

# Diabetes Prevention Programming Referral and Participation in the United States: Results from a Nationally-Representative Sample

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# Disclosures



I have no financial relationships or conflicts of interest to disclose.

# The Pressing Need for Prevention in the United States



- Diabetes affects over 30 million adults in the US
  - Substantial individual burden (increased risk of heart disease, stroke, end-stage renal disease)
  - \$240 billion economic burden
- **1 in 3 adults (over 80 million) have prediabetes**
- Lifestyle modification can prevent or delay progression to type 2 diabetes
  - **Diabetes Prevention Program (DPP)**
    - 7% weight loss + moderate physical activity (150/min)
    - ↓ risk of type 2 diabetes development (by 58% at 3 years)

# A National Platform for Diabetes Prevention in the US



- **Centers for Disease Control and Prevention's National Diabetes Prevention Program (NDPP)**

- Workforce development
- ↑ number of intervention sites
- Quality assurance (recognition program)
- ↑ Awareness of program and referral among healthcare providers

- **NDPP Lifestyle Intervention**

- 12 month, group-based program, delivered by trained lifestyle coaches
- Goals: 5% weight loss, 150 min/week physical activity
- Eligibility criteria:
  - 1) prediabetes, history of gestational diabetes or elevated type 2 diabetes risk score
  - 2) elevated BMI
- As of April 2018: coverage by Medicare (public insurance for elderly, adults with disabilities)

# What is the “reach” of diabetes prevention programming?



- CDC NDPP intervention participant level data (2012-2016)  
*(Ely EK et al. Diabetes Care, 2017)*
  - 435 recognized organizations
  - 35,844 adult participants
    - 80% female
    - 20% 18-44 years; 24.2% 65+ years
    - 44.9% non-Hispanic white, 13.8% non-Hispanic black, 10% Hispanic
- Provider level data regarding referral practices
  - 12% of primary care providers (PCPs) refer prediabetic patients to behavioral interventions as initial management *(Tseng E, et al. JGIM, 2017)*
  - <50% eligible adults referred to DPP by PCP *(Mehta S et al. BMJ Open Diabetes Res Care, 2017)*

# Study Objectives



- Among adults likely eligible to participate in diabetes prevention programming in the United States, to:
  - 1) characterize the prevalence of diabetes prevention programming referral, participation and interest
  - 2) identify sociodemographic correlates of program referral and participation

# Data Source



- National Health Interview Survey (NHIS), 2016
  - Nationally-representative survey of US households conducted annually
  - “Sample Adult” section included Diabetes Primary Prevention Questions
    - Questions about history of diabetes, prediabetes and risk factors
    - Diabetes prevention program referral, participation and interest

“ [these questions] are about a **year-long program that can help people prevent Type 2 diabetes**. This program has weekly sessions during the first 6 months and monthly sessions over the last 6 months. People in the program receive support from a lifestyle coach on achieving and maintaining a healthy lifestyle.”

# Sample Definition



- **Analytic Sample**

- Adults ages 18 years and older
- No self-reported diagnoses of diabetes
- Met additional NDPP lifestyle intervention eligibility criteria:
  - Body Mass Index (BMI)  $\geq 24$  kg/m<sup>2</sup> ( $\geq 22$  kg/m<sup>2</sup> if Asian) \*
  - AND
  - Self-reported diagnosis of prediabetes OR history of gestational diabetes

*\* as per 2015 Diabetes Prevention Recognition Program eligibility criteria*



# Measures



- **Outcomes:**

- 1) **Program participation**

- 2) **Program referral**

- by “a doctor or other health professional”

- 3) **Interest in programming** (somewhat/very vs not interested)

- **Covariates:**

- Gender

- Age (18 to 44 years; 45 to 64 years; 65 years and over)

- BMI

- Race, Hispanic ethnicity

- Insurance coverage

- Self-reported medical conditions: hypertension, high cholesterol

# Analyses



- **Descriptive statistics: prevalence of referral, participation and interest**
  - **Secondary analysis:**
    - include adults who also met program criteria based upon BMI and American Diabetes Association (ADA) Diabetes Risk Test score of  $\geq 5$
- **Correlates of referral, participation and interest**
  - Multivariable logistic regression analyses
- All analyses took into account the complex survey design of the NHIS

# Results: Characteristics of Study Sample



Adults without self-reported diabetes diagnosis

N = 28,345

(212,603,880 weighted) respondents

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↓ 8.1 %

**Adults likely eligible for diabetes prevention programming**

(BMI criteria + self-reported prediabetes or gestational diabetes)

**N = 2,341**

**(17,164,813 weighted) respondents**

# Results: Characteristics of Study Sample



## Adults likely eligible for diabetes prevention programming

N = 2,341

(17,164,813 weighted) respondents

Characteristics	% or mean (SE)
Gender	
Female	63.0
Age in years	
18 to 44	31.8
45 to 64	44.3
65 and over	23.9
BMI, kg/m <sup>2</sup>	34.3 (0.40)
Race	
White only	74.6
Black only	14.4
Asian only	6.7
Am Indian /Alaskan native	1.6
Multiple races	2.7
Hispanic ethnicity	16.6

Characteristics	% or mean (SE)
Family income	
<100% FPL	12.4
100% to < 200% FPL	17.6
≥ 200% FPL	70.0
Insurance status	
Uninsured	6.4
Private	64.8
Medicaid/other public	12.4
Medicare/dual eligible	11.7
Other insurance	5.1
Has usual source of care	93.7
Hypertension	46.6
High cholesterol	47.7

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# Results: Referral & Participation



**Adults likely eligible for diabetes prevention programming**

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(17,164,813 weighted) respondents



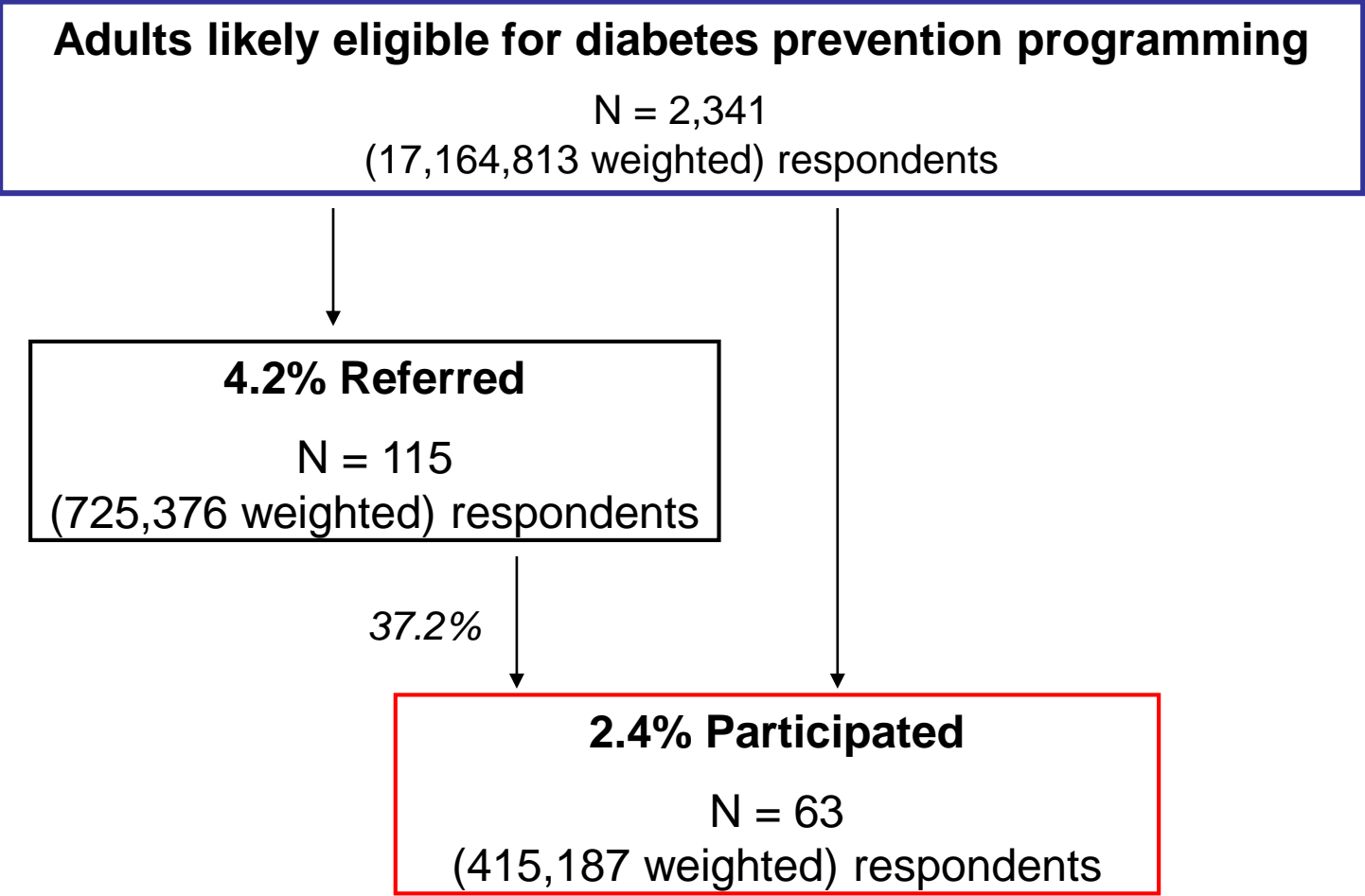
**4.2% Referred**

N = 115

(725,376 weighted) respondents



# Results: Referral & Participation



# Results: Characteristics of Referred Adults

		% or mean (SE)
<b>Gender</b>	Female	55.2
<b>Age in years</b>	18 to 44	20.0
	45 to 64	44.8
	65 and over	35.2
<b>BMI, kg/m<sup>2</sup></b>		34.5 (2.14)
<b>Race</b>	White only	60.2
	African American only	22.4
	American Indian/Alaskan only	2.7
	Asian only	14.1
	Multiple races	0.6
<b>Hispanic ethnicity</b>		20.4
<b>Family income</b>	<100% Federal Poverty Level (FPL)	12.3
	100% to < 200% FPL	16.3
	≥ 200% FPL	71.4
<b>Insurance status</b>	Uninsured	2.6
	Private	65.8
	Medicaid/other public	6.6
	Medicare/dual eligible	1.5
	Other insurance	10.1
<b>Usual source of care</b>		97.9
<b>Hypertension</b>		60.3
<b>High cholesterol</b>		57.8

# Results: Characteristics of Referred Adults

		% or mean (SE)
<b>Gender</b>	Female	55.2
<b>Age in years</b>	18 to 44	20.0
	45 to 64	44.8
	65 and over	35.2
<b>BMI, kg/m<sup>2</sup></b>		34.5 (2.14)
<b>Race</b>	White only	60.2
	African American only	22.4
	American Indian/Alaskan only	2.7
	Asian only	14.1
	Multiple races	0.6
<b>Hispanic ethnicity</b>		20.4
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	Other insurance	10.1
<b>Usual source of care</b>		97.9
<b>Hypertension</b>		60.3
<b>High cholesterol</b>		57.8

**Compared to adults NOT referred:**

→ Greater % minorities (African American and Asian)

# Results: Correlates of Referral

		Adjusted Odds Ratio (95% CI)
<b>Gender</b>	Male	Ref
	Female	0.85 (0.48 to 1.49)
<b>Age in years</b>	18 to 44	Ref
	45 to 64	1.51 (0.72 to 3.13)
	65 and over	2.01 (0.88 to 4.61)
<b>BMI, kg/m<sup>2</sup></b>		1.01 (0.98 to 1.03)
<b>Race</b>	White only	Ref
	African American only	<b>2.28 (1.23 to 4.22)</b>
	American Indian/Alaskan only	1.97 (0.58 to 6.64)
	Asian only	<b>3.42 (1.21 to 9.70)</b>
	Multiple races	0.37 (0.09 to 1.56)
<b>Hispanic ethnicity</b>		1.83 (0.96 to 3.48)
<b>Family income</b>	≥ 200% FPL	Ref
	100% to < 200% FPL	1.01 (0.51 to 1.99)
	< 100% FPL	1.45 (0.65 to 3.22)
<b>Insurance status</b>	Any private	Ref
	Uninsured	0.42 (0.12 to 1.38)
	Medicaid/other public	0.45 (0.17 to 1.17)
	Medicare/dual eligible	0.93 (0.39 to 2.19)
<b>Hypertension</b>	No	Ref
	Yes	1.50 (0.89 to 2.52)
<b>High cholesterol</b>	No	Ref
	Yes	1.02 (0.55 to 1.89)

# Results: Characteristics of Adults who Participated



		% or mean (SE)
<b>Gender</b>	Female	75.4
<b>Age in years</b>	18 to 44	20.6
	45 to 64	50.9
	65 and over	28.5
<b>BMI, kg/m<sup>2</sup></b>		34.8 (1.91)
<b>Race</b>	White only	60.2
	African American only	18.4
	American Indian/Alaskan only	1.7
	Asian only	9.4
	Multiple races	10.3
<b>Hispanic ethnicity</b>		25.5
<b>Family income</b>	< 100% FPL	23.7
	100% to < 200% FPL	9.5
	≥ 200% FPL	66.8
<b>Insurance status</b>	Uninsured	3.9
	Private	64.9
	Medicaid/other public	12.8
	Medicare/dual eligible	10.7
	Other insurance	7.7
<b>Usual source of care</b>		86.9
<b>Hypertension</b>		61.2
<b>High cholesterol</b>		51.3

# Results: Characteristics of Adults who Participated



		% or mean (SE)
<b>Gender</b>	Female	75.4
<b>Age in years</b>	18 to 44	20.6
	45 to 64	50.9
	65 and over	28.5
<b>BMI, kg/m<sup>2</sup></b>		34.8 (1.91)
<b>Race</b>	White only	60.2
	African American only	18.4
	American Indian/Alaskan only	1.7
	Asian only	9.4
	Multiple races	10.3
<b>Hispanic ethnicity</b>		25.5
<b>Family income</b>	< 100% FPL	23.7
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	≥ 200% FPL	66.8
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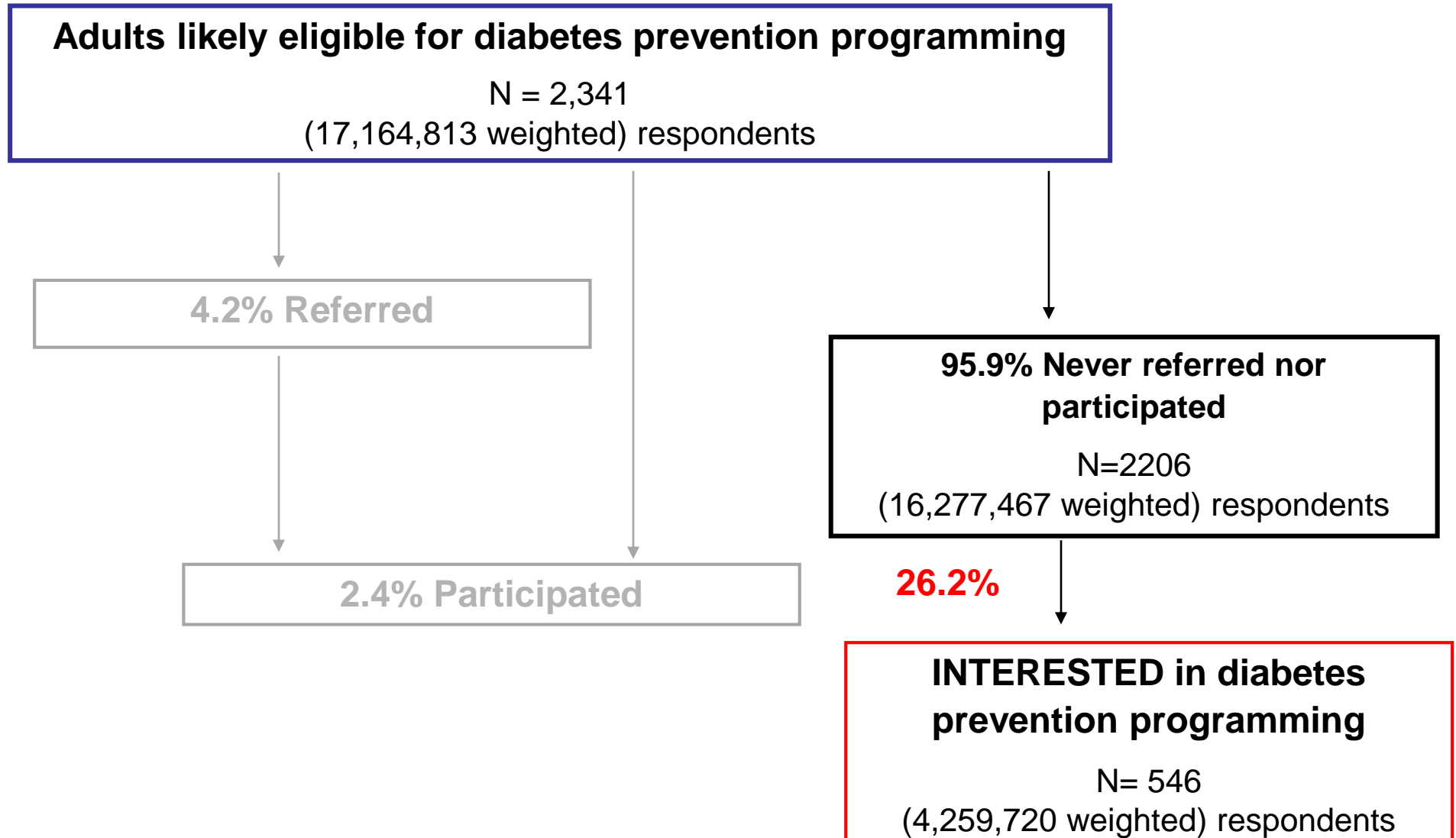
**Compared to adults who did NOT participate:**

→ Trend towards greater % lower-income adults (X<sup>2</sup> p=0.09)

# Results: Correlates of Participation

		Adjusted Odds Ratio (95% CI)
<b>Gender</b>	Male	Ref
	Female	2.04 (0.89 to 4.71)
<b>Age in years</b>	18 to 44	Ref
	45 to 64	2.07 (0.95 to 4.55)
	65 and over	<b>2.65 (1.09 to 6.43)</b>
<b>BMI, kg/m<sup>2</sup></b>		1.00 (0.99 to 1.02)
<b>Race</b>	White only	Ref
	African American only	1.70 (0.76 to 3.84)
	American Indian/Alaskan only	0.87 (0.14 to 5.31)
	Asian only	2.59 (0.60 to 11.20)
	Multiple races	<b>6.14 (1.05 to 35.88)</b>
<b>Hispanic ethnicity</b>		2.33 (0.99 to 5.46)
<b>Family income</b>	≥ 200% FPL	Ref
	100% to < 200% FPL	0.65 (0.23 to 1.82)
	< 100% FPL	<b>2.56 (1.22 to 5.40)</b>
<b>Insurance status</b>	Any private	Ref
	Uninsured	0.28 (0.03 to 2.44)
	Medicaid/other public	0.48 (0.14 to 1.69)
	Medicare/dual eligible	0.48 (0.20 to 1.20)
<b>Hypertension</b>	No	Ref
	Yes	1.87 (0.95 to 3.65)
<b>High cholesterol</b>	No	Ref
	Yes	0.89 (0.39 to 2.04)

# Results: Interest in Diabetes Prevention Programming





# Results: Correlates of Interest

**Adults likely eligible for diabetes prevention programming**

N = 2,341  
(17,164,813 weighted) respondents

**Higher odds of reporting interest with/if:**

- **Increasing BMI**
- **African American (vs White)**
- **Hispanic (vs non-Hispanic)**

**95.9% Never referred nor participated**

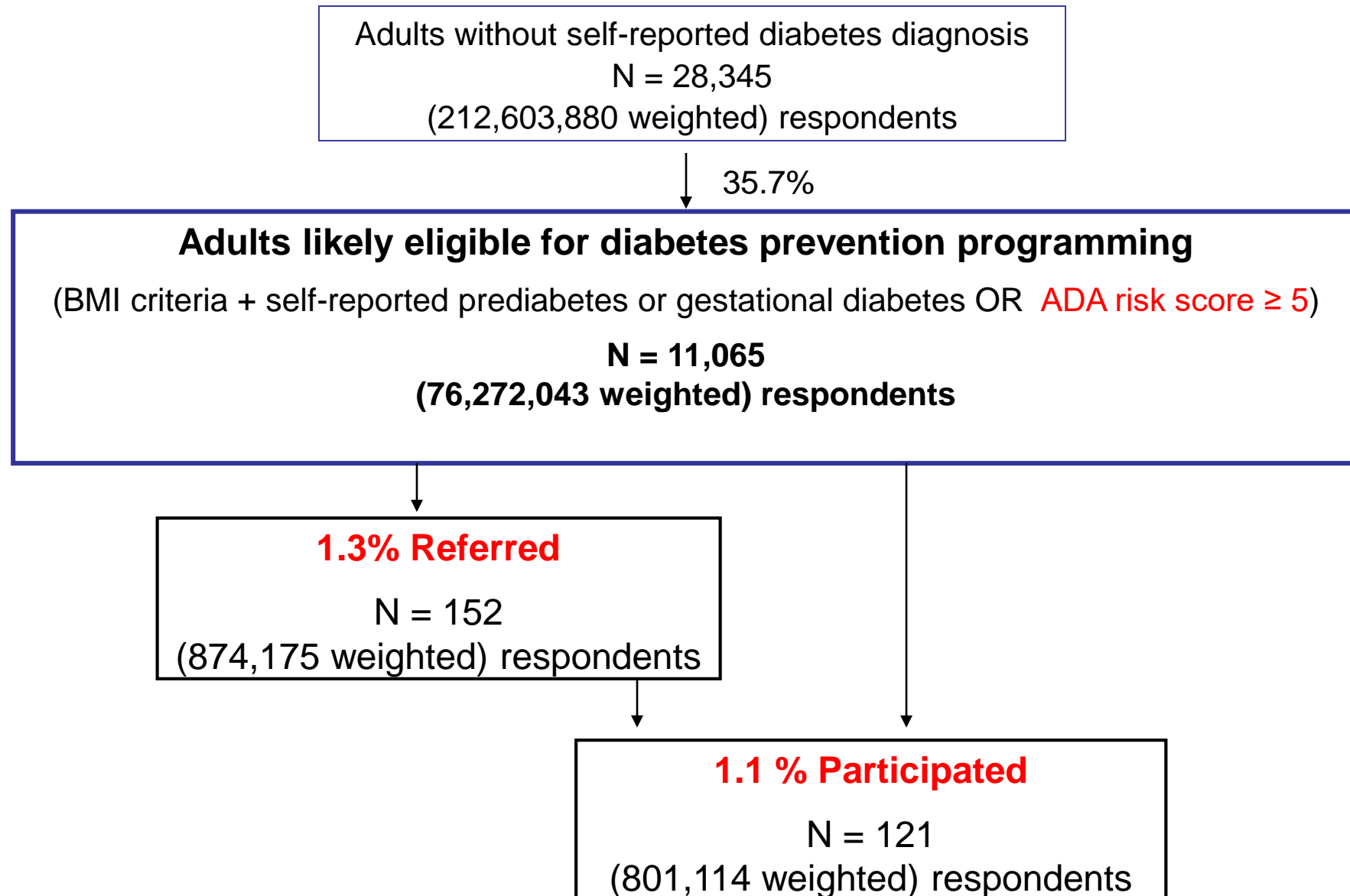
N=2206  
(16,277,467 weighted) respondents

**26.2%**

**INTERESTED in diabetes prevention programming**

N= 546  
(4,259,720 weighted) respondents

# Results: Secondary Analyses of Referral & Participation



# Limitations



- Eligibility determination based on self-reported measures
  - 90% of those with prediabetes unaware of status
  - Primary analysis likely overestimates referral and participation prevalence
- Outcomes based on self-report
  - Recall bias (referral and participation)
  - Cannot confirm if NDPP lifestyle intervention / general diabetes prevention program versus other lifestyle intervention

# Conclusions and Implications

- **A minority of likely eligible adults in the US** are being referred to, or participating in, diabetes prevention programming
  - Only 4.2% referred, 2.4% participated
  - > 25% report interest in participation
  - ***Highlights the continued importance of the efforts of the NDPP***
- Higher odds of referral and participation in groups with demonstrated disparities to preventive service access
  - ↑ odds referral among minorities
  - ↑ odds participation among low-income individuals
  - ***May reflect the community-based focus of DPP providers participating in the NDPP?***
  - ***Requires further confirmation given implications for health equity***

# Thank you!



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- Jeanne Clark, Nisa Maruthur, Megan Brown, Kathy Michalski, Raquel Greer, Christin Hill, May Maw, Fran Dashiell, Marissa Alert, Geetanjali Chander

- **Community partners in Baltimore, Maryland**

- Zion Memorial Church, Memorial Baptist Church, Knox Presbyterian Church, Charm City Care Connection, Dunbar High School



# Eligible Adults: Prediabetes and Gestational DM



	<b>% (N=2341)</b>
Prediabetes	81.9%
Gestational diabetes	25.5% (40% of females)
Both	7%

Have you EVER been told by a doctor or other health professional that you have any of the following: prediabetes, impaired fasting glucose, impaired glucose tolerance, borderline diabetes, or high blood sugar?

Were you EVER told by a doctor or other health professional that you had diabetes, sugar diabetes, or gestational diabetes during pregnancy?

# Comparison with CDC Participant Data



	NHIS	CDC*
	% or mean	% or mean
<b>Gender</b>		
<b>Male</b>	24.6	19.7
<b>Female</b>	75.4	80.3
<b>Age in years</b>		
<b>18 to 44</b>	20.6	19.9
<b>45 to 64</b>	50.9	56.0
<b>65 and over</b>	28.5	24.2
<b>Mean age</b>	58.0	55.1
<b>BMI, kg/m<sup>2</sup></b>		
<b>&lt;25</b>	23.3	8.1
<b>25-29</b>	27.6	27.1
<b>&gt;=30</b>	45.7	62.5
<b>Race</b>		
<b>Non-Hispanic, White</b>	44.0	44.9
<b>Non-Hispanic Black</b>	18.5	13.8
<b>Hispanic</b>	25.5	10.0
<b>Other</b>	12.0	31.3

\* Based upon 14747 participants from 220 CDC-Recognized Organizations (2012-2015). *Ely EK et al. A National Effort to Prevent Type 2 Diabetes: Participant-Level Evaluation of CDC's National Diabetes Prevention Program. Diabetes Care 2017;40:1331-41.*

# BMI Distribution among Likely Eligible Adults



	<b>% (N=2341)</b>
Normoweight (BMI < 25)	8.2
Overweight (BMI ≥ 25)	40.4
Obese (BMI ≥ 30)	51.4



# American Diabetes Association Diabetes Risk Test Score



	Points
<b>Age</b>	
Less than 40 years	0
40 to 49 years	1
50 to 59 years	2
60 years or older	3
<b>Sex</b>	
Female	0
Male	1
<b>History of hypertension</b>	1
<b>History of gestational diabetes</b>	1
<b>Physically inactive</b>	1
<b>Weight-for-Height (BMI) status</b>	
BMI $\geq 24.9$ kg/m <sup>2</sup> and $< 29.9$ kg/m <sup>2</sup>	1
BMI $\geq 29.9$ kg/m <sup>2</sup> and $< 39.9$ kg/m <sup>2</sup>	2
BMI $\geq 39.9$ kg/m <sup>2</sup>	3
<b>Diabetes in 1st degree relative</b>	1

# Results: Characteristics Associated with Referral



	Characteristics of referred versus non-referred eligible adults		
	Yes % or mean (SE)	No % or mean (SE)	p
<b>Gender</b>			
Male	44.8	36.7	0.18
Female	55.2	63.3	
<b>Age in years</b>			
18 to 44	20.0	32.3	0.06
45 to 64	44.8	44.3	
65 and over	35.2	23.4	
<b>BMI, kg/m<sup>2</sup></b>	34.5 (2.14)	34.2 (0.41)	0.89
<b>Race</b>			
White only	60.2	75.2	0.02
Black only	22.4	14.1	
American Indian/Alaskan only	2.7	1.5	
Asian only	14.1	6.4	
Multiple races	0.6	2.8	
<b>Hispanic ethnicity</b>	20.4	16.5	0.40
<b>Family income, %</b>			
< 100% FPL	12.3	12.4	0.94
100% to < 200% FPL	16.3	17.7	
>=200% FPL	71.4	69.9	
<b>Insurance status, %</b>			
Uninsured	2.6	6.2	0.09
Any private	65.8	64.8	
Medicaid/other public	6.6	12.6	
Medicare/dual eligible	1.5	11.5	
Other insurance	10.1	4.9	

	Characteristics of referred versus non-referred eligible adults		
	Yes % or mean (SE)	No % or mean (SE)	p
<b>Usual Source of Care</b>	97.9	93.5	0.11
<b>Hypertension</b>	60.3	45.9	0.03
<b>High cholesterol</b>	57.8	47.3	0.11

# Results: Characteristics Associated with Participation



	Characteristics of participants versus non-participants		
	Yes % or mean (SE)	No % or mean (SE)	p
<b>Gender</b>			
Male	24.6	37.4	0.12
Female	75.4	62.7	
<b>Age in years</b>			
18 to 44	20.6	32.0	0.39
45 to 64	50.9	44.2	
65 and over	28.5	23.8	
<b>BMI, kg/m<sup>2</sup></b>	34.8 (1.91)	34.2 (0.41)	0.79
<b>Race</b>			
White only	60.2	74.9	0.15
Black only	18.4	14.3	
American Indian/Alaskan only	1.7	1.6	
Asian only	9.4	6.7	
Multiple races	10.3	2.5	
<b>Hispanic ethnicity</b>	25.5	16.4	0.26
<b>Family income, %</b>			
< 100% FPL	23.7	12.1	0.09
100% to < 200% FPL	9.5	17.9	
>=200% FPL	66.8	70.0	
<b>Insurance status, %</b>			
Uninsured	3.9	6.1	0.90
Any private	64.9	64.8	
Medicaid/other public	12.8	12.4	
Medicare/dual eligible	10.7	11.7	
Other insurance	7.7	5.0	

	Characteristics of participants versus non-participants		
	Yes % or mean (SE)	No % or mean (SE)	p
<b>Usual Source of Care</b>	86.9	93.9	0.26
<b>Hypertension</b>	61.2	46.2	0.09
<b>High cholesterol</b>	51.3	47.6	0.70

# Results: Correlates of Interest

		Adjusted Odds Ratio (95% CI)
<b>Gender</b>	Male	Ref
	Female	0.79 (0.57 to 1.08)
<b>Age in years</b>	18 to 44	Ref
	45 to 64	1.22 (0.87 to 1.71)
	65 and over	0.94 (0.60 to 1.47)
<b>BMI, kg/m<sup>2</sup></b>		<b>1.02 (1.01 to 1.03)</b>
<b>Race</b>	White only	Ref
	African American only	<b>2.14 (1.44 to 3.18)</b>
	American Indian/Alaskan only	1.79 (0.65 to 4.93)
	Asian only	1.73 (0.88 to 3.40)
	Multiple races	<b>2.55 (1.12 to 5.79)</b>
<b>Hispanic ethnicity</b>		<b>1.56 (1.06 to 2.29)</b>
<b>Family income</b>	≥ 200% FPL	Ref
	100% to < 200% FPL	1.33 (0.93 to 1.89)
	< 100% FPL	1.12 (0.70 to 1.79)
<b>Insurance status</b>	Any private	Ref
	Uninsured	1.17 (0.62 to 2.22)
	Medicaid/other public	1.09 (0.68 to 1.74)
	Medicare/dual eligible	0.78 (0.52 to 1.18)
<b>Hypertension</b>	No	Ref
	Yes	1.20 (0.88 to 1.63)
<b>High cholesterol</b>	No	Ref
	Yes	1.21 (0.89 to 1.66)

# References



- Centers for Disease Control and Prevention. National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States, 2017. Atlanta, GA: US Department of Health and Human Services; 20147 Available at: <https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>. Accessed March 24, 2018
- Albright AL, Gregg EW. Preventing type 2 diabetes in communities across the U.S: the National Diabetes Prevention Program. *Am J Prev Med*. 2013; 44( 4 Suppl 4).
- Schellenberg ES, Dryden DM, Vandermeer B, Ha C, Korownyk C. Lifestyle Interventions for Patients With and at Risk for Type 2 Diabetes: A Systematic Review and Meta-analysis. *Ann Intern Med*. 2013;159: 543–551.
- Ely EK, Gruss SM, Luman ET, et al.. A National Effort to Prevent Type 2 Diabetes: Participant-Level Evaluation of CDC's National Diabetes Prevention Program. *Diabetes Care*. 2017 Oct;40(10):1331-1341
- Centers for Disease Control. Centers for Disease Control and Prevention Diabetes Prevention Recognition Program. Standards and Operating Procedures January 1, 2015. Available at: <https://www.cdc.gov/diabetes/prevention/pdf/dprp-standards.pdf>. Accessed January 28, 2018.
- Mehta S, Mocarski M, Wisnieski T, Gillespie K, Narayan KM, Lang K. Primary care physicians' utilization of type 2 diabetes screening guidelines and referrals to behavioral interventions: a survey-linked retrospective study. *BMJ Open Diabetes Research and Care* 2017;5:e000406. doi:10.1136/bmjdr-2017-000406
- Center for Medicare and Medicaid Services. Medicare Program; Revisions to Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2018; Medicare Shared Savings Program Requirements; and Medicare Diabetes Prevention Program. Final rule. *Fed Regis*. 2017 Nov 15;82(219):52976-3371. Available at: <https://www.gpo.gov/fdsys/pkg/FR-2017-11-15/pdf/2017-23953.pdf>. Accessed March 24, 2018.