studies. *JEHS* 2016;2:1–6.
- Wang JB, Cataldo JK, Ayala GX, et al. Mobile and wearable device features that matter in promoting physical activity. *J Mob Technol Med* 2016;5:2–11.
- Yingling LR, Brooks AT, Wallen GR, et al. Community engagement to optimize the use of web-based and wearable technology in a cardiovascular health and needs assessment study: a mixed methods approach. *JMIR mHealth uHealth* 2016;4: e38.
- Shan R, Sarkar S, Martin SS. Digital health technology and mobile devices for the management of diabetes mellitus: state of the art. *Diabetologia* 2019;62:877–87.
- Allet L, Knols RH, Shirato K, de Bruin ED. Wearable systems for monitoring mobility-related activities in chronic disease: a systematic review. *Sensors (Basel)* 2010;10:9026–52.
- American Diabetes Association. Standards of Medical Care in Diabetes—2019. *Diabetes Care* 2019; 42 (Supplement 1).
- Craig CL, Marshall AL, Sjöström M, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc* 2003;35:1381–95.
- Lindström J, Tuomilehto J. The diabetes risk score: a practical tool to predict type 2 diabetes risk. *Diabetes Care* 2003;26:725–31.
- Saaristo T, Peltonen M, Lindström J, et al. Cross-sectional evaluation of the Finnish Diabetes Risk Score: a tool to identify undetected type 2 diabetes, abnormal glucose tolerance and metabolic syndrome. *Diab Vasc Dis Res* 2005;2:67–72.
- Nilsen V, Bakke PS, Rohde G, Gallefoss F. Predictors of health-related quality of life changes after lifestyle intervention in persons at risk of type 2 diabetes mellitus. *Qual Life Res* 2014;23:2585–93.
- Cardona-Morrell M, Rychetnik L, Morrell SL, Espinel PT, Bauman A. Reduction of diabetes risk in routine clinical practice: are physical activity and nutrition interventions feasible and are the outcomes from reference trials replicable? A systematic review and meta-analysis. *BMC Public Health* 2010;10:653.

26. Dunkley AJ, Bodicoat DH, Greaves CJ, et al. Diabetes prevention in the real world: effectiveness of pragmatic lifestyle interventions for the prevention of type 2 diabetes and of the impact of adherence to guideline recommendations: a systematic review and meta-analysis. *Diabetes Care* 2014;37:922–33.
27. Baker MK, Simpson K, Lloyd B, Bauman AE, Singh MA. Behavioral strategies in diabetes prevention programs: a systematic review of randomized controlled trials. *Diabetes Res Clin Pract* 2011;91:1–12.
28. Edwardson CL, Gorely T, Davies MJ, et al. Association of sedentary behaviour with metabolic syndrome: a meta-analysis. *PLoS one* 2012;7:e34916.
29. Helmerhorst HJ, Wijndaele K, Brage S, Wareham NJ, Ekelund U. Objectively measured sedentary time may predict insulin resistance independent of moderate-and vigorous-intensity physical activity. *Diabetes* 2009;58:1776–9.
30. Rockette-Wagner B, Edelstein S, Venditti EM, et al; Diabetes Prevention Program Research Group. The impact of lifestyle intervention on sedentary time in individuals at high risk of diabetes. *Diabetologia* 2015;58:1198–202.
31. Howe DC, Chauhan RS, Soderberg AT, Buckley MR. Paradigm shifts caused by the COVID-19 pandemic. *Organ Dyn* 2021;50:100804.
32. DeVoe JE, Bazemore A. Primary care in the COVID-19 pandemic: essential, and inspiring. *J Am Board Fam Med* 2021;34:S1–6.
33. Silver SL, Lewis MN, Ledford CJ. A stepwise transition to telemedicine in response to COVID-19. *J Am Board Fam Med* 2021;34:S152–61.
34. Centers for Disease Control and Prevention. Diabetes prevention impact toolkit. Available at <https://nccd.cdc.gov/toolkit/diabetesimpact>. Accessed January 5, 2022.
35. Coughlin SS, Stewart JL. Toward research-tested mobile health interventions to prevent diabetes and cardiovascular disease among persons with pre-diabetes. *J Hosp Manag Health Policy* 2017;1:7.

## Appendix: DPPFit Daily Message Content

With few exceptions, including hyperlinks for Fitbit® app use, the text message content and images for the DPPFit intervention came from the 2012 National DPP Curriculum, which was created through the original DPP copyright: ©1996 by the University of Pittsburgh, developed under cooperative agreement number U01-DK48489 by the U.S. Department of Health and Human Services.

Template ID	Message Content (*includes image/MMS)																							
DPPFit_0	DPPFit update! Please save this # in your contacts as DPPFit. Your daily messages will come from this # and begin tomorrow!																							
	<b>Week 1: Welcome to DPPFit</b>																							
DPPFit_1_1	Welcome to DPPFit! The aim is to reduce diabetes risk through weight loss and increased physical activity. You Can Do It! We know that change is not easy, but we are here to help you through it!																							
DPPFit_1_2	Losing 7% of your body weight may prevent you from getting type 2 diabetes or heart disease. You will look and feel better. Your health will improve.																							
DPPFit_1_3	Increasing physical activity to 150 minutes a week can reduce your risk of diabetes. The Fitbit® will help you keep track of those minutes!																							
DPPFit_1_4	You can make healthy choices that will reduce your risk for type 2 diabetes. Together we will take it one step at a time!																							
DPPFit_1_5	How can we stop ourselves from getting type 2 diabetes? Participating in DPPFit to lose some weight and become more active can prevent diabetes!																							
DPPFit_1_6	Sleep is just as important as nutrition and physical activity in preventing diabetes. Consistently sleeping 7+ hours a night (all week) can reduce your risk!																							
DPPFit_1_7	GOALS are an important part of DPPFit and any lasting lifestyle change. Take time today to set some realistic goals for YOU through the Fitbit® App. The link below will walk you through goal setting in the Fitbit® App: <a href="https://www.wearable.com/fitbit/how-to-change-goals-on-fitbit-6847">https://www.wearable.com/fitbit/how-to-change-goals-on-fitbit-6847</a>																							
	<b>Week 2: Be a Fat and Calorie Detective</b>																							
DPPFit_2_1	To be a Fat and Calorie Detective we first need to track everything we eat and drink. The Fitbit® App can help track food, calories, and fat at the same time! <a href="https://help.fitbit.com/articles/en_US/Help_article/1375.htm#">https://help.fitbit.com/articles/en_US/Help_article/1375.htm#</a>																							
DPPFit_2_2	We must be honest about everything we eat and drink in order for this to work. If food tracking in the App is difficult, try writing it out and adding it later.																							
DPPFit_2_3	Healthy eating means eating less fat and fewer calories. Eating too much fat is what makes us fat. By eating less fat, we can lose weight!																							
DPPFit_2_4	Fat has the most calories of all the foods we eat. Fat contains more than twice the calories as the same amount of sugar, starch, or protein.																							
DPPFit_2_5	1 pound of fat=3,500 calories. This means that if you want to lose 1 or 2 pounds each week, eat between 500 and 1,000 fewer calories every day.																							
DPPFit_2_6	Research suggests that tracking what we eat and drink may be the most effective way to lose weight. How is your food log going? Keep trying and keep it up!																							
DPPFit_2_7	Food Labels: If you eat a larger serving than the size on the label, you will be eating more calories and more fat grams than are given on the label. Keep up the detective work!																							
	<b>Week 3: Three Ways to Eat Less Fat and Fewer Calories</b>																							
DPPFit_3_1	1. Eat high-fat and high-calorie foods less often (frequency) Example: If we eat French fries every day, eating them just once a week makes a big difference.																							
DPPFit_3_2	Try to write down several ways you could eat high-fat and high-calorie foods less often. Refer to your tracking to see what those foods are.																							
DPPFit_3_3	2. Eat smaller amounts of high-calorie foods (quantity). Example: Use a spoon instead of the ladle to pour on salad dressing at a salad bar.																							
DPPFit_3_4	Think of a high-calorie food you typically eat. Cutting back even a little on the amount of the high-calorie foods you typically eat can make a big difference!																							
DPPFit_3_5	3. Eat low-fat and low-calorie foods instead of high-fat, high-calorie foods. Example: Eat baked/skinless chicken instead of fried breaded chicken.																							
DPPFit_3_6*	Use the example table to identify your top 5 high-fat high-calorie foods. Which of the tools on the right would work for those foods?																							
	<table border="1"> <thead> <tr> <th rowspan="2">My top 5 high-fat foods</th> <th colspan="3">The 3 Ways to Eat Less Fat</th> </tr> <tr> <th>I will eat it less often.</th> <th>I will eat a smaller amount.</th> <th>I will eat a lower-fat food instead.</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	My top 5 high-fat foods	The 3 Ways to Eat Less Fat			I will eat it less often.	I will eat a smaller amount.	I will eat a lower-fat food instead.																
My top 5 high-fat foods	The 3 Ways to Eat Less Fat																							
	I will eat it less often.	I will eat a smaller amount.	I will eat a lower-fat food instead.																					
DPPFit_3_7	Using yesterday's table, ask yourself: What will I need to carry out my plan? What problems might I have cutting down on these foods, and how will I solve them?																							
	<b>Week 4: Healthy Eating</b>																							
DPPFit_4_1	Healthy eating is determined by both what we eat and the way we eat. To eat healthier, try to eat at regular times. Also, eat slowly to digest food better.																							
DPPFit_4_2	Do not skip meals. Try to eat at the same time each day. Regular meals will also keep you from getting too hungry and losing control. Eat 3 meals a day and 1 to 2 healthy snacks.																							
DPPFit_4_3	Do not eat while watching television or doing anything else that can take your attention away from your meal. You are more likely to eat more than you intend.																							
DPPFit_4_4	Eat slowly. Try pausing between bites. Eating slowly will help you digest your food better and be more aware of what you are eating. Drink water with meals and enjoy the taste of your food.																							

(continued)

DPPFit\_4\_5 Don't worry about cleaning off your plate. Serve yourself smaller portions to begin with. The greatest waste of food is eating more than you want or need.

DPPFit\_4\_6 MyPlate is a general guide to healthy eating. It is based on the latest research about nutrition and health. Go to <https://www.choosemyplate.gov/> to learn more.

DPPFit\_4\_7 Use tools like MyPlate to help you choose healthier foods in amounts that you need. Go to <https://www.choosemyplate.gov/> to see what tools you can use.

**Week 5: Move Those Muscles**

DPPFit\_5\_1 The physical activity goal for this program is 150 minutes (2 1/2 hours) each week. The important thing to remember is that we will work up to this. It's a goal. We will start with where you are and we will increase your activity level slowly, steadily, and safely.

DPPFit\_5\_2 Before you start any activity, think about how active you are now and how active you were in the past. Think also about your likes and dislikes when it comes to being active or inactive.  
-Write a short list of what you like most about being active.

DPPFit\_5\_3 Being physically active has many benefits. It helps improve our general well-being by keeping weight off, improving our mood, increasing our energy and ability to get around, and reducing stress.

DPPFit\_5\_4 It can take up to 4 weeks to work up to the goal of 150 minutes of activity a week. Pick activities you like. Spread the weekly total over 3, 4, or more days per week. Work up to this goal slowly.

DPPFit\_5\_5 Physical activity makes our heart, lungs, and bones stronger, and it may reduce back pain and injuries. It also helps lower our risk.

DPPFit\_5\_6 Use your Fitbit® to make physical activity easier by doing it with another person. Fitbit® community allows you to socialize with others being active. Anyone with a Fitbit® can be part of your Fitbit® community. The article below will show you how to add friends and more:  
[https://help.fitbit.com/articles/en\\_US/Help\\_article/1858.htm#addfriends](https://help.fitbit.com/articles/en_US/Help_article/1858.htm#addfriends)

DPPFit\_5\_7 Physical activity can also be fun. Use your Fitbit® to challenge yourself or others to be physically active. The link below will provide more information how to do this:  
[https://help.fitbit.com/articles/en\\_US/Help\\_article/1531.htm#start](https://help.fitbit.com/articles/en_US/Help_article/1531.htm#start)

**Week 6: Being Active – A Way of Life**

DPPFit\_6\_1 This week is about making active lifestyle choices. All through your day, choose active options instead of less active ones. Every minute adds up to a "more active you."  
Active Choice:

1. Take the stairs instead of the elevator
2. Park farther away to walk more.

DPPFit\_6\_2 Other Active Choices:

3. Walk to the mailbox or a neighbor's house instead of driving.
4. Walk around the outside of a store before going in.
5. Do some activity while watching TV. For example, write an exercise bike or lift weights.

DPPFit\_6\_3 Every day set aside 20 to 30 minutes of time to be active. If one block of time does not work, think about trying smaller blocks of time:  
-15 minutes twice a day  
-10 minutes three times a day (morning, afternoon, and evening)

DPPFit\_6\_4 Replace less active blocks of time with active ones:  
-Walk for half an hour instead of watching an extra half-hour TV.  
-Instead of reading a book seated, read while on an exercise bike.

DPPFit\_6\_5 Being active doesn't have to mean trip to the gym or walking for a long time on a treadmill. You can be active anywhere. The place is not important. What is important is finding the time to be active and being active regularly throughout the day. You'll be surprised at how easy it can be!

DPPFit\_6\_6\* Keep it safe. Stretching is one of the best ways to keep muscles from becoming sore, cramped, or injured. Stretching also helps you be more flexible and feel relaxed. The attached picture provides information about safe and easy stretches.



DPPFit\_6\_7\* Safe and easy stretching continued....



**Week 7: Tip the Caloric Balance**

DPPFit\_7\_1 About calories: There is a reason we eat calories - our bodies need them to survive.  
-Our body uses calories for all its functions, even breathing and sleeping. And of course, moving.  
-Calories are a measure of the energy value of food and drink. When we eat food, we take in calories.

DPPFit\_7\_2 A rule of thumb is that one mile of brisk walking uses about 100 calories. Most people walk a mile in 15 to 20 minutes. So, you can see that it would take many miles to burn off a high fat meal.

DPPFit\_7\_3 How many calories and how much physical activity is needed to tip the balance in favor of losing weight?  
This varies person to person. The best way to tip the balance is to both reduce the amount we eat and increase the time we are physically active.

DPPFit\_7\_4 You can use the Fitbit® App to log food and automatically track your calorie intake. By wearing your Fitbit® tracker all day, you can track your activity. This will give you a measure of your calorie balance.

*(continued)*

DPPFit\_7\_5\* NOTE: To have a healthy well-balanced diet, be sure that you do not eat fewer than 1,200 calories a day!

To lose:	Tip the balance by this number:
1 pound per week	3,500 fewer calories per week (or 500 fewer each day)
1 ½ pounds per week	5,250 fewer calories per week (or 750 fewer each day)
2 pounds per week	7,000 fewer calories per week (or 1,000 fewer each day)

DPPFit\_7\_6 We are nearly at the halfway point of this program, and you have already made many positive changes. Take time to write down the changes you have made so far in these areas:  
 -Being more active  
 -Eating less fat and fewer calories

DPPFit\_7\_7\* Set a goal for total physical activity minutes this week and use the table to plan your activities.  
 -Try setting aside one block of time or 2 to 3 shorter periods of time for physical activity.  
 -Make sure to plan activities you LIKE to do.

Day	What I will do	When	Minutes
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			
<b>Total minutes for the week:</b>			

**Week 8: Take Charge of What's Around You**

DPPFit\_8\_1 Understanding Cues:  
 We often eat or drink because something triggers our desire for food. These triggers are called cues. Food cues affect how much we eat and can be a problem when they lead us to overeat.

DPPFit\_8\_2 Taking Charge:  
 When we respond to a food cue in the same way over and over again, we build a habit. When faced with the food cue, we respond without thinking. Once a habit forms, it becomes hard to break. Changing behavior requires us to take control and stay in control.

DPPFit\_8\_3 The first step to overcoming the habit of eating too much is to become aware of our food cues.  
 Remember it takes time to break old habits and build new, healthier ones.  
 Change does not happen overnight.  
 As always, we will do it together!

DPPFit\_8\_4\* For each of us, the cues that make us want to eat are different. Some common cues are:  
 \*Hunger  
 \*What we are thinking or feeling  
 \*What other people say and do  
 \*Sight and smell of food

Cue	Makes us want to eat
We see a carton of ice cream	Ice cream
We turn on the TV	Potato chips
We go to the movies	Popcorn

Examples of the effect of some cues are in the table below.

DPPFit\_8\_5\* Food cues are not always bad. But they can become a problem if they get in the way of our efforts to eat less fat and fewer calories. Ideas for dealing with negative food cues are in the picture above.

Common problem food cues	
At Home	At Work
In the living room: TV, computer, telephone, candy dishes	On the way to work: travelling by a bakery or fast food restaurant
In the kitchen: ready-made foods (ice cream, frozen cookies, food being cooked, leftovers)	In public areas: high-fat or high-calorie foods (donuts, high-fat coffee, crackers, candy) in vending machines
In the dining room: full serving dishes on the table, large dinner plates, leftovers on plates	At desks: unhealthy snacks brought from home

DPPFit\_8\_6 Keep high-fat and high-calorie foods out of your house and workplace.  
 - Or, if you can't, keep them out of sight.  
 Keep low-fat and low-calorie choices easy to reach, in sight, and ready to eat.  
 - For example, keeping fresh fruit on the counter.  
 When you eat, do not do anything else.  
 - For example, do not eat while watching TV, or working on the computer.

DPPFit\_8\_7 Shopping Tips:  
 Make a shopping list ahead of time. Stick to the list!  
 Avoid shopping when you are hungry.  
 Avoid sections in the store that tempt you.  
 Where available, order groceries ahead of time and do curbside pick-up.

**Week 9: Problem Solving**

DPPFit\_9\_1 When working on changing our lifestyle to healthy eating and physical activity, our problems can be as small as a schedule change or as big as an injury. No matter what the problem is, we can take steps to keep it from getting in the way of progress toward our goals.

- We will go over each of the 5 Steps to Problem Solving in detail this week.
1. Describe the problem.
  2. List all of your options.
  3. Pick what seems to be the best option and try it.
  4. Make a plan for putting the option into effect.
  5. Follow the plan.

(continued)

DPPFit\_9\_2\* Step 1: When describing the problem, do the following:

- ✓ Be Specific
- ✓ Look at what led to the problem.
- ✓ Find the action (or behavior) chain.
- ✓ Try to see the links in the action chain. Look for --
  - Cues that make you want to eat or be inactive
  - People who do not support you.
  - Thoughts or feelings that get in your way.



DPPFit\_9\_3\* Step 2: Brainstorm Your Options

Think of all the options you have for overcoming the cues you listed in Step 1. Pair them with each event in the action chain that led to the problem.

Events (Links) in Sarah's Action Chain	Some of Sarah's Options
Did not eat lunch.	<input type="checkbox"/> Pack a bag lunch.
Boss was angry.	<input type="checkbox"/> Talk with boss about solving the problems at work.
Sarah felt stressed and anxious.	<input type="checkbox"/> Quit job. (Just kidding, but not really.) <input type="checkbox"/> Take a break. <input type="checkbox"/> Get support from a co-worker.
Came home tired, upset, and hungry.	<input type="checkbox"/> Go for a walk after work to unwind. <input type="checkbox"/> Eat a healthy snack.
Went right to the kitchen.	<input type="checkbox"/> Enter house through different door. <input type="checkbox"/> Plan something to do immediately after arriving home. (For example, go out in the yard, clean a closet.)
Saw cookies on counter.	<input type="checkbox"/> Do not buy cookies. <input type="checkbox"/> If other family members have cookies in the house, keep them out of sight. <input type="checkbox"/> Keep fruit in sight.

DPPFit\_9\_4\* Step 3: Pick One Option to Try  
You have thought about a lot of options, and now it's time to pick one. Follow these guidelines for picking the best option for you.

- ✓ Weigh the pros and cons of each option.
- ✓ Choose one that is likely to work and that you can do.
- ✓ Try to break as many links as you can, as soon as possible.



DPPFit\_9\_5\* Step 4: Make a Positive Action Plan  
Your plan should include each action you will take to make a change in your eating cues. See the example of the actions Sarah will take.

Your Plan	Sarah's Plan
<b>I will ...</b>	<input type="checkbox"/> Pack a bag lunch.
<b>When?</b>	<input type="checkbox"/> Tuesday and Thursday of next week
<b>I will do this first...</b>	<input type="checkbox"/> Shop for food for the bag lunch. <input type="checkbox"/> Pack lunch the night before.
<b>Redirections</b>	<input type="checkbox"/> I might forget to pack or bring the lunch. If so: <ul style="list-style-type: none"> <li>• I'll find a healthy lunch place with good service.</li> <li>• I'll order a turkey sandwich for delivery.</li> </ul>
<b>I will do this to make my success more likely...</b>	<input type="checkbox"/> Ask a friend who brings bag lunches to work to join me for lunch on Tuesday.

DPPFit\_9\_6 Step 5: Try It!  
This final step is to put your plan into action. Try your plan. Afterwards ask yourself these questions:

1. Did it work?
2. If not, what went wrong?
3. What can I do next time to make this plan work better?
4. What other plan can I try if this one will not work?

Problem solving is a process. If your plan does not work, then try each step again. Remember: Do not give up!

DPPFit\_9\_7 Plan for the coming week:

Keep track of my weight, eating, and physical activity.  
Try my positive action plan.  
Answer these questions:

- Did my action plan work?
- If not, what went wrong?
- What could I do differently next time?

### Week 10: Four Keys to Healthy Eating Out

DPPFit\_10\_1 The Challenge of Eating Out  
Eating out is a way of life for many people, but it can be a challenge for people who are trying to eat healthy. However, it can be done. It just requires some planning and careful choices.  
This session will cover the Four Keys to Healthy Eating Out.

1. Plan ahead
2. Ask for what you want
3. Take charge of what's around you
4. Choose foods carefully

DPPFit\_10\_2 1. Plan ahead

- ✓ Call restaurants or go to their websites to find out about low fat, low-calorie choices on the menu.
- ✓ Select a restaurant that offers low-fat, low-calorie choices.
- ✓ Do not drink alcohol before eating.
- ✓ Eat a small, healthy snack or drink a large, low-calorie or calorie-free beverage before you go out.

DPPFit\_10\_3 2. Ask for What You Want

- ✓ Ask for low-fat, low-calorie foods
- ✓ ask if foods can be cooked in a different way (I.e. baked not fried)
- ✓ Order salad dressing, gravy, sauces or spreads on the side.
- ✓ Ask for less cheese or no cheese.
- ✓ Before or after the meal, have the amount you do not want to eat put in a container to take home.

(continued)

- DPPFit\_10\_4 3. Take Charge of What's Around You  
Be the first to order.  
 ✓ You will be less likely to order unhealthy meals at other people order.  
 Keep foods off the table that you do not want to eat.  
 ✓ Ask the server to remove bread and butter from the table.  
 Ask the server to remove your plate as soon as you finish.  
 ✓ You'll be less likely to pick at the leftover food on your plate when you're already full.
- DPPFit\_10\_5 4. Choose Food Carefully  
Watch out for these high-fat words on menus!! (au gratin, breaded, buttery, creamy, fried, seasoned, rich)  
 \*Look for these low-fat words instead: BAKED, BROILED, GRILLED, ROASTED, STEAMED.  
 Use these tips for choosing your foods.  
 ✓ Be cautious of sauces.  
 ✓ Think about what you really need to eat.  
 ✓ Trim fat off meat.  
 ✓ Take skin off chicken.

DPPFit\_10\_6\* No matter which restaurant you go to, you can make low-fat, low-calorie choices. Note that most restaurants serve a tossed salad - a low-fat choice if topped with lemon juice, vinegar, or low-fat dressing.

Restaurant Type	GO!	CAUTION
	<b>Low-fat choices</b>	<b>High-fat choices</b>
Pizza	<ul style="list-style-type: none"> <li>Plain cheese pizza. Ask for half the cheese or no-fat cheese.</li> <li>Onions, green peppers.</li> </ul>	<ul style="list-style-type: none"> <li>Meat toppings such as sausage or pepperoni.</li> <li>Olives.</li> </ul>
Burgers (fast food)	<ul style="list-style-type: none"> <li>Broiled, extra lean burger.</li> <li>Grilled, broiled, or roasted chicken without sauce.</li> <li>Soft sauce (ketchup or low-fat sauce).</li> </ul>	<ul style="list-style-type: none"> <li>Large hamburger, cheeseburger.</li> <li>French fries.</li> <li>Fried fish or chicken.</li> <li>Sauces made with mayonnaise, cheese, or bacon.</li> </ul>
Mexican	<ul style="list-style-type: none"> <li>Heated (not fried) tortillas.</li> <li>Grilled chicken or beef fajitas.</li> <li>Soft sauce (ketchup or low-fat sauce).</li> <li>Salsa.</li> </ul>	<ul style="list-style-type: none"> <li>Enchiladas.</li> <li>Chili con queso (Chili with cheese).</li> <li>Fried tortillas, tortilla chips.</li> <li>Sour cream, guacamole.</li> <li>Queso sauce.</li> </ul>
Chinese and Japanese	<ul style="list-style-type: none"> <li>Steamed chicken.</li> <li>Steamed vegetables.</li> <li>Steamed rice.</li> <li>Soup.</li> <li>Terrine.</li> </ul>	<ul style="list-style-type: none"> <li>Egg foo yung.</li> <li>Fried chicken, beef, or fish.</li> <li>Fried rice or noodles.</li> <li>Egg rolls.</li> <li>Fried soft bun.</li> <li>Tempura.</li> </ul>
Italian	<ul style="list-style-type: none"> <li>Vegetables with meatless tomato sauce.</li> <li>Minestrone soup.</li> </ul>	<ul style="list-style-type: none"> <li>Sausage.</li> <li>Lasagna, manicotti, other pasta dishes with cheese or cream.</li> <li>Fried or breaded dishes such as veal or eggplant parmesan.</li> </ul>
Seafood	<ul style="list-style-type: none"> <li>Broiled, baked, or boiled seafood with lemon.</li> <li>Plain baked potato.</li> </ul>	<ul style="list-style-type: none"> <li>Fried fish.</li> <li>Hash potatoes.</li> </ul>
Steakhouse	<ul style="list-style-type: none"> <li>Grilled, broiled, or roasted chicken or fish.</li> <li>Plain baked potato.</li> </ul>	<ul style="list-style-type: none"> <li>Steak (except trimmed, lean cuts).</li> <li>Potatoes au gratin.</li> <li>Onion rings, other fried vegetables.</li> <li>French fries.</li> </ul>

- DPPFit\_10\_7 Explore nutrition information from popular fast-food restaurants below:  
 Arby's: <http://www.arbys.com/>  
 Burger King: <http://redesign.bk.com/en/us/menu-nutrition/index.html>  
 Chick-Fil-A: <http://www.chick-fil-a.com/#nutritiondata>  
 Domino's: <http://www.dominos.com/home/menu/lighteroptions.jsp>  
 KFC: [http://www.kfc.com/nutrition/pdf/kfc\\_nutrition.pdf](http://www.kfc.com/nutrition/pdf/kfc_nutrition.pdf)  
 McDonald's: <http://nutrition.mcdonalds.com/nutritionexchange/nutritionfacts.pdf>  
 Subway: [http://www.subway.com/applications/NutritionInfo/index.aspx?WT\\_mc\\_id=C-SB-NAV&WT\\_mc\\_ev=mainNav-MenuNutrition](http://www.subway.com/applications/NutritionInfo/index.aspx?WT_mc_id=C-SB-NAV&WT_mc_ev=mainNav-MenuNutrition)  
 Taco Bell: <http://www.tacobell.com/nutrition/information>  
 Wendy's: <http://www.wendys.com/food/pdf/us/nutrition.pdf>

**Week 11: Talk Back to Negative Thoughts**

DPPFit\_11\_1 **Overcoming Negative Thoughts:**  
 Positive thoughts are thoughts that make us feel good about our progress. Negative thoughts cause us to lose hope or to stand in the way of our progress. A negative thought is usually a criticism of ourselves. We become angry with ourselves for something as simple as eating a piece of cake or not going for a walk.

We are all human, so we all have negative thoughts from time to time. However, we must try to overcome them because they often lead us into doing even more eating and less activity rather than the reverse.

DPPFit\_11\_2 **The Negative Spiral**  
 Suppose you come home after a hard day at work. You think to yourself, "I am tired of working so hard. I am sick of this program. I can never eat what I want."  
 This negative thought might lead you to eat some potato chips. And then you think, "I did it again. I will never lose weight." So, you go on to eat more chips. Does this sound familiar? We've all done this, so please don't give up just because you ate one or two unhealthy items.  
 If you begin to lose hope because of this chain of thoughts and unhealthy actions, take a deep breath and start again.  
 You are worth it!

DPPFit\_11\_3 **The Habit of Negative Thoughts**  
 Negative thinking can become a habit. One goal of this program is to help you recognize negative thoughts as they occur and to teach you to talk back to them.  
 Talking back to negative thoughts means that you must first catch yourself having the negative thought. Imagine saying "Stop!" to yourself. Then, talk back with a positive thought. An example of a positive thought would be to praise yourself for what you've already accomplished. Doing so will help stop the cycle of negative thinking we all experience.

DPPFit\_11\_4\* Everyone has negative thoughts. This table helps explain the different types of negative thoughts.

Type of Negative Thought	Example
<b>Good or Bad</b> <ul style="list-style-type: none"> <li>Divides the world into good or bad people.</li> <li>Sees self as a success or failure.</li> <li>Is on or off the program.</li> </ul>	"I look at what I did. I ate just cake. I will never be able to do well in the program."
<b>Excuses</b> <ul style="list-style-type: none"> <li>Blames others for problems.</li> <li>Claims to not be able to help or control situations.</li> </ul>	"I have to buy these cookies just in case I don't stop it."
<b>Should</b> <ul style="list-style-type: none"> <li>Expects to always make the right choice.</li> <li>Gets set up for failure.</li> <li>Leads to anger.</li> </ul>	"I should have eaten less cereal."
<b>Not As Good As</b> <ul style="list-style-type: none"> <li>Compares self to someone else.</li> <li>Blames self for not doing as well as someone else.</li> </ul>	"I didn't lose two pounds this week, and I only lost one."
<b>Give Up</b> <ul style="list-style-type: none"> <li>Beats self up.</li> <li>Often follows the other kind of negative thoughts.</li> </ul>	"This program is too hard. I might as well forget it."

(continued)



DPPFit\_11\_5\* General way to stop negative thoughts:

1. Catch yourself. Think, "I am being negative about myself."
2. Say "Stop!" to yourself. Say it out loud. Picture a huge, red stop sign.

Negative thought	Talk back with a positive thought
<b>Food is either "good" or "bad."</b> "I can never eat dessert again." "Look at what I did. I ate that cake. I will never do well."	<b>Work toward balance</b> "I can eat dessert and cut back on something else." "One slip-up is not the end of the world. I can get back on track."
<b>Excuse</b> "It is too cold to take a walk." "I do not have the willpower."	<b>It's worth it</b> "I can go for a walk and stop if it gets too cold." "It is hard to change old habits, but I will give it a try and see how it works."
<b>Should</b> "I should have eaten less dessert." "I haven't written down everything I eat."	<b>It is my choice</b> "It was my choice. Next time I can decide not to eat so much." "I'm writing down everything I eat because it helps me eat better."
<b>Not as good as</b> "Martin lost ten pounds this week, and I ate just one."	<b>Everyone is different</b> "It is not a race. Martin and I can lose weight at different rates and both do well."
<b>Give up</b> "This program is too hard. I might as well forget it." "I will never get a sign."	<b>One step at a time</b> "I've learned something about what is hard for me." "I will try something different next time."

DPPFit\_11\_6\* Using the table, follow these steps to practice replacing a negative thought with a positive one:

1. Write the negative thoughts you've had.
2. Say each thought out loud. Then say, "Stop!"
3. Talk back, again out loud, with a positive thought. Write down the positive thought.

Negative thought	STOP!	Positive thought
	STOP!	
	STOP!	
	STOP!	
	STOP!	
	STOP!	
	STOP!	
	STOP!	

DPPFit\_11\_7

During the next week I will -

- ✓ Keep track of my weight, eating, and physical activity.
- ✓ Catch myself when I have negative thoughts.
- ✓ I'll practice stopping the negative thoughts and talking back with positive thoughts.

**Week 12: The Slippery Slope of Lifestyle Change**

DPPFit\_12\_1

The Slippery Slope of Lifestyle Change

We know that sometimes change is hard. It's not easy to be the best we can be. Nobody's perfect, and slips happen.

What are slips?

Slips are times when we do not follow our plans for healthy eating or being active. Slips are normal. If you haven't already had a slip, you will surely have one in the future. However, no need to worry. Slips do not always hurt our progress. What hurts our progress is the way we react to slips.

DPPFit\_12\_2

Why do we slip?

Because we are human. However, different things cause different people to slip. We talked about cues that make us eat or not be active. Moods or feelings cause many of us to slip from healthy eating. Some of us overeat when we are happy. Some of us overeat when we are bored. What causes us to slip is a habit, something we learned over time.

DPPFit\_12\_3

What if we slip?

The way we react to slips is also a habit. We can learn a new way to react to slips that will get us back on our feet again.

As you go forward with this program, remember two things: slips are normal and to be expected. Just about everyone who tries to lose weight and be more active has slips. A slip is not a problem. Just get back on your feet and continue to work toward your goals.

DPPFit\_12\_4

So, after you slip:

1. Talk back to negative thoughts with positive thoughts. Negative thoughts are your worst enemy. Talk back. "I am not a failure because I slipped. I am back on my feet again."
2. Ask yourself how the slipped happened. Learn from the slip. Can you avoid the cue in the future? Will you be able to handle the situation better?
3. Regain control immediately. Make your very next meal a healthy one. Get back on schedule with your activity plan right away.

DPPFit\_12\_5

So, after you slip continued...

4. Talk to someone supportive. Call someone in the program or another friend and discuss your new plan for handling slips. Commit yourself to a new effort.
5. Focus on all the positive changes you made. You are making lifelong changes, and slips are just part of the process. Just remember this: give yourself permission to fall short once in a while. Overeating once, no matter how extreme, will NOT ruin everything.

DPPFit\_12\_6

To avoid slips from your healthy eating, spend a moment thinking about how you slipped in the past, and how you might handle similar situations better in the future.

1. Describe one thing that caused you to slip from healthy eating:
2. Can you avoid it in the future? If so, how?
3. Make a plan for how to get back on your feet the next time you slip:
  - I will:
  - Roadblocks that might come up:
  - I will handle them by:

I will do this to make my success more likely:

DPPFit\_12\_7

To avoid slips from being active, we can learn from past experience. Think about the situations that caused you to slip from being active in the past and how you might handle similar situations now.

1. Describe one situation that caused you to slip from being active:
2. Can you avoid similar situations in the future? If so, how?
3. Plan for how to get back on your feet the next time you slip:
  - I will...
  - Roadblocks that might come up:
  - I will handle them by:

I will do this to make my success more likely.

(continued)

**Week 13: Jump Start Your Activity Plan**

DPPFit\_13\_1

**Jump Start Your Routine**

After a while, your activity routine might become a little boring. Boredom is a problem because it may cause you to slip back into old habits. It is important to do something to keep your routine fresh and fun. Find ways to jump start your activity routine, giving it new energy.

DPPFit\_13\_2

**Adding Variety**

You may choose not to do the same activity day in and day out, every season of the year. You are making lifelong changes and being active is something you will be doing for the rest of your life. Build some variety into your routine and find ways to make it fun.

DPPFit\_13\_3

**Improving Your Aerobic Fitness**

As you increase your aerobic activity, you will also improve your aerobic fitness. As you exercise your heart, it will become stronger over time. As your heart becomes stronger, you will notice that it is easier for you to do things, like walking up stairs while carrying groceries.

Your Fitbit® automatically tracks your heart rate. For more information, visit: <https://www.fitbit.com/us/technology#heart-rate>

DPPFit\_13\_4\*

**Ways to Prevent Boredom**

If you get bored doing one activity, you might slip back into old habits of not being active. Think about ways to prevent boredom. Some are listed below. You can add examples that would work for you.

Ways to prevent boredom	Examples
Do something new.	
Do the same activity in a new place.	
Be active as a way to be social.	
Make being active fun.	
Challenge yourself.	

DPPFit\_13\_5

**Improving Your Aerobic Fitness**

Heart rate is a good measure of intensity. Raising the intensity of our physical activity increases our heart rate and improves how well our heart works.

The heart is a muscle. And just as with any muscle, we must exercise it to make it stronger. We exercise the heart by making it beat faster than normal.

As your heart becomes stronger, you'll notice that it's easier for you to do things, like walking up stairs while carrying groceries. The reason is that, as your heart becomes stronger, your aerobic fitness improves. Aerobic fitness means that your heart does a good job of pumping oxygen through your blood to your other muscles (for example, the muscles in your arms and legs).

DPPFit\_13\_6\*

**F.I.T.T. Principles** Not all forms of activity will strengthen your heart. Only activities that are "F.I.T.T." will work the heart muscle. The principles above describe how activity should take place to get the most benefit.

F.I.T.T. Principle	Making It Work
<b>Frequency</b> How often you are active	Try to be active most days. We suggest being active at least 3 days a week, but 5 to 7 days is even better. Increase the frequency slowly.
<b>Intensity</b> How hard you work while active; how fast your heart beats	While you're active, you should breathe fast enough so that you can talk, but not sing. If you can sing, go faster! If you have trouble breathing and talking, slow down. As you do regular activity over time, your heart will not beat as fast and you will need to do a more challenging activity in order to get the same benefits.

DPPFit\_13\_7\*

**How hard are you working?**

By paying attention to our bodies, most of us can tell how hard we are working. Rate yourself on the scale below, by checking the box that shows how you feel when you are active.

How hard are you working?			
Intensity	Rating	Description	F.I.T.T. Range
Very, Very Light		"I am not working hard at all. I can talk and even sing easily."	↑ Try working a little harder.
Very Light		"I am working and breathing a little harder than usual. I can still talk easily."	
Fairly Light		"I am working and breathing somewhat hard. I can talk fairly easily."	↓ Stay in this range.
Somewhat Hard		"I'm working hard and breathing deeply. I can still talk."	
Hard		"I'm working very hard. I cannot catch my breath or talk."	↓ Slow down. Rest for a while.
Very Hard			
Very, Very Hard			

**Week 14: Make Social Cues Work for You**

DPPFit\_14\_1

**The Power of Social Cues**

Social cues are occasions that trigger us to behave in a certain way when we're around other people. Social cues sometimes make it hard to stay on track with healthy goals.

The best way to overcome social cues is to stay away from them. But staying away is not always possible. In such a case, we can try changing the cue or responding differently to it.

Not all social cues are problems, however. Some social cues will help you eat healthier and be more active.

DPPFit\_14\_2\*

Social cues involve other people, not just ourselves. When we react to a social cue in the same way over and over, we build a habit. The other person has also learned a habit. When two people are involved, breaking a habit is even harder than when it is just you who must adjust to change.

The table includes examples of negative social cues. What examples have you noticed in your own life?

Problem social cues	Examples in your life
The sight of other people eating problem foods or being inactive.	
Being offered (or pressured to eat) problem foods.	
Being invited to do something inactive such as watch a movie and eat popcorn.	
Hearing complaints, especially about eating or not eating something.	

(continued)

DPPFit\_14\_3\* Not all social cues are problems, however. The table includes some examples of helpful social cues.

Do you have examples of social cues that have helped you be more active and eat healthier?

Helpful social cues	Examples
The sight of other people eating healthy foods or being active.	
Being offered healthy foods or invited to do something active.	
Being praised.	

DPPFit\_14\_4 We can change social cues. Or we can change how we react to them.

- Stay away from the cue, if you can.
  - ✓ For example, move to a different room when someone is eating a tempting food.
  - ✓ Spend time with people in ways that do not involve eating.
- Change the cue, if you can.
  - ✓ Discuss the problem with those involved.
  - ✓ Think of other options.
  - ✓ Tell the other person about the program and your efforts to lose weight and be more active.
- Practice responding in healthier ways to offers of unhealthy food.
  - ✓ Say “No, thank you.”
  - ✓ Respond in a gentle but firm manner.

DPPFit\_14\_5 Some social cues are helpful for staying on track. Here are a few examples.

- Spend time with people who are already active and make healthy food choices.
- Put yourself in places where people are active.
- Set up a regular date with others to be active.
- Ask your friends to call you to remind you to be active.
- Bring a low-fat or low-calorie dish to share when you go to a dinner party.
- Be social by doing something active. Take a walk and talk.

What examples do you have from your life?

- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

DPPFit\_14\_6\* Take a minute to think about who supports your goals or who would support your goals if you asked them to. What do they do, or what could they do to help you?

Ways Others Can Help Me Eat Healthy	People Who Can Help
Serve low-fat or low-calorie foods for meals.	
Eat low-fat or low-calorie foods when I am hungry.	
Not tempt me with problem foods as a reward or gift.	
Clear the table and put away food as soon as the meal is over.	
Help with cooking, shopping, or cleaning up after meals.	
Not offer me second helpings.	
Encourage me to cook new foods.	
Praise my efforts to eat healthier foods.	
Other:	
Other:	

Ways Others Can Help Me Be More Active	People Who Can Help
Go for a walk or do other physical activities with me.	
Plan social events around being active.	
Compromise when my being active conflicts with their schedule.	
Praise me when I do my planned activity. Do not remind me if I do not.	
Babysit for me so I can take a walk.	
Set up a regular date with me to be active.	
Encourage me to go for a walk, if I am hesitant about whether to go.	
Work to achieve and maintain the program goals with me.	
Other:	
Other:	

DPPFit\_14\_7 My Problem Social Cues

- Describe a social cue that is a problem for me.
  - Pick one idea from this session for changing the problem social cue. Choose one that is likely to work and that I can do.
  - Create a positive action plan.
    - I will:
    - When?
    - I will do this first:
- Roadblocks that might come up:  
I will handle them by:  
I will do this to make my success more likely:

**Week 15: You Can Manage Stress**

DPPFit\_15\_1 What is Stress?

Stress is a part of life and occurs when we tense up in response to pressure. Stress is what happens to us when we allow events or situations to overwhelm our ability to cope with them. Any change, good or bad, big or small, can cause stress. The old saying “An ounce of prevention is worth a pound of cure” is certainly true when it comes to stress. It’s best to avoid stress whenever we can. However, if we cannot avoid stress, there are ways to cope.

DPPFit\_15\_2 Stress and Diabetes

Why are we talking about stress in this program? Many people react to stress by changing their eating and activity habits. Some people eat and drink too much as a way to deal with stress, and others may stop eating. Some people become very inactive and withdrawn.

We understand that it is stressful to participate in this program and to think about all the lifestyle changes we suggest. Changing behavior and asking your family to make changes to help you can create stress.

(continued)

- DPPFit\_15\_3 When you have time, answers the questions below to better understand how you feel stress.
- What situations make you feel stressed?
  - How do you feel, physically and mentally, when you are stressed?
  - What do you do differently when you get stressed?

- DPPFit\_15\_4 Ways to Prevent Stress
- Say “No” when asked to do something you do not want to do.
    - ✓ Try to say “Yes” only to important matters.
  - Share some of your workload with others.
  - Set goals you can reach in a realistic time.
  - Take charge of your time.
    - ✓ Make realistic schedules.
    - ✓ Get organized.
  - Use problem solving techniques (Week 9)
    - ✓ Describe the problem in detail.
    - ✓ Think of all your options.
    - ✓ Pick one option to try.
    - ✓ Make an action plan.
    - ✓ Try the plan. See how it goes.
    - ✓ Plan ahead.

- DPPFit\_15\_5 Ways to prevent stress cont...
- Plan ahead
    - ✓ Think about the kind of situations that are stressful for you.
    - ✓ Plan how to handle them or to work around them.
  - Keep things in perspective. Remember your purpose.
    - ✓ Think of all the good things in your life.
    - ✓ Remember why you joined this program.
  - Reach out to people for support.
  - Be physically active. Physical activity is a great stress reducer

- DPPFit\_15\_6 When you cannot avoid stress:
- Catch the stress early.
    - ✓ Learn to be aware of the signs that show you are getting stressed.
    - ✓ Write down 3 signs that you are getting stressed:
    - ✓ Stop yourself as soon as you realize you are stressed.
  - Take a 10-minute time-out
    - ✓ Move those muscles. Go for a walk, a bike ride, or do another activity you enjoy.
    - ✓ Breathe. Take a full, deep breath. Use your Fitbit® for a guided breathing exercise to relax ([https://help.fitbit.com/articles/en\\_US/Help\\_article/2077.htm#start](https://help.fitbit.com/articles/en_US/Help_article/2077.htm#start)).

DPPFit\_15\_7\* Taking part in this lifestyle program may cause you stress. It takes effort to make the changes this program suggests. And these changes can complicate your life, causing tension and stress for you and for those around you. The table includes some examples of how being in the program may cause stress and some ways for dealing with it.

Possible sources of stress	Ways to manage stress	Example
Extra time spent shopping and preparing food.	Share the work.	Ask spouse or family member to help shop.
	Take charge of your time.	Make double recipes, and freeze half for later.
Feeling you are missing out because you can't eat favorite foods.	Set goals you can reach.	Now and then allow yourself to have favorite foods in small portions.
	Keep things in perspective.	Remind yourself how important preventing diabetes is to you.
Your family does not like low-fat foods.	Reach out to people.	Ask your family to support your efforts to try new foods.
	Use the steps for solving problems.	Discuss your feelings and your priorities to lose weight with your family. Think of all your options that might work with them, and then try one.
Feeling uneasy joining at social events where high-fat foods are available.	Practice saying “No.”	Turn down invitations that are not important to you.
	Reach out to people.	Call the host or hostess ahead, ask what will be served, and ask whether you can bring a low-fat dish.
	Plan ahead.	Before you go to a party, plan what foods you will choose when you are there.
Feeling pressure to fit activity into a busy schedule.	Plan ahead.	Make an appointment to be active with a family member or friend.
	Problem solve.	Combine activity with other events you plan to do. (Have a meeting while walking. Go hiking with the family.)

**Week 16: Ways to Stay Motivated**

DPPFit\_16\_1 Congratulations!  
 This is the last week of the 16-week program. From now on, you will have the tools and information to continue your work toward a healthier lifestyle.  
 Think about all the great progress you've made. If you have met your goals -- GREAT!  
 If you are still working on them -- GREAT! You have what you need to succeed. Just don't give up!

- DPPFit\_16\_2 Ways to Stay Motivated
1. Stay aware of the goals you've already reached and the goals you plan to reach.
    - What did you hope to achieve when you first joined this program?
    - Have you reached these goals?
    - Were there any benefits to being in the program that you did not expect?
    - What would you like to achieve over the next 6 months?
  2. Recognize your successes.
    - What changes in your eating and activity do you feel proudest of?
    - What was easier than you thought it would be? What was harder?

*(continued)*

- DPPFit\_16\_3 Ways to stay motivated cont...
3. Keep visible signs of your progress.
    - Post weight and activity graphs on your refrigerator door.
    - Mark on a chart your activity milestones toward a specific goal.
    - Measure waist or belt size once a month.
  4. Keep track of your weight, eating, and activity.
    - Record your activity daily.
    - Record everything you eat every day.
    - Record your weight once a week on:
      - How have you varied your activity?
      - How do you vary meals and snacks to avoid becoming bored?
      - Can you think of some new ways to vary your food choices?
- DPPFit\_16\_4 Ways to stay motivated cont...
6. Identify new ways to challenge and reward yourself.
    - Develop ways to reward yourself when you meet new challenges.
      - Challenges: Should be specific, short-term, and realistic.
      - Rewards: Something you will do or buy if, and only if, you succeed in your challenge.
    - What are some non-food ways you can reward yourself for meeting a challenge?
  7. Create some friendly competition.
    - Set up a friendly contest that everyone wins. That is, everyone will lose weight, or everyone will be active, even if one person loses more or does more.
    - What ideas do you have for a contest? The Fitbit® app has many options for friendly competition to get moving.
- [https://help.fitbit.com/articles/en\\_US/Help\\_article/1531.htm#start](https://help.fitbit.com/articles/en_US/Help_article/1531.htm#start)
- DPPFit\_16\_5 Ways to stay motivated cont...
8. Remember, slips are normal.
    - If you do slip, focus on how to get back in the game. Stay motivated.
  9. Look to others for help in staying motivated.
    - Call some in the program or a friend for encouragement and support.
- A key part of keeping on track with healthy habits is staying motivated. The ideas for staying motivated from this week have worked for others, but it is important to find out which ideas work best for you.
- DPPFit\_16\_6 Create Your Plan to Stay Motivated
- Using the examples of methods to stay motivated that have worked for others, create your own a plan to stay motivated.
1. Choose one way to stay motivated that would help you now.
 

Make a positive action plan:

    - I will:
    - When?
    - I will do this first:
- Roadblocks that might come up:  
I will handle them by:
- DPPFit\_16\_7 You should have received information about your follow-up by e-mail. If you haven't, please respond with a good e-mail and the information will be resent. You did it!
-