

Diabetes Prevention

Lifestyle change and CDC-DPP

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Disclosures

I have no financial relationships to disclose.





Objectives

- Define Pre-Diabetes
- Compare Interventions
- Introduce National Diabetes Prevention Program

History of Pre-Diabetes



Concept emerged in late 1970

- National Diabetes Data Group
- 2-hour post glucose load values on an oral glucose tolerance: 140-199mg/dL
- Adopted by ADA and WHO

1997 (ADA) 1998 (WHO)

- Fasting plasma glucose values: 110-125mg/dL

2003

- ADA adopted FBG values of 100-125 mg/dL

2010

- ADA introduced HbA1c based definition for prediabetes of 5.7-6.4%



Table 1

Current diagnostic criteria for prediabetes

Tests	ADA	WHO	IEC
FPG	100–125 mg/dl	110–125 mg/dl	NA
2hBG (75-g oral glucose tolerance test)	140–199 mg/dl	140–199 mg/dl	NA
HbA _{1C}	5.7–6.4%	NA	6.0–6.4%

Abbreviations: 2hBG, 2-hour postload blood glucose; ADA, American Diabetes Association; FPG, fasting plasma glucose; HbA_{1C}, hemoglobin A_{1C}; IEC, International Expert Committee; NA, not applicable; WHO, World Health Organization.

Prediabetes Demographics



Age and BMI = two of the strongest risk factors

Characteristic	Prediabetes, ^a 2021 Estimates Number in Millions (95% CI)	Prediabetes, ^a 2017–2020 Estimates Percentage (95% CI)	Prediabetes Awareness, ^b 2017–2020 Estimates Percentage (95% CI)
Total	97.6 (91.9–103.2)	38.0 (35.7–40.3)	19.0 (15.0–23.7)
Age in years			
18–44	32.8 (28.2–37.4)	27.8 (24.0–32.0)	13.8 (9.8–18.9)
45–64	37.5 (35.1–40.0)	44.8 (41.7–47.9)	20.6 (14.3–28.9)
≥65	27.2 (24.9–29.6)	48.8 (44.3–53.2)	23.0 (16.9–30.4)
Sex			
Men	53.2 (48.9–57.6)	41.9 (38.4–45.6)	17.4 (13.4–22.2)
Women	44.3 (40.4–48.3)	34.3 (31.2–37.5)	20.9 (15.5–27.5)
Race-Ethnicity			
White, non-Hispanic	61.8 (59.6–66.7)	38.7 (35.5–41.9)	17.3 (11.8–24.7)
Black, non-Hispanic	12.3 (11.3–13.3)	39.2 (35.8–42.6)	21.9 (18.0–26.5)
Asian, non-Hispanic	5.8 (5.1–6.6)	37.3 (32.6–42.3)	30.1 (21.0–41.1)
Hispanic	15.0 (13.7–16.3)	34.5 (31.3–37.7)	20.9 (15.3–27.9)

Data Source: 2017–2020 NHANES; 2021 Census Bureau
From CDC National Diabetes Statistic Report

Intervention Trials



Table 2

Landmark diabetes prevention trials

Study	Country	Years of study	Prediabetes phenotypes	Age of participants (in years)	Study arms (n)	Weight target	Mean follow-up (in years)	Risk reduction for diabetes (intervention versus control)
Chinese Da Qing (81)	China	1986-1992	IGT	≥25	Diet (130) Exercise (141) Diet and exercise (126) Control (133)	No specific weight target	6	Diet (31.5%) Exercise (46%) Diet and exercise (42%)
Finnish DPS (100)	Finland	1993-2001	IGT	40-65	Diet and exercise (265) Control (257)	>5% weight loss	4	Diet and exercise (58%)
American DPP (56)	United States	1996-2001	IGT and ADA-IFG	≥25	Diet and exercise (1,079) Metformin (1,073) Control (1,082)	7% weight loss	2.8	Diet and exercise (58%) Metformin (31%)
Indian DPP (86)	India		IGT	33-55	Diet and exercise (133) Metformin (133) Diet, exercise, and metformin (136) Control (136)	No specific target	3	Diet and exercise (28.5%) Metformin (26.4%) Diet, exercise, and metformin (28.2%)

Abbreviations: DPP, Diabetes Prevention Program; DPS, Finnish Diabetes Prevention Study; IFG, impaired fasting glycemia; IGT, impaired glucose tolerance

Diabetes Prevention Program Research Trial Group Prediabetes Intervention Trial



Participants: 3234 nondiabetic, prediabetic (25 yrs, BMI 24+, fasting plasma glucose 95-125mg/dL)

Methods:

Placebo or metformin (850 mg twice daily) + lifestyle recommendations, lifestyle modification program (goal 7% weight loss, at least 150 minutes of moderate intensity activity per week)

Lifestyle Intervention: 16-lesson curriculum over 24 weeks

Follow-up average of 2.8 years

Glucose checks every 6 mos.

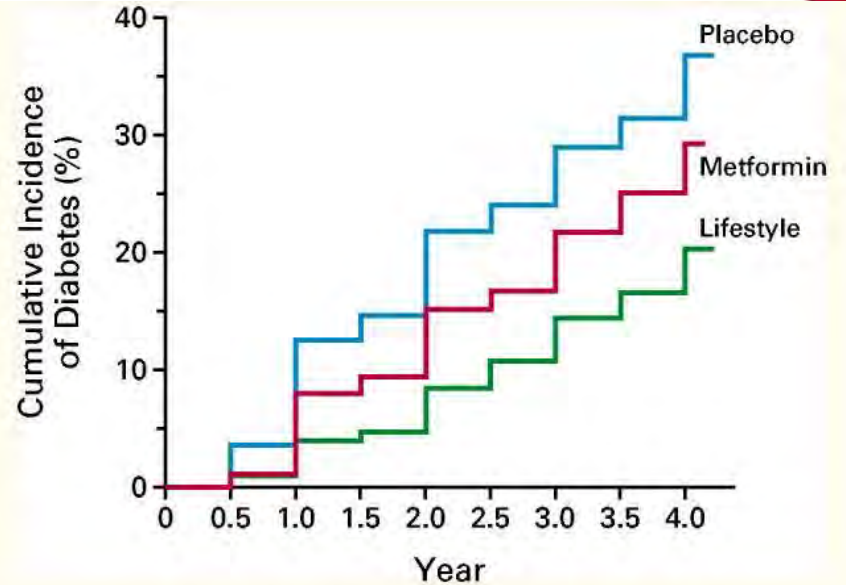
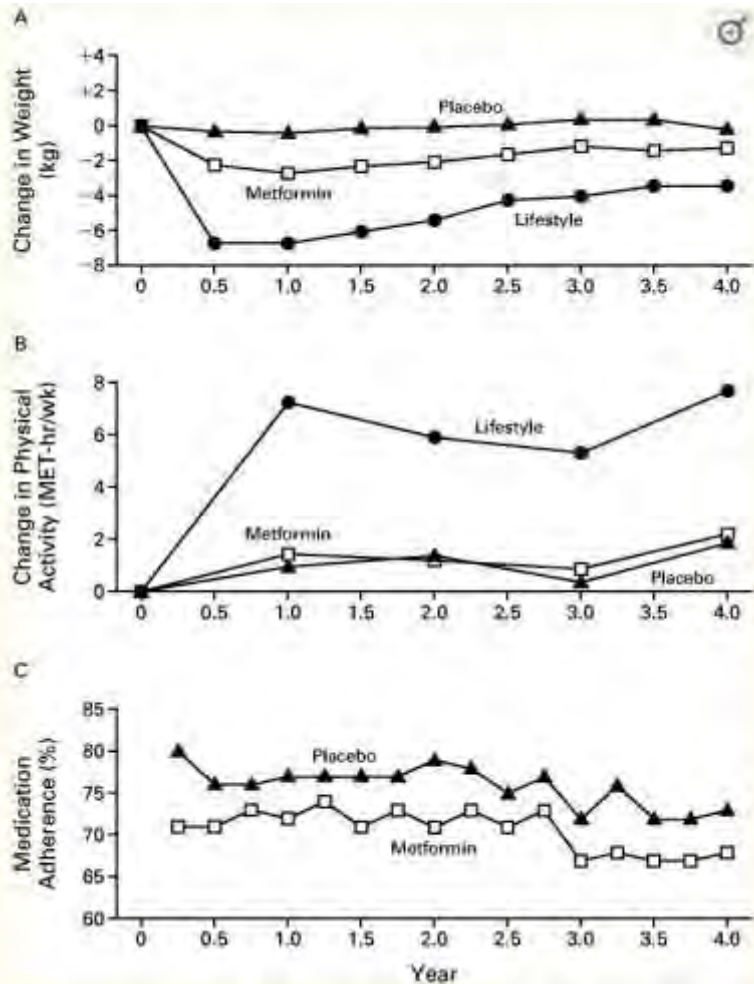


Figure 2.

Cumulative Incidence of Diabetes According to Study Group.

The diagnosis of diabetes was based on the criteria of the American Diabetes Association.¹¹ The incidence of diabetes differed significantly among the three groups ($P < 0.001$ for each comparison).

[Table - PMC \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/)

Diabetes Prevention Program Research Trial Group Prediabetes Intervention Trial



Incidence of diabetes reduced

Lifestyle: 58%

Metformin: 31%

Conclusion:

Lifestyle changes and treatment with Metformin both reduced the incidence of diabetes in persons at high risk. Lifestyle intervention was more effective than metformin.

10 Year Follow Up



Participants: all active participant eligible, 2766 (88% of previous study)

Procedures: provided with previous results, 1-2 week drug washout for placebo + metformin – then unmasked metformin and placebo discontinued
ALL participants were given 16-session lifestyle curriculum as a bridge protocol

Metformin – continued

Lifestyle – individual session every 3 mos. + four group sessions every year



10 Year Follow Up

Results: Incidence of diabetes reduced

Diabetes incidence rates did not significantly differ among groups during follow up specifically

Overall Incidence of diabetes reduced:

Lifestyle: 34% (58%)

Metformin: 18% (31%)

Median delay to onset: (as compared to placebo)*

Lifestyle: 4 years

Metformin: 2 years

10 year Follow Up



Conclusion:

Long term, both lifestyle and metformin interventions delayed or prevented diabetes

Limitations:

Participants and public were aware of initial trial results

All participants were offered some type of lifestyle intervention

DPP Milestones

2010: Congress authorized CDC to establish the National DPP

2011: CDC began building National DPP and offering Lifestyle Change Programs

2015: "Combined diet and physical promotion programs are cost effective interventions for individuals at risk for developing T2"

2021: National DPP Find a Program launches ([Find a Lifestyle Change Program | National Diabetes Prevention Program | CDC](#)); DPRP Standards & Operating Procedures; updated Prevent T2 Curriculum



National Diabetes Prevention Program



A public-private partnership working to build a nationwide delivery system for a lifestyle change program proven to prevent or delay type 2 diabetes in adults with prediabetes

Lifestyle Change Program

A key part of the National DPP is a **lifestyle change program** that provides:



A trained
lifestyle coach



CDC-approved
curriculum



Group support over
the course of a year

CDC is working to:



Build a workforce
that can implement
the lifestyle change
program effectively



**Ensure quality and
standardized reporting**
of participant outcomes
in the program



Deliver the lifestyle
change program
through organizations
nationwide and **sustain**
it through public/private
payer coverage



Increase referrals to
and participation in
the lifestyle change
program



Goals of the Program

Moderate changes in Physical Activity and Diet

1. Weight loss in the range of 4-7% of baseline body weight
2. Combination of loss of 4% of baseline body weight + 8 weeks of 150 minutes of moderate intensity PA
3. Combination of loss of 4% of baseline body weight + at least 17 sessions attended
4. A modest reduction in hemoglobin A1c of 0.2%



TO JOIN CDC'S NATIONAL DPP* LIFESTYLE CHANGE PROGRAM:

Meet ALL of these



18 YEARS
OR OLDER

AND



OVERWEIGHT

AND



NOT DIAGNOSED
WITH T1 OR T2
DIABETES

AND



NOT
CURRENTLY
PREGNANT

AND

Meet ONE of these



DIAGNOSED
WITH
PREDIABETES

OR



PREVIOUSLY
DIAGNOSED WITH
GESTATIONAL
DIABETES

OR



HIGH-RISK RESULT
ON PREDIABETES
RISK TEST

WWW.CDC.GOV/PREDIABETES/RISKTEST



CE332719A

* NATIONAL DIABETES PREVENTION PROGRAM



Delivery Mode

- In Person
- Distance Learning (live)
- In Person with Distance Learning
- Online (non live)
 - HALT DPP (app)
 - HALT Diabetes NE: preventdiabetesne.org



Lifestyle Coaches

- Must be trained using the CDC-approved curriculum
- Currently 13 training entities that are CDC approved
 - In person and virtual, 12-14 hours required
- Focus: CDC-approved curriculum, support for participants, assist with groups working together
- 2 hours of Advanced Coach Training (CEC/CEUs) per year



CDC Curriculum

Focus on self-monitoring of diet and physical activity, building self-efficacy and social support for long term maintenance and improvement in nutrition and physical activity

Months 1-6: 16 Core curriculum modules must be covered in weekly sessions

Months 7-12: 10 optional Core Maintenance Sessions, minimum of 6 must be offered once monthly

Curriculum Topics



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

PreventT2 2021 Curriculum
Program Overview
Introduction to the Program
Get Active to Prevent T2
Track Your Activity
Eat Well to Prevent T2
Track Your Food
Energy In, Energy Out
Eating to Support Your Health Goals
Manage Stress
Eat Well Away From Home
Managing Triggers
Stay Active to Prevent T2
Take Charge of Your Thoughts
Get Back on Track
Get Support
Stay Motivated to Prevent T2

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

PreventT2 2021 Curriculum
When Weight Loss Stalls
Take a Movement Break
Keep Your Heart Healthy
Shop and Cook to Prevent Type 2
Find Time for Physical Activity
Get Enough Sleep
Stay Active Away From Home
More About Type 2
More About Carbs
Prevent Type 2 For Life!

Program Recognition



Preliminary Recognition: Granted through application

Full Recognition: Based on Risk Reduction

- At least 60% of completers achieve 5% weight loss; 4% weight loss + 8 sessions of 150 minutes PA/wk; 4% weight loss + 17 sessions attended; 0.2% reduction in A1c

Full Plus Recognition: Based on Retention

- Minimum 50% participants retained at the start of 4th month; Minimum 40% participants retained at start of 7th month; Minimum 30% participants retained at start of 10th month

Data Submission: every 6 months to CDC via SAMS



Current Programs

NDPP Registry: [Find a Lifestyle Change Program | National Diabetes Prevention Program | CDC](#)

- 1,495 currently in all 50 states
 - 27 in Nebraska
 - 4 in Omaha
 - In person or online nonlive

UNMC Engage Wellness Center



Engage Wellness Medical Fitness Center | Engage
Wellness | University of Nebraska Medical Center
(unmc.edu)

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Review/Questions



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