

Optimizing Physical Activity in the Diabetes Prevention Program

Elizabeth Joy, MD, MPH, FACSM

Senior Medical Director

Wellness & Nutrition

Intermountain Healthcare

Liz.joy@imail.org



Conflict of Interest

YES

NO

Outline

- Review physical activity in the National Diabetes Prevention Program
- Dissemination of the DPP into the YMCAs
- Community and online DPP and access to PA resources
- Impact of the COVID-19 pandemic on PA and PA resources
- Impact of the COVID-19 pandemic on incident T2DM
- Overview of the DPP curriculum (examples of the PA modules)
 - Gaps in the PA curriculum
- Evidence for PA and DPP Outcomes
- Opportunities to enhance PA as a part of the DPP
- Discussion and Q&A – All teach | All Learn

National Diabetes Prevention Program

The New England Journal of Medicine

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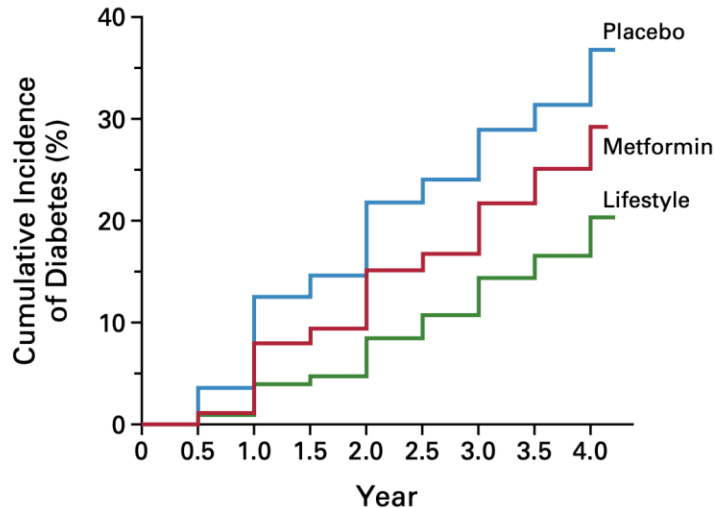


Figure 2. Cumulative Incidence of Diabetes According to Study Group.

...to prevent one case of diabetes during a period of three years, 6.9 persons would have to participate in the lifestyle-intervention program, and 13.9 would have to receive metformin.

Conclusions Lifestyle changes and treatment with metformin both reduced the incidence of diabetes in persons at high risk. The lifestyle intervention was more effective than metformin. (N Engl J Med 2002; 346:393-403.)

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...for the development of type 2 diabetes. The study was designed to answer the following primary questions: Does a lifestyle intervention or treatment with

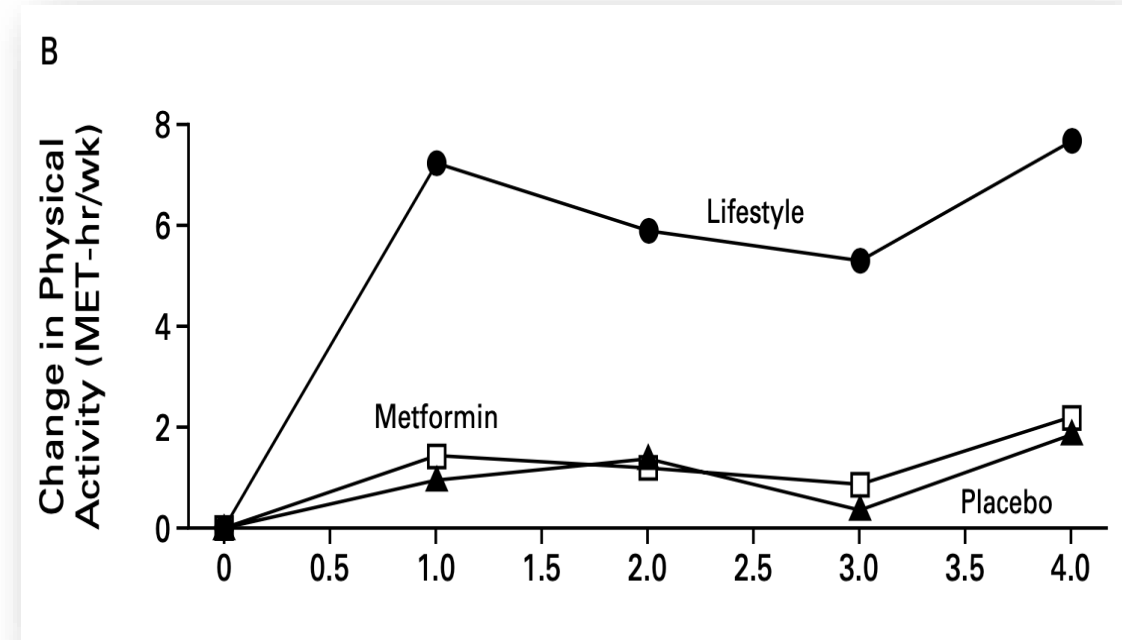
The writing group (William C. Knowler, M.D., Dr.P.H., Elizabeth Barrett-Connor, M.D., Sarah E. Fowler, Ph.D., Richard F. Hamman, M.D., Dr.P.H., John M. Lachin, Sc.D., Elizabeth A. Walker, D.N.Sc., and David M. Nathan, M.D.) takes responsibility for the content of this article. Address reprint requests to the Diabetes Prevention Program Coordinating Center, Biostatistics Center, George Washington University, 6110 Executive Blvd., Suite 750, Rockville, MD 20852.

*The members of the Diabetes Prevention Program Research Group are listed in the Appendix.

- Randomized 3234 persons to lifestyle, metformin or placebo.
- Lifestyle-modification program promoted 7% weight loss and at least **150 minutes of physical activity per week**.
- Taught by case managers on a one-to-one basis during the first 24 weeks and described as flexible, culturally sensitive, and individualized.
- Subsequent individual sessions (usually monthly) and group sessions with the case managers were designed to reinforce the behavioral changes.
- The lifestyle intervention reduced the incident T2DM by 58%, metformin by 31% compared with placebo
- To prevent one case of diabetes during a period of three years, 6.9 persons would have to participate in the lifestyle-intervention program, and 13.9 would have to receive metformin.

Physical Activity in the NDPP

- Engage in PA of moderate intensity, such as brisk walking, for at least 150 minutes per week.
- 16-lesson curriculum covering diet, exercise, and behavior modification
- Self-reported levels of LTPA were assessed annually with the Modifiable Activity Questionnaire (converted to MET-hr/week)



Dissemination of the DPP in the YMCAs: Translating the Diabetes Prevention Program into the Community The DEPLOY Pilot Study

D i a b e t e s E d u c a t i o n & P r e v e n t i o n w i t a L i f e s t e L i f e s t e I n t e r v e n t i o n O f f e r e d a t t h e Y M C A (D E P L O Y)

- **Test the hypothesis:** YMCA wellness instructors could be trained to implement a group-based lifestyle intervention with fidelity to the DPP model and that adults at high risk for developing diabetes who were assigned to receive this intervention could achieve changes in body weight comparable to the DPP.
- **Results:** After 6 months, body weight decreased by 6.0% in intervention participants and 2.0% in controls ($p < 0.001$; difference between groups); differences were sustained after 12 months (*did not report on PA*)
- **Conclusion:** The YMCA may be a promising channel for wide-scale dissemination of a low-cost approach to lifestyle diabetes prevention.

A little more on the YMCA....

- Currently, the Y delivers the YMCA's DPP in 42 states (>1000 sites) and has served more than 64,000 participants
- YMCA is currently the largest deliverer of in-person DPP interventions nationally
- YMCA of the USA received a Health Care Innovation Award from the CMS to provide a DPP to Medicare beneficiaries with prediabetes in 17 regional networks of participating YMCAs nationwide.
 - Tested whether the program reduced medical spending and utilization in the Medicare population
 - Average savings per member per quarter during the first three years of the intervention period was \$278 = \$3336/3 year
 - 9 fewer inpatient stays and 9 fewer ED visits per 1,000 participants per quarter

State

City

 Download full Registry

OR

Search by organization name:

what and where are the PA resources?

- ★★ Organization has achieved full plus CDC recognition
- ★ Organization has achieved full CDC recognition
- Organization has preliminary recognition

Results per page: 1 - 29 of 29

Umbrella Organizations are organizations designated to provide administrative infrastructure support.
▲ Data sorted by this column (click column header to sort)

Community Building Services	337 E Hidden Garden Ln	S Salt Lake	UT	84115-3648	(801) 638-8329	Distance Learning	Public Employees Members
FourPoints Community Health Centers	440 N Paiute Dr.	Cedar City	UT	84721	(435) 586-1112 Ext. 317	In-person	Public
Jolley's Compounding Pharmacy	1702 S 1100 E	Salt Lake Cty	UT	84105-3424	(801) 484-4393	PHARMACY In-person	Public
Mentes Activas	1927 S 300 E	Salt Lake City	UT	84115	(801) 651-6773	In-person	Public
Merit Medical	1600 W Merit Pkwy	South Jordan	UT	84095-2416	(801) 253-1600	EMPLOYER Combination	Employees
Midtown Community Health Center	2240 Adams Ave.	Ogden	UT	84401	(801) 393-5355	In-person	Public
Midvale CBC	49 W Center St	Midvale	UT	84047-7364	(385) 887-9002	CLINIC Combination	Public
Mosaic Interfaith Ministries	4392 S 900 E	Slc	UT	84124-2447	(801) 588-0139	In-person	Other

Online DPP Programs



DPP from the couch????

Evidence for Online DPP

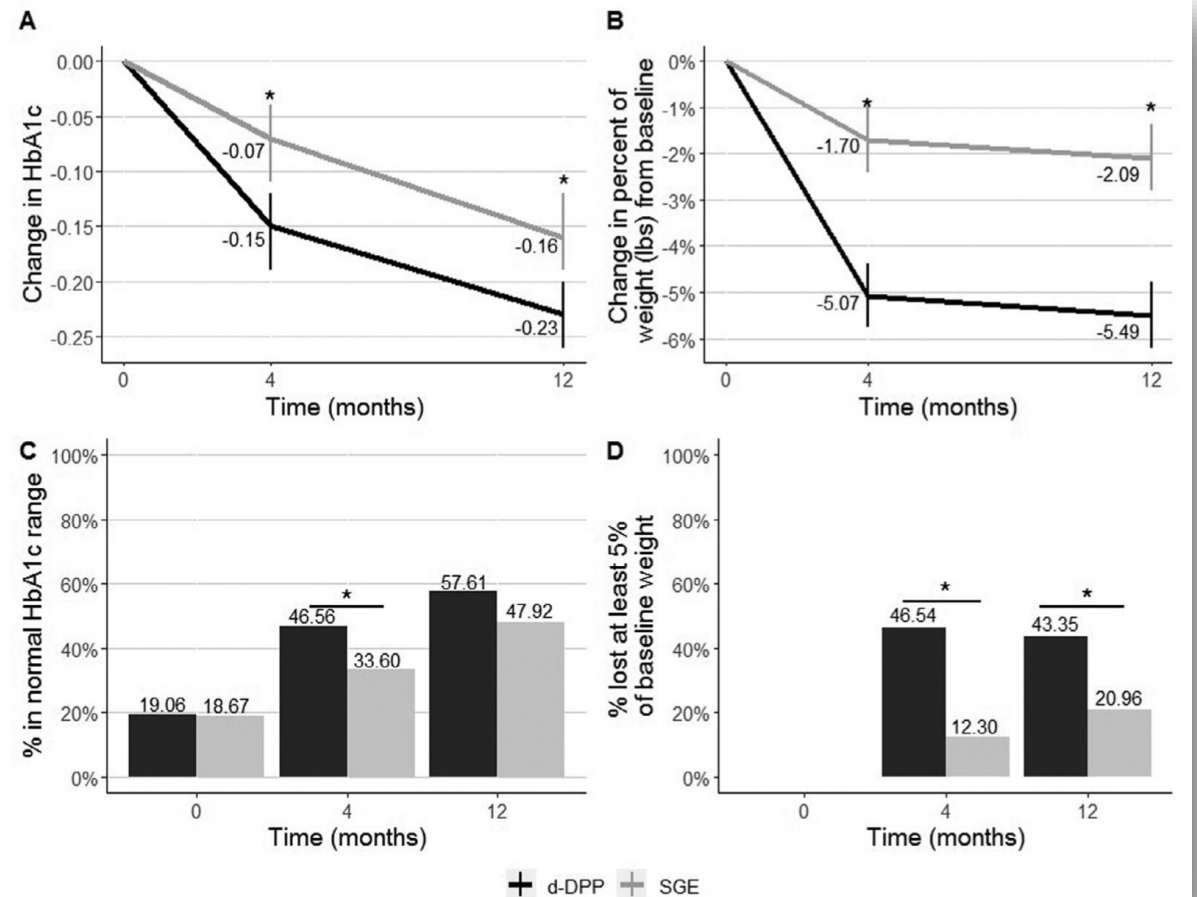
American Journal of
Preventive Medicine

RESEARCH ARTICLE

Effects of a Digital Diabetes Prevention Program An RCT

Jeffrey A. Katula, PhD, MA,¹ Emily V. Dressler, PhD,² Carol A. Kittel, MA,² Lea N. H. Almeida, PhD,³ Kathryn E. Wilson, PhD,⁴ Tzeyu L. Michaud, PhD,⁵ Gwendolyn C. Porter, PhD,³ Fabiana A. Brito, PhD,³ Cody L. Goessl, PhD,³ Carolyn B. Castro Sweet, PhD,⁵ Robert Schwab, MD,⁶ Paul A. Estabrooks, PhD,⁶

(did not report on PA)



Mobile Delivery of the Diabetes Prevention Program in People With Prediabetes: Randomized Controlled Trial

Monitoring Editor: Gunther Eysenbach

Reviewed by Daiana Biduski, Yu-Hsuan Lin, and Ana De Ma

[Tatiana Toro-Ramos](#), BSc, PhD,¹ [Andreas Michaelides](#), PhD
[Charalambos Argyrou](#), MSc,² [Elisavet Loukaidou](#), BA,² [Mari](#)

¹ Noom, Inc, New York, NY, United States,

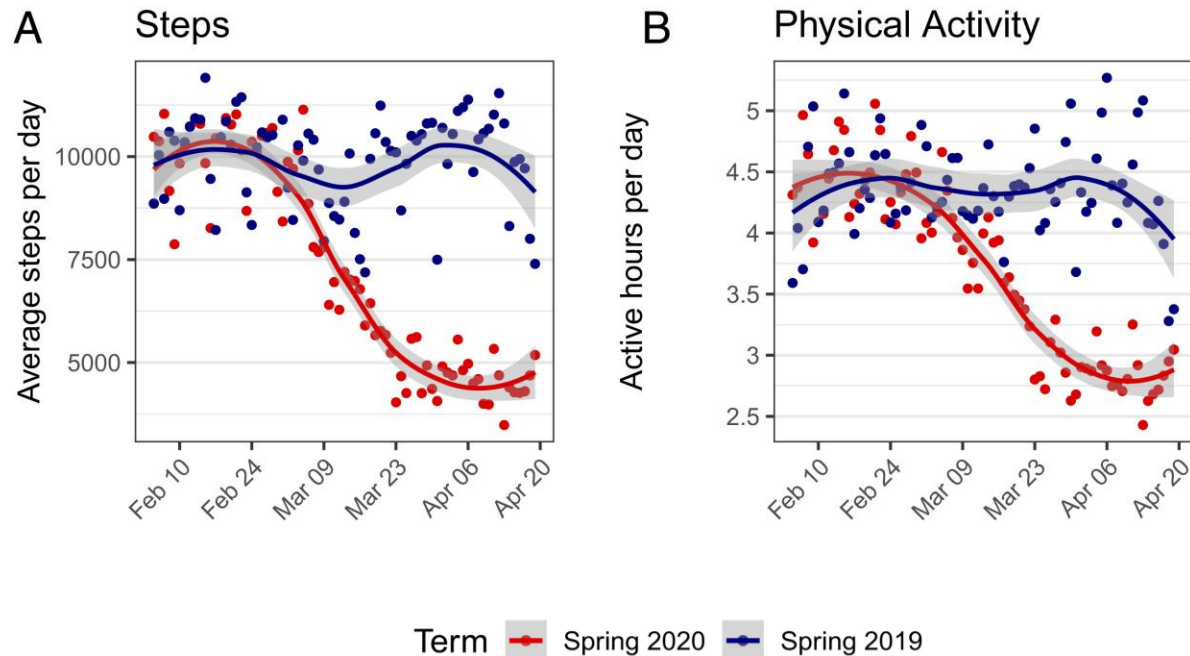


Table 2

Change in body weight and hemoglobin A_{1c} at 6 and 12 months by participant group (intervention, intervention completers, and control group).

Measured values	Intervention group ^a			Intervention completers						Control group			
	6 months, mean (95% CI)	Effect size ^b	P value ^c	12 months, mean (95% CI)	Effect size ^b	P value ^c	6 months, mean (95% CI)	Effect size ^b	P value ^c	12 months, mean (95% CI)	Effect size ^b	P value ^c	6 months, mean (95% CI)
Weight (kg)	-3.31 (-4.43 to -2.19)	-0.12	<.001	-2.22 (-3.31 to -1.13)	0.01	.02	-4.86 (-6.39 to -3.33)	-0.22	<.001	-3.92 (-5.48 to -2.37)	-0.14	<.001	-0.42 (-1.53 to 0.69)
Weight (%)	-3.69 (-4.89 to -2.48)	-0.63	<.001	-2.54 (-3.74 to -1.33)	-0.40	<.001	-5.59 (-7.22 to -3.95)	-0.99	<.001	-4.66 (-6.42 to -2.90)	-0.72	<.001	-0.15 (-1.42 to 1.11)
BMI (kg/m ²)	-1.35 (-1.79 to -0.92)	-0.13	<.001	-0.88 (-1.31 to 0.44)	-0.00	<.001	-1.79 (-2.34 to -1.24)	-0.15	<.001	-1.44 (-2.02 to -0.87)	-0.09	<.001	-0.12 (-0.53 to 0.29)
HbA _{1c} ^d (%)	-0.15 (-0.22 to -0.08)	0.08	<.001	-0.23 (-0.32 to -0.14)	-0.13	<.001	-0.17 (-0.25 to -0.10)	-0.06	<.001	-0.28 (-0.37 to -0.19)	-0.38	<.001	-0.17 (-0.25 to -0.09)

Impact of COVID-19 on Community PA and PA Resources



- 25% of U.S. health clubs and 30% of studios have permanently closed since March 2020 when the COVID-19 pandemic began, according to research from IHRSA
 - 40,000 fitness facilities --> 30,000

<https://www.pnas.org/doi/10.1073/pnas.2016632118>

COVID-19 and T2DM

- Of the 1,000,000 Americans who have died of COVID-19, ~ 40% had diabetes (98% of which is T2DM)
- Among COVID-19 (+) adults --> 40% increase in T2DM (compared to non-infected control group) (1)
- In the U.S., deaths from diabetes increased 17% in 2020 and 15% in 2021 to > 100,000 per year (excludes deaths attributed to COVID-19) (2)
- Online questionnaire (n=3473)
 - 48% gained weight, 34% remained the same weight, 18% lost weight
 - Predictors of pandemic weight gain were psychological distress, pre-pandemic weight status, having children at home; and time since last bodyweight check (3)

1. *Lancet Diabetes Endocrinol* 2022; 10: 311–21

2. <https://www.reuters.com/world/us/exclusive-us-diabetes-deaths-top-100000-second-straight-year-federal-panel-urges-2022-01-31/>

3. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 16 (2022) 102392








DPRP Standards and Curriculum






- The Centers for Disease Control and Prevention (CDC) established the CDC Diabetes Prevention Recognition Program (DPRP) as part of the National Diabetes Prevention Program (National DPP) (<https://www.cdc.gov/diabetes/prevention/index.html>).
- The purpose of the DPRP is to recognize organizations that have demonstrated their ability to effectively deliver the evidence-based National DPP LCP (lifestyle change program)
- DPRP develops standards that DPP programs must achieve to maintain their recognition status
- Organizations will achieve full recognition when they meet the following criteria:
 - at least 60% of all completers achieved at least **one** of the following outcomes:
 - at least 5% weight loss 12 months after the cohort began, or
 - at least 4% weight loss and at **least 150 minutes/week on average of physical activity 12 months after the cohort began**, or
 - at least a 0.2% reduction in HbA1C

DPP Curriculum

Table 1. Curriculum Topics (Core Phase: Months 1-6)

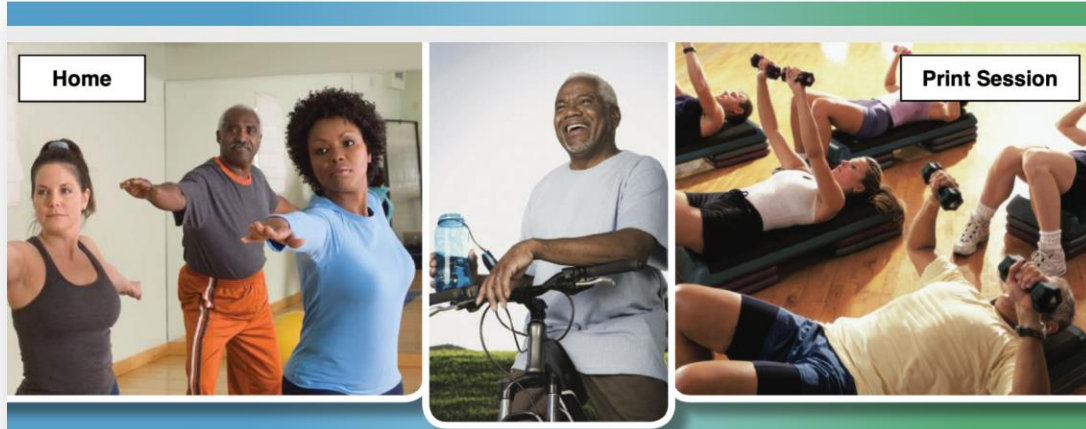
Table 2. Curriculum Topics (Core Maintenance Phase: Months 7-12)

2012 National DPP Curriculum	PreventT2 Curriculum
Welcome to the National Diabetes Prevention Program	Program Overview & Introduction to the Program
Being Active - A Way of Life 	Get Active to Prevent T2 
Move Those Muscles 	Track Your Activity 
Be a Fat and Calorie Detective	Track Your Food
Three Ways to Eat Less Fat and Fewer Calories	Eat Well to Prevent T2 
Jump Start Your Activity Plan 	Get More Active
Tip the Calorie Balance	Burn More Calories Than You Take In
Healthy Eating	Shop and Cook to Prevent T2
You Can Manage Stress	Manage Stress
The Slippery Slope of Lifestyle Change	Find Time for Fitness 
Make Social Cues Work for You & Talk Back to Negative Thoughts	Cope with Triggers
Can use Heart Health from months 7-12	Keep Your Heart Healthy
Problem Solving	Take Charge of Your Thoughts
Take Charge of What's Around You	Get Support
Four Keys to Healthy Eating Out	Eat Well Away from Home
Ways to Stay Motivated	Stay Motivated to Prevent T2

2012 National DPP Curriculum	Prevent T2 Curriculum
Welcome to Sessions 7-12	N/A
Balance Your Thoughts for Long-Term Maintenance	When Weight Loss Stalls
Staying on Top of Physical Activity 	Take a Fitness Break 
Stepping up to Physical Activity 	Stay Active Away from Home 
A Closer Look at Type 2 Diabetes	More About T2
More Volume, Fewer Calories	More About Carbs
Fats - Saturated, Unsaturated, and Trans Fat	Can repeat Eat Well to Prevent T2 from months 1-6
Healthy Eating - Taking it One Meal at a Time & Food Preparation and Recipe Modification	Have Healthy Food You Enjoy
Stress and Time Management	Get Enough Sleep
Preventing Relapse	Get Back on Track
Handling Holidays, Vacations, and Special Events	Can repeat Eat Well Away from Home from months 1-6
Heart Health	Stay Active to Prevent T2 
Healthy Eating with Variety and Balance	Can repeat Shop and Cook to Prevent T2 from months 1-6
Looking Back and Looking Forward	Prevent T2—for Life!

 = Physical Activity Modules

DPP Physical Activity Modules



Participant Guide

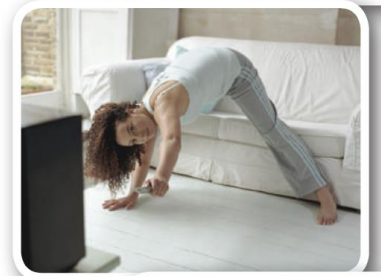
Get Active to Prevent T2



Ways to Get Active


There are so many great ways to get active. You're sure to find at least one that you enjoy. Here are just a few ideas.

1. After you read six pages of a book, get up and move a little.
2. Dance to your favorite music.
3. Pace the sidelines at your children's or grandchildren's sports events.
4. Play actively with your children or pets for 15 to 30 minutes a day.
5. Replace Sunday drives with Sunday walks.
6. Run or walk fast when you do errands.
7. Start a new active hobby, such as biking or hiking.
8. Take a walk after dinner with your family or by yourself.
9. Track your steps with a pedometer. Work up to 10,000 steps or more a day.
10. Walk around whenever you talk on the phone.
11. Walk briskly when you shop.
12. Walk up and down escalators instead of just riding them.
13. Walk your dog each day.
14. When you watch TV, stand up and move during the ads, or do chores.



How do you plan to get active?

DPP Physical Activity Modules



Home Print Session

Participant Guide

Get More Active



Ways to Get More Active

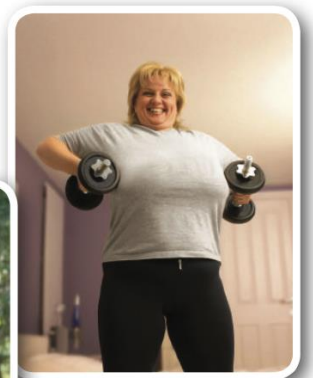
1. Do bicep curls with a can of food while you march in place.
2. Do more reps or sets.
3. Lift heavier weights.
4. Push a stroller while you walk.
5. Take more steps per day or per week.
6. Use one-pound hand or ankle weights while you walk.
7. Walk farther.
8. Walk faster.
9. Walk longer.
10. Walk up steeper hills.

How will you get more active over the next few weeks?

Week 1: _____

Week 2: _____

Week 3: _____



Pros & Cons of the DPP PA Curriculum

• Pros

- Emphasizes the PA Continuum (lifestyle activities to intentional exercise)
 - Guidance on both aerobic and strength training
- Provides safety guidance for PA
- Includes advice to overcome challenges

• Cons

- Insufficient PA content
- Does not advocate for PA within sessions
- Does not address PA for people with disabilities
- Participant curriculum guide lacks diversity
- Limited programming for people who are non-English speaking
- [Coverage of the DPP through government and commercial insurance]

Evidence for PA in the Prevention of T2DM

- **Effects of physical activity goal attainment on engagement and outcomes in the National Diabetes Prevention Program**
 - Examined PA goal setting, DPP retention, and weight loss
 - PA goal attainment was 52.7%
 - Direct positive relationship between goal achievement and % of DPP sessions completed, and total program completion
 - PA goal attainment predicted total weight loss and achieving $\geq 5\%$ weight loss
 - For every 10% decrease in PA goal attainment, participants had a 6.1% lower likelihood of achieving at least 5% weight loss

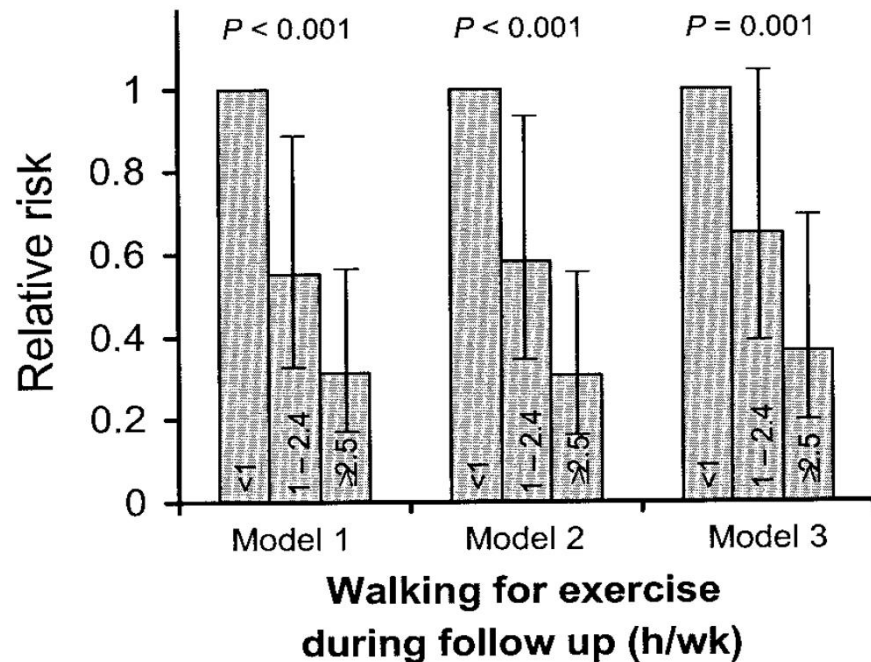


Evidence for PA in the Prevention of T2DM

Physical Activity in the Prevention of Type 2 Diabetes

The Finnish Diabetes Prevention Study

David E. Laaksonen,^{1,2} Jaana Lindström,³ Timo A. Lakka,^{2,4,5} Johan G. Eriksson,³ Leo Niskanen,¹ Katja Wikström,³ Sirkka Aunola,^{6,7} Sirkka Keinänen-Kiukaanniemi,^{8,9} Mauri Laakso,⁸ Timo T. Valle,³ Pirjo Ilanne-Parikka,^{10,11} Anne Louheranta,¹² Helena Hämäläinen,⁷ Merja Rastas,^{3,7} Virpi Salminen,¹³ Zygimantas Cepaitis,³ Martti Hakumäki,^{2,12} Hannu Kaikkonen,^{8,9} Pirjo Härkönen,^{8,9} Jouko Sundvall,¹⁴ Jaakko Tuomilehto,^{3,15} and Matti Uusitupa,¹² for the Finnish Diabetes Prevention Study Group



- After adjustments, individuals engaging in >2.5 h (150 min)/week of walking for exercise during follow-up were **63–69% less likely to develop diabetes** than those who walked <1 h (60 min)/week

Evidence for PA in the Prevention of T2DM

Effects of exercise training alone vs a combined exercise and nutritional lifestyle intervention on glucose homeostasis in prediabetic individuals: a randomised controlled trial

Aka...**STRIDE-PD** (Studies of Targeted Risk Reduction Interventions through Defined Exercise)

Cris A. Slentz¹ · Lori A. Bateman^{1,2} · Leslie H. Willis¹ · Esther O. Granville³ ·
Lucy W. Piner¹ · Gregory P. Samsa⁴ · Tracy L. Scjij⁵ · Michael J. Muehlbauer¹ ·
Kim M. Huffman¹ · Connie W. Bales³ · **William E. Kraus^{1,6}**

Purpose: To better understand the exercise benefit relative to a combined exercise/diet program, and to explore the independent influence of exercise intensity and amount for improvement in glucose homeostasis in those at risk for diabetes

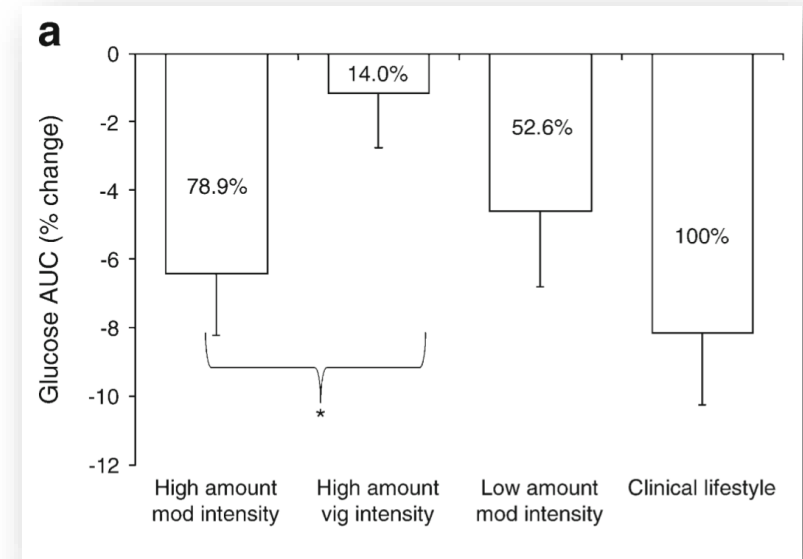
Hypotheses: A high percentage of the diet and exercise effect on measures of glucose control would be achieved with a high amount of moderate-intensity exercise; moderate-intensity exercise would be superior to vigorous- intensity exercise training, controlling for amount; and a high amount would be superior to a low amount of moderate- intensity exercise.

Interventions: Participants were randomized into one of four 6-month intervention groups consisting of exercise predominantly on tread-mills, but also elliptical trainers, rowing and cycle ergometers (low amount/moderate intensity, high amount/moderate intensity, high amount/vigorous intensity, lifestyle intervention (diet/moderate intensity))

Outcomes: Primary outcome for this trial was fasting glucose; secondary outcomes – insulin levels, change in glucose tolerance, cardiometabolic health outcomes

STRRIDE-PD Results & Conclusion

- When expressed in ml/kg/min, the diet/exercise group and both high-amount exercise groups experienced significant improvements in CRF.
 - Increase in fitness was due entirely to weight loss for the diet/exercise group, because when expressed as l/min there was no increase for this group.
- Changes in body composition were greatest for the diet/exercise group; and for the exercise-only groups, corresponded to total exercise energy expenditure.
- Only the diet/exercise group experienced significant reductions in fasting glucose
- The high amount/ moderate-intensity exercise group (230 min/week) achieved **79%** of the improvement in glucose tolerance of the diet/exercise group





**Cochrane
Library**

Cochrane Database of Systematic Reviews

Diet, physical activity or both for prevention or delay of type 2 diabetes mellitus and its associated complications in people at increased risk of developing type 2 diabetes mellitus (Review)

Hemmingsen B, Gimenez-Perez G, Mauricio D, Roqué i Figuls M, Metzendorf MI, Richter B

Hemmingsen B, Gimenez-Perez G, Mauricio D, Roqué i Figuls M, Metzendorf MI, Richter B. Diet, physical activity or both for prevention or delay of type 2 diabetes mellitus and its associated complications in people at increased risk of developing type 2 diabetes mellitus. Cochrane Database of Systematic Reviews 2017, Issue 12. Art. No.: CD003054.

There is no firm evidence that diet alone or physical activity alone compared to standard treatment influences the risk of T2DM and especially its associated complications in people at increased risk of developing T2DM. However, **diet plus physical activity reduces or delays the incidence of T2DM in people with IGT.**

PA and CRF, not just for diabetes prevention.....

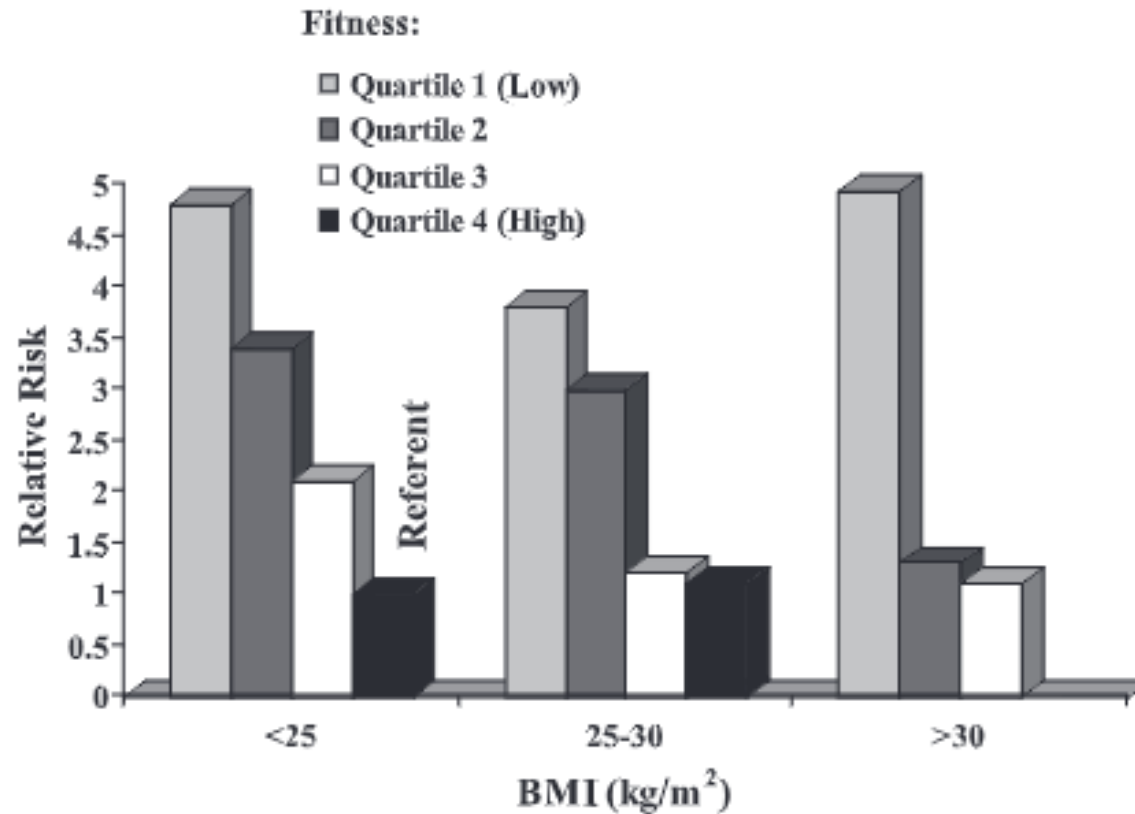


Fig. 6. Age-adjusted relative risk of all-cause mortality by fitness and BMI in men with diabetes. Adapted from Church et al. (12).

Opportunities to Enhance PA in the DPP

OPPORTUNITY!!!

• Wearables

Original Investigation | Nutrition, Obesity, and Exercise

Interventions Using Wearable Physical Activity Trackers Among Adults With Cardiometabolic Conditions
A Systematic Review and Meta-analysis

Alexander Hodkinson, PhD; Evangelos Korpantelis, PhD; Charles Adeniji, MD; Harm van Marwijk, PhD; Brian McMillan, PhD; Peter Bower, PhD; Maria Panagioti, PhD

Interventions that combined wearable PA trackers with health professional consultations [i.e. lifestyle coaches] were associated with significant improvements in PA levels among people with cardiometabolic conditions.

• Apps

The Efficacy of Mobile Phone Apps for Lifestyle Modification in Diabetes: Systematic Review and Meta-Analysis

Included 26 articles (23 studies) in the systematic review, of which 18 studies (5 type 1 diabetes, 11 type 2 diabetes, and 2 prediabetes studies)

Strong evidence for the efficacy of mobile phone apps for lifestyle modification in type 2 diabetes. The evidence is inconclusive for the other diabetes subtypes.

• Access to fitness facilities and trained fitness professionals

One-to-one personal training can be an effective approach to changing individuals' attitudes toward exercising

Use of personal trainers is associated with improvements in strength during exercise interventions, increased exercise intensity, and better adherence to an exercise program overall

Highly cited systematic reviews have consistently shown that exercise referral schemes have a limited and short-term impact on patients' levels of PA and other associated health outcomes

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

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 [†] 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 ²)	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).

[†]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.

Summary



- Physical activity, specifically, 150 min/week of moderate intensity PA is a key component of the DPP
 - More time may add additional benefit
- COVID-19 infection increases risk of, and deaths from T2DM
 - Weight gain, lower levels of PA, prevalent obesity (underlying pro-inflammatory state)
- CDC DPRP Standards added 4% weight loss + 150 min/week mod PA as a success criteria
 - Unknown if this is increasing the number of participants defined as successful
- There have been modest improvements in the PA components of the Prevent T2 curriculum
 - Gaps include a lack of information on PA for people with disabilities, access to the program for non-English speaking participants, lack of diversity in curricular materials
- The evidence for PA as a key component of the DPP is robust
 - There are opportunities to further explore the role of wearable devices, apps and fitness professionals in enhancing PA during the DPP and reducing incident T2DM