


COPE WEBINAR SERIES FOR HEALTH PROFESSIONALS

March 6, 2019

**Behavior Change to Prevent Chronic Disease:  
Psychology in Action**



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Nursing Education    Continuing Education Programming    Research

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## OBJECTIVES

- Discuss key components of evidence-based lifestyle interventions
- Describe the efficacy trials and translational research contributing to current public health science (specifically related to obesity management/diabetes prevention) in high risk groups
- Identify challenges that remain in the field to improve translational and public health

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## CE CREDITS



- This webinar awards 1 contact hour for nurses and 1 CPEU for dietitians
- Suggested CDR Learning Need Codes: **5370, 6010, 6020 and 5190**
- Level 2
- CDR Performance Indicators: **9.6.1, 9.6.6, 6.2.5**

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**Behavior Change to Prevent Chronic Disease:  
Psychology in Action**



Elizabeth Venditti, Ph.D.  
Associate Professor of Psychiatry and Epidemiology  
University of Pittsburg School of Medicine



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**DISCLOSURE**

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**Behavior Change to Prevent Chronic Disease: Psychology in Action**

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University of Pittsburgh School of Medicine

MacDonald Center for Obesity Prevention and Education  
Villanova University College of Nursing  
March 6, 2019

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## Outline for Today's Presentation

**Rationale** for behavior change interventions in obesity/diabetes prevention for adults (**why**)

Fundamental **intervention components** (**what**)

**Evidence base** from some major randomized trials and translational effectiveness studies

**Implications** for integrated clinical practice

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## Type 2 Diabetes in the US

- > 30 million with diagnosed diabetes (~ 10 % of US population)
- ~ 84 million with "pre-diabetes" (most don't know)
- 1 out of 3 people will develop diabetes in their lifetime
- Prevalent in Blacks, Hispanics, American Indian, Alaska Native, Native Hawaiian/Pacific Islanders



Source: American Diabetes Association 2018

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## Diabetes is Costly

- Driving force is Type 2 diabetes (accounts for 90-95% of all diabetes cases)
- Estimated that \$1 out of \$7 total health care dollars is spent treating diabetes and its complications
- Total costs--\$327 billion and rising



Source: American Diabetes Association 2018

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## Rationale: Why Bother With Lifestyle Behavior Change?

- We know genetic, physiologic, psychosocial factors are complex and we need to address individual vulnerabilities
- Yet...food/activity environment is potent in shaping habits in animals and people ("a final common pathway")
- **The bargain:** lifestyle interventions impact energy balance behavior change and influence broad spectrum physical outcomes, health related quality of life and well-being, depression



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## Lifestyle Self-Management is Good Medicine

- Person, environment and cognition interact to shape healthy behavior and counter unhealthy behavior
- Primary focus is on building capacity to self-regulate in changing (sometimes toxic) environments
- Emphasis is on social learning (thinking/behavior), social norms, social support and social ecology ("taking charge of what's around you")

Bandura, A. Health promotion by social cognitive means (2004) *Health Education and Behavior*: 31, 143-164.

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## If lifestyle intervention is good medicine, what is a minimally effective dose?

- 1-8: Self-management of diet/nutrition, physical activity, weight, environment  
(specifies weight, activity, calorie/fat goals, self monitoring for **induction** of weight loss, core behavioral skills)
- 9-16 and beyond: **Psychological and behavioral skills; trial and error problem solving** and application re: personal barriers for healthy eating and activity

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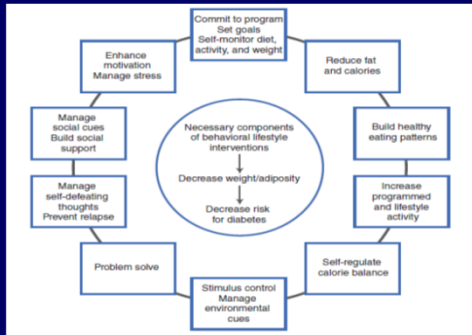
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## Multicomponent lifestyle interventions




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## Diabetes Prevention Program (DPP) Intensive Lifestyle Intervention as an exemplar (many came before...innovations since)

- Goal based (7% weight loss; 150 minutes per week moderately vigorous physical activity)
- Individual case managers or “lifestyle coaches” or group leaders to facilitate basic self-management/problem solving skills
- Structured “core curriculum” sequence; flexibility to adapt within standardized format (gold-standard is 16 sessions over 6 months)
- Less frequent, but regular contact following core program delivery (e.g. monthly contacts)

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## DPP Maintenance Intervention (not sustainable/reimbursable)

- Required in-person contact at least every two months
- Interim phone/mail contact
- DPP delivered 50.3 (±21.8) total sessions over 2.8 years
- Supplemental group classes
- Motivational “campaigns”, “boosters”, “restarts”

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## Lifestyle Intervention Evidence (Adults)



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### Long history of obesity outcomes research shows weight loss is feasible, achievable

Randomized-controlled behavioral treatment studies (since 1970's)\* show it's **possible** to achieve (on average)

- 10% loss at ~ 6 months (e.g. ~ 10 kg in 200 lb individual)
- Longer duration contact = better weight loss
- *Regain is the norm; maintenance contacts and moderate- high levels of physical activity slow rate of regain*
- Many multi-site RCT's show 4-8% average weight loss at ~ 1-3 years (~ 5 kg)

Wadden TA (multiple reviews listed in PubMed)

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### But what about non-responders?

- More of the same is not better. There are "late bloomers" but not as likely.
- The first two months of behavioral lifestyle intervention often predicts long term response
- Unick et. al (2014) showed achieving  $\geq 2\%$  loss at 8 weeks predicts likelihood of 10% weight loss at one year
- Only 15% of those who don't show this marker of weight loss response go on to succeed at that level.

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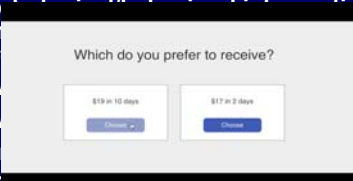
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## Science of Behavior Change (SOBC)

- Psychological functions (e.g., motivation, self-efficacy) will be increased
- Willingness to change
- Willingness to act
- Example: Diabetes Prevention Program (DPP) will be used
- “Engaging” interventions
- Neurobehavioral functions
- Stepped care, augmentation, adaptive intervention approaches



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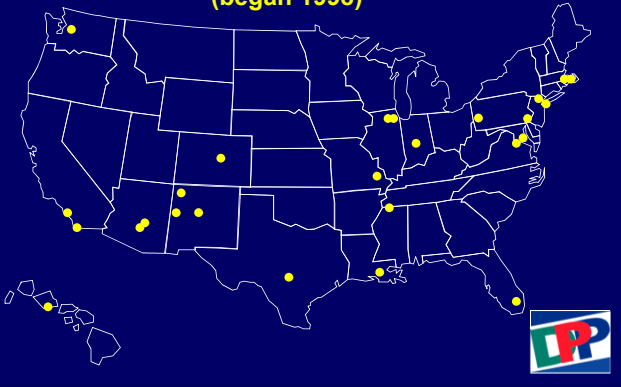
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## Diabetes Prevention Program Clinical Trial (began 1998)



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## DPP Primary Intervention Goal

- To prevent or delay the development of type 2 diabetes in persons with impaired glucose tolerance (IGT)

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## Feasibility of Preventing Type 2 Diabetes

- Long period of glucose intolerance that precedes the development of diabetes
- Screening tests identify persons at higher risk
- Safe, potentially effective interventions can address modifiable risk factors

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## Modifiable Risk Factors for Type 2 Diabetes

- Obesity
- Body fat distribution
- Physical inactivity
- Rising fasting and 2 hr glucose levels

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## DPP Study Design

- 3-group RCT (lifestyle, metformin, placebo)
- 27 clinical sites
- Standardized across clinics:
  - Common protocol and procedures manual
  - Expert staff training
  - Data quality control program

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## DPP Eligibility

- Age  $\geq$  25 years
- Elevated plasma glucose
  - 2 hour glucose 140-199 mg/dl and/or
  - Fasting glucose 95-125 mg/dl
- BMI  $>$  24 kg/m<sup>2</sup> (Asian-American/22 kg/m<sup>2</sup>)
- Goal: recruit at least 50% of sample from high risk race/ethnic groups




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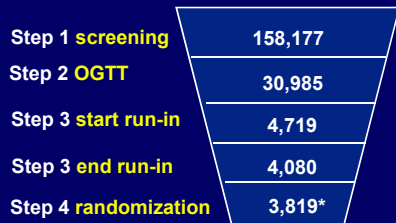
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## Screening and Recruitment

Number of participants



\*3,234 in 3 arm study  
(585 in troglitazone arm)

DPP Research Group, *Controlled Clin Trials* (2002)

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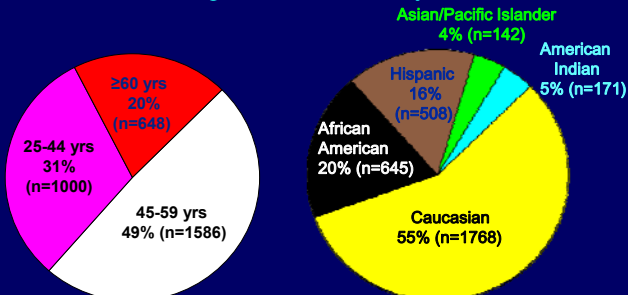
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## Study Population

Age, Race, Ethnicity



The DPP Research Group, *Diabetes Care* 23:1619-29, 2000

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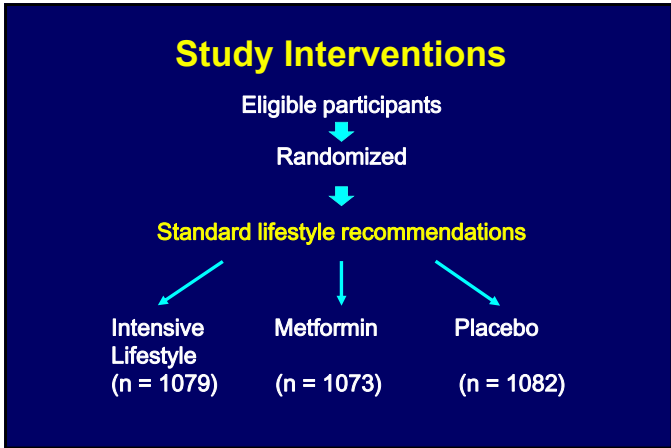
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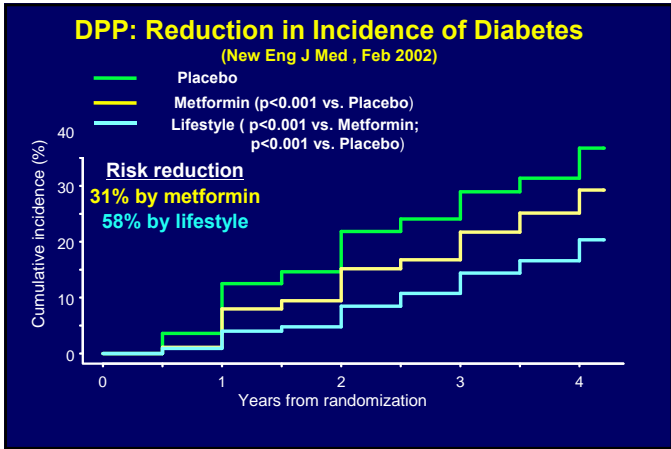
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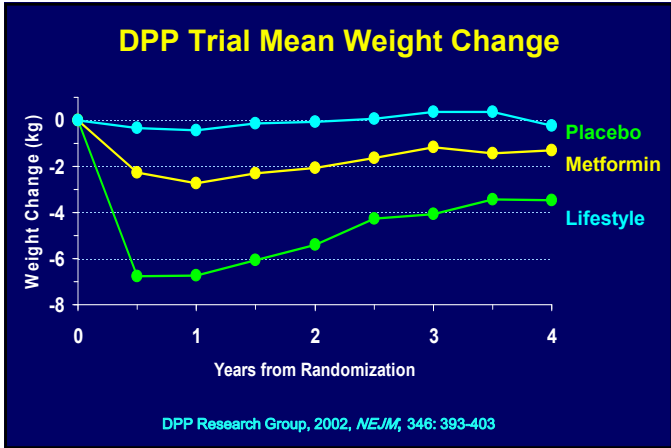
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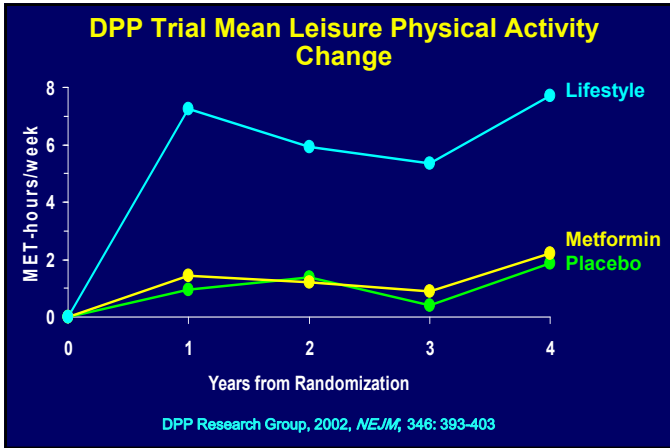
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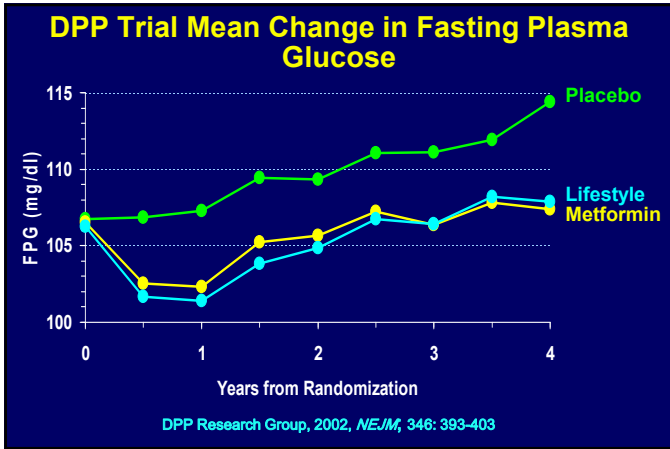
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### DPP: Weight loss was the dominant determinant of reduced diabetes risk

- Each kg of weight loss associated with 16% reduction in diabetes risk
- Lower % calories from fat predicted weight loss
- Increased physical activity predicted weight loss maintenance over time
- was independently associated with decreased diabetes risk (among those not at 7% weight loss goal)



Hamman et al, *Diab Care* 29: 2102-2107, 2006

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## DPP Calorie and Fat Changes 0-12 months

- Mean kilocalories  
Decreased 450/day  
(from 2137 to 1687)
- Mean percent calories from fat  
Decreased 6.6%  
(from 34.1% to 27.5%)



Hamman et al, *Diab Care* 29: 2102-2107, 2006

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## DPP > Bridge Period > DPPOS

- 2001 - 2002
  - Completed individual treatments
  - Metformin wash-out (4-8 weeks)
- January - June 2002
  - All participants offered 16-session group DPP program over six months
- September 2002-present
  - DPP "Outcomes Study" (offered some lifestyle intervention to all, up to 20% attended)

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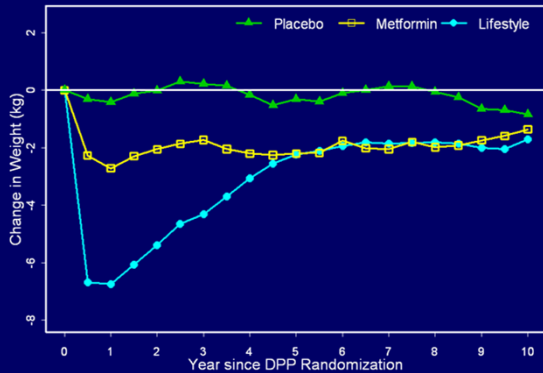
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## Weight Change Over Time – 10 Year Data



DPP Research Group, *Lancet*. 2009; 374:1677-1686 (Figure 2)

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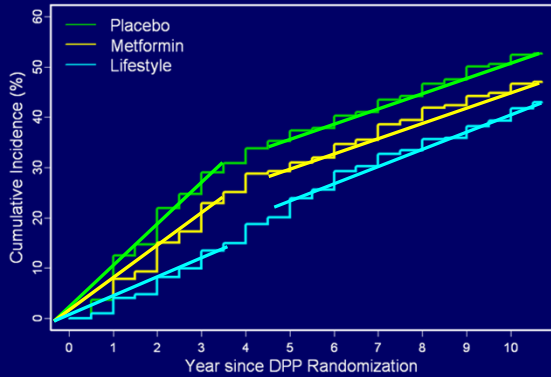
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### Incidence of Diabetes – 10 Years



DPP Research Group, Lancet, 2009; 374:1677-1686 (Figure 3)

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### Cardiovascular Risk Reduction

- All groups (lifestyle, metformin, placebo) had decreased blood pressure, cholesterol and triglycerides.
- Lifestyle participants had same or lower blood pressure and lipid levels over time than other participants with less use of medicines.

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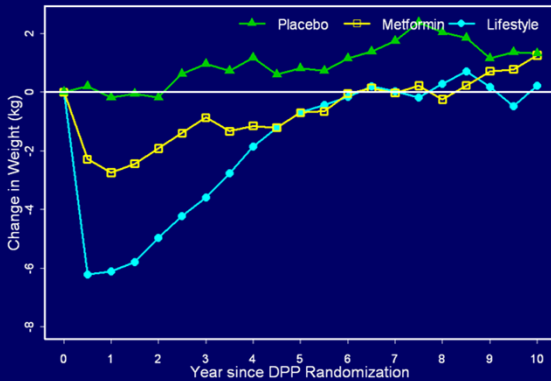
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### Age differences in long term weight change— 25-44 yrs old



DPP Research Group, Lancet, 2009; 374:1677-1686 (Figure 2)

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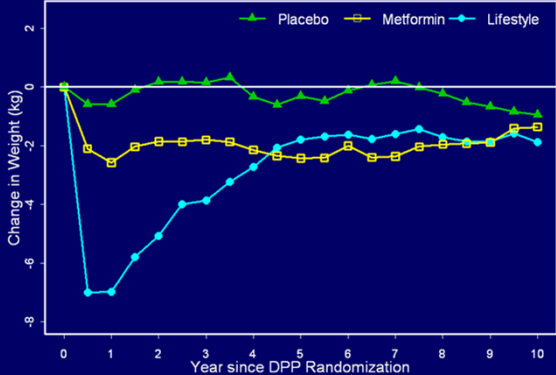
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### Weight Change Over Time – 45-59 yrs old



DPP Research Group, Lancet. 2009; 374:1677-1686 (Figure 2)

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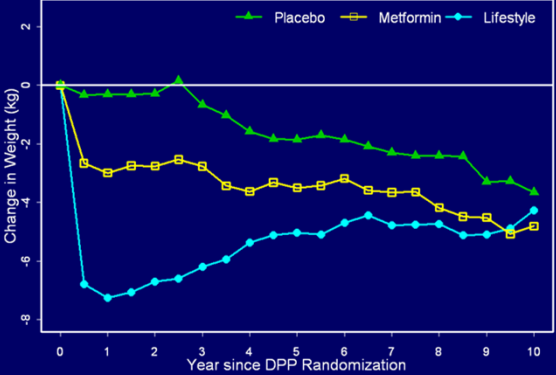
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### Weight Change Over Time – 60+ yrs old



DPP Research Group, Lancet. 2009; 374:1677-1686 (Figure 2)

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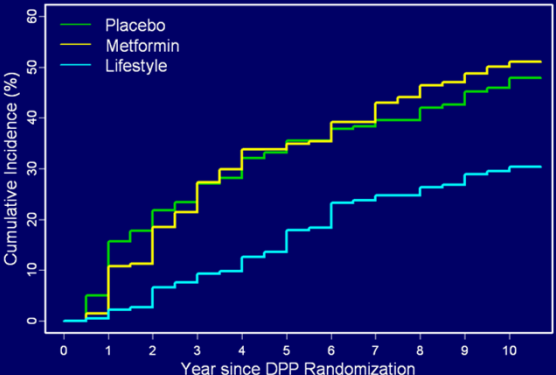
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### Incidence of Diabetes – 60+ yrs old



DPP Research Group, Lancet. 2009; 374:1677-1686 (Figure 3)

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## 15-years of follow-up and counting... (we continue to learn)

Long-term effects of lifestyle intervention or metformin on diabetes development and microvascular complications over 15-year follow-up: the Diabetes Prevention Program Outcomes Study

Diabetes Prevention Program Research Group\*

### Summary

**Background** Effective prevention is needed to combat the worldwide epidemic of type 2 diabetes. We investigated the long-term extent of beneficial effects of lifestyle intervention and metformin on diabetes prevention, originally shown during the 3-year Diabetes Prevention Program (DPP), and assessed whether these interventions reduced diabetes-associated microvascular complications.

*Lancet Diabetes Endocrinol* 2013  
September 18, 2013  
http://dx.doi.org/10.1016/S2213-8587(13)00030-0



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## Efforts to translate the DPP lifestyle program are expanding rapidly

- YMCA-DPP
  - National DPP-Prevent T2D
  - Indian Health Service
  - State Health Depts
  - VAMC-MOVE
  - Faith-based
  - Primary care, worksite, military
- Reimbursement available**
- CMS/Medicare (classroom-based)
  - United Health Care (other payers)
- Now being evaluated**
- Medicaid models
  - Web-based coaching

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## NDPP Results (Feb 2012-Jan 2016)

Ely et al, *Diabetes Care* (Oct 2017)

### METHOD:

Studied N = 14, 747 men and women (18+ years) enrolled in year-long program. Session schedule:

- 16 in first six months
- 6 in last six months

### RESULTS

- Median attendance = 14 sessions
- Median days in program = 134 (~ 19 weeks)
- Average weight loss = 4.2% (median = 3.1%)
- 35% achieved 5% weight loss goal
- 41.8% achieved 150 min/per week goal

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**Pitt Retiree Study:  
Group Lifestyle Balance (GLB)  
(2012-2018)**

- 322 adults (65-80)
- 12 sessions, in person
- At 4-months from baseline:
  - Group Phone Calls (8 sessions, 8 months)
  - Newsletter Control
- Primary outcome = weight change at 12-months

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**Community Based Screening**

Targeted “high-yield” settings for participants in the target age and risk range (BMI ≥ 27 plus 1 additional cardiometabolic risk factor)

- Pitt Retirees (via Benefits Office)
- Pitt Claude Pepper Registry
- Pitt Clinical and Translational Science Institute
- Hospital Community Outreach Foundation
- Pennsylvania Public School Employees Association-Retired (PSEA-R)
- Senior Services organizations and centers

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**Month 12 Results**

(paper in process)

**Weight loss (primary outcome)**

- Phone group: -7.5% (5.5)
- Newsletter group: 5.8% (6.1)
- Between group  $P = 0.01$

**Secondary outcomes (physical activity, physical function, lipids, waist, blood pressure)**

- Phone group: slightly more favorable consistent with degree of weight loss (between group  $P = ns$ )
- Both groups showed modest physical and mental health-related quality of life benefits

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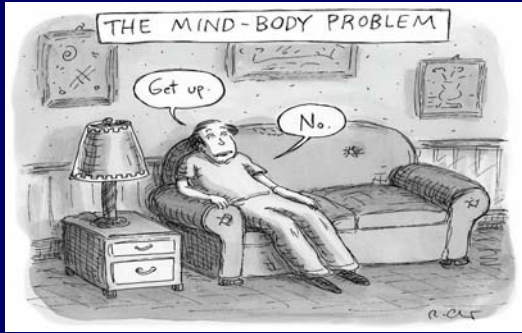
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## So is lifestyle self-management good medicine?




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### Pitt Retirees with mild depressive symptoms show benefit

Measure	MDS Present 24% (n = 45)		MDS Absent 76% (n = 141)		Between Group Δ p-value
	Baseline Mean (sd) or Median [IQR*]	4 mos Δ Mean (sd) or Median [IQR*] p-value	Baseline Mean (sd) or Median [IQR*]	4 mos Δ Mean (sd) or Median [IQR*] p-value	
BMI (kg/m <sup>2</sup> )	33.7 (5.0)	-2.1 (1.2) <.0001	33.0 (4.6)	-2.2 (1.1) p <.0001	0.77
Weight (lb)	197.4 (25.8)	-12.3 (7.3) <.0001	199.7 (36.2)	-13.1 (6.7) p <.0001	0.46
Percent Weight Change	-----	6.4 (3.7) <.0001	-----	-6.6 (3.1) <.0001	0.71
SF-12 PCS	45.7 (7.7)	+3.5 (5.6) <.0001	49.6 (7.8)	+1.1 (7.2) p <.01	<0.02
SF-12 MCS	50.6 (8.9)	-0.6 (8.4) 0.44	57.1 (4.9)	-0.3 (5.5) 0.68	0.79
CES-D	14  12,17	2   7,+2  0.02	4  2,7	0   1,+2  0.16	0.003

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### Implications for integrated clinical practice

#### Mind/body health is just "health"

- Manualized (scalable) evidence-based interventions are the foundation
- Adaptive or stepped care intervention is needed for non-responders
- Teams of multi-disciplinary professionals (*mind and body experts*) and support staff play a critical role in delivery

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**Thanks for listening.**  
**Questions/discussion**  
[vendittiem@upmc.edu](mailto:vendittiem@upmc.edu)  
**(412) 647-1027**

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## QUESTIONS & ANSWERS



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Email: [lope@villanova.edu](mailto:lope@villanova.edu)  
Website: [www.villanova.edu/COPE](http://www.villanova.edu/COPE)

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