Women Veterans' Early Experiences and Weight Loss Outcomes with a Web-Based Diabetes Prevention Program (DPP)

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VA Cyberseminar – Spotlight on Women's Health

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CSHIIP
Center for the Study of Healthcare Innovation, Implementation & Policy

QUERI
Quality Enhancement Research Initiative

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  - Santanu Datta
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- **Diabetes Prevention Support Center (Group Lifestyle Balance Program)**
  - M. Kaye Kramer
  - Andrea Kriska
  - Linda Semler
  - Beth Venditti
- **Omada Health**
  - Sean Duffy
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QUESTION

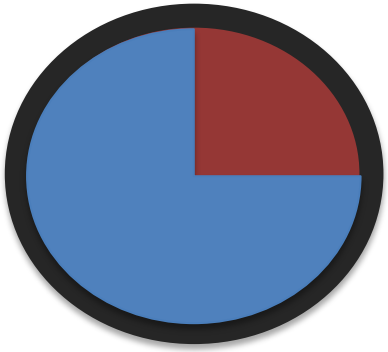
- How familiar are you with DPP?

A. I don't know what DPP is
B. I've read about it but can not recall the details
C. I know about its outcomes
D. I've participated in DPP
E. I've led DPP groups, interventions or studies

Outline

- Background
  - Prediabetes and diabetes prevention
- Overview of the VA Diabetes Prevention Program (DPP) Clinical Demonstration Project
- Online DPP
  - Quantitative Evaluation
    - Weight outcomes and adherence
  - Qualitative Evaluation
    - Early experiences of a subset of women Veterans

Diabetes Epidemic



25% of Veterans have diabetes

↑ mortality and costs

Prediabetes Epidemic

1 in 3 US adults have prediabetes

15-30%

Will transition to diabetes over 5 years

CDC, *National Diabetes Fact Sheet*, 2014, Diabetes QUERI. Strategic Plan 2015

Diabetes Prevention Program (DPP)

- Large RCT published in the NEJM in 2002
  - Showed a **58%** reduction in diabetes incidence through changes in diet and exercise

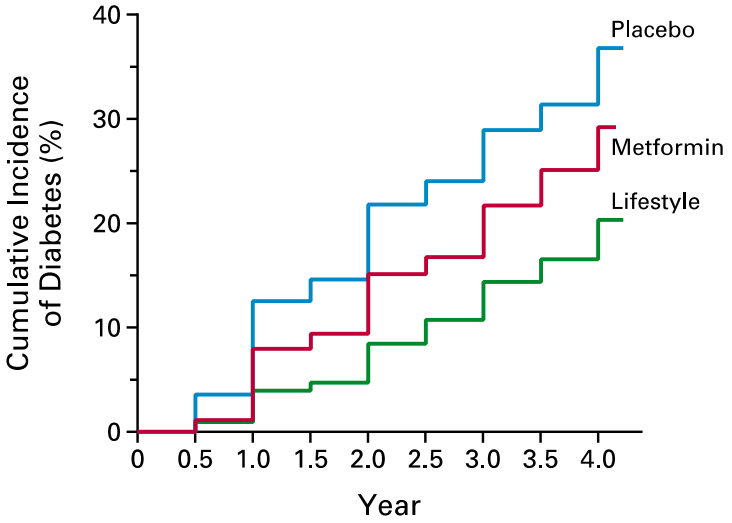


Figure 2. Cumulative Incidence of Diabetes According to Study Group.

- Longitudinal follow-up studies show that effects can persist up to 10 years

Knowler WC, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. The New England journal of medicine. 2002;346(6):393-403.
Diabetes Prevention Program Research G, Knowler WC, Fowler SE, et al. 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. Lancet. 2009;374(9702):1677-86.

Strong evidence to support the use of lifestyle interventions for diabetes prevention (DPP Study NEJM 2002)

VA leadership decision to implement VA DPP PARTNERED + PRAGMATIC

Operations = VA National Center for Health Promotion and Disease Prevention (NCP)
Research = coordinated by Diabetes QUERI

Overall Study Goals

Compare effectiveness
of group-based interventions to prevent diabetes among Veterans with prediabetes

MOVE!

Usual Care

VA DPP

VA DPP Study Arms

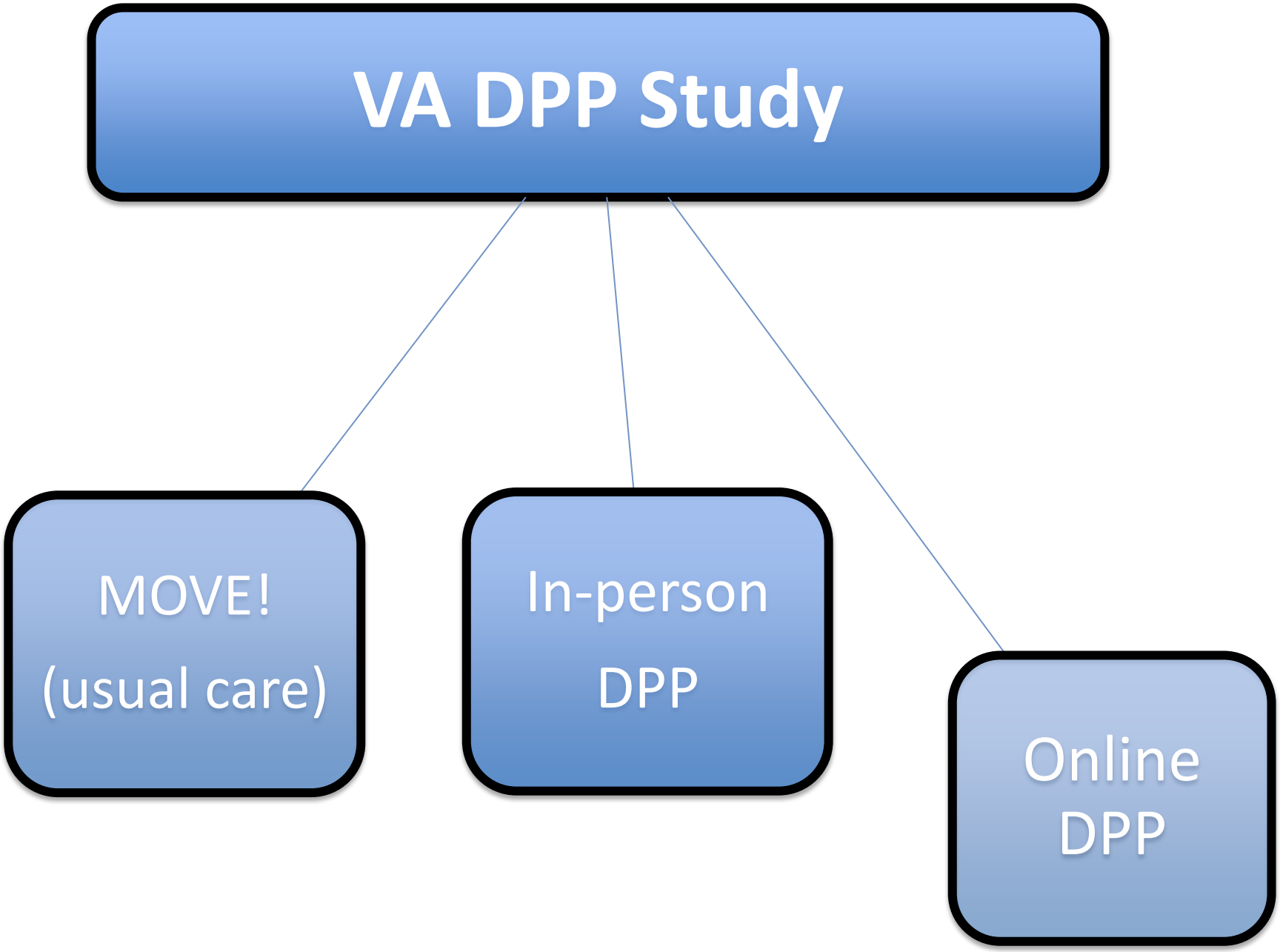
Group-based, lifestyle interventions

MOVE!

- 8-12 core sessions (6 months)
- Independent topics
- Personalized goals
- Open groups
- Multiple instructors
- Target all overweight/obese

VA DPP

- 16 core sessions (6 months)
- Iterative skill building
- Standardized goals
- Closed groups
- One instructor
- Target those with prediabetes


VA DPP Study
MOVE!
(usual care)
In-person
DPP
Online
DPP

QUESTION

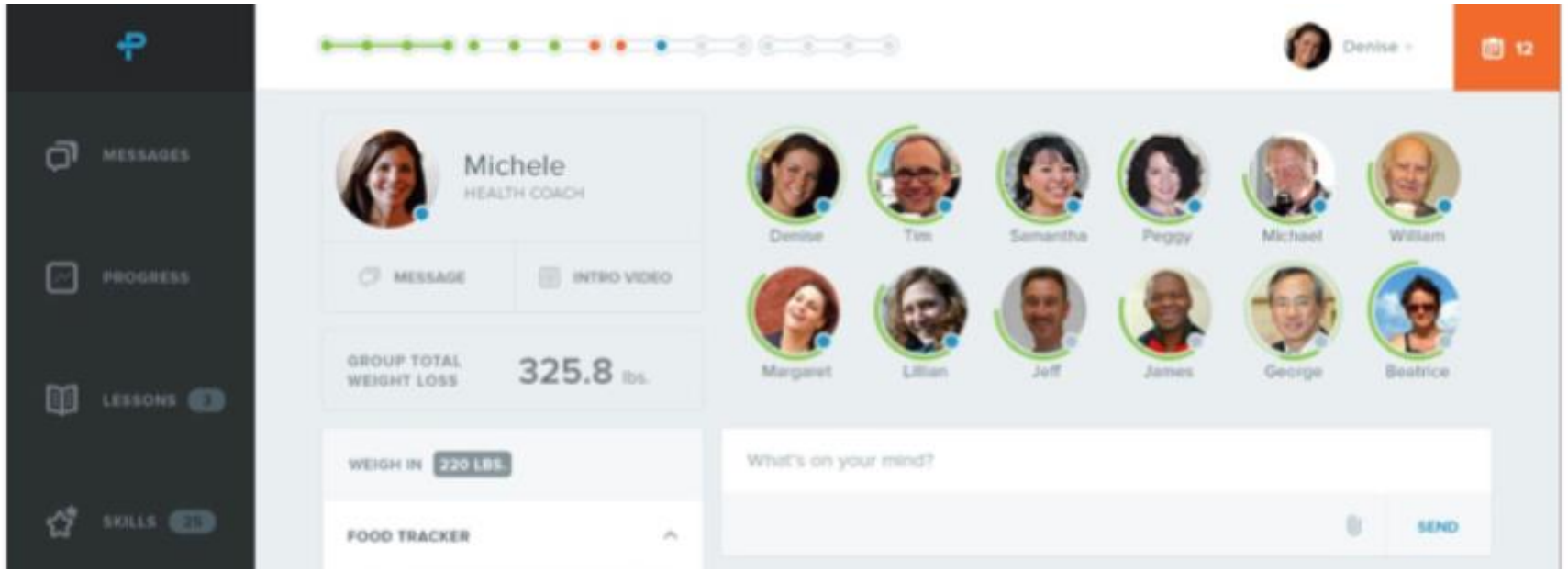
How useful do you think it would be to have an online DPP intervention for Veterans?

A. Extremely useful
B. Somewhat useful
C. Not useful
D. Not sure

Non-Randomized, Parallel Online VA DPP Arm

- Weekly in person sessions may not be possible for working Veterans with competing demands
  - Asynchronous communication
  - Potential appeal to a different kind of Veteran?
- Harness the power of social media
  - Redefining engagement and participation
- Using technology to track and monitor progress
  - Wireless scales transmit weights over cellular network

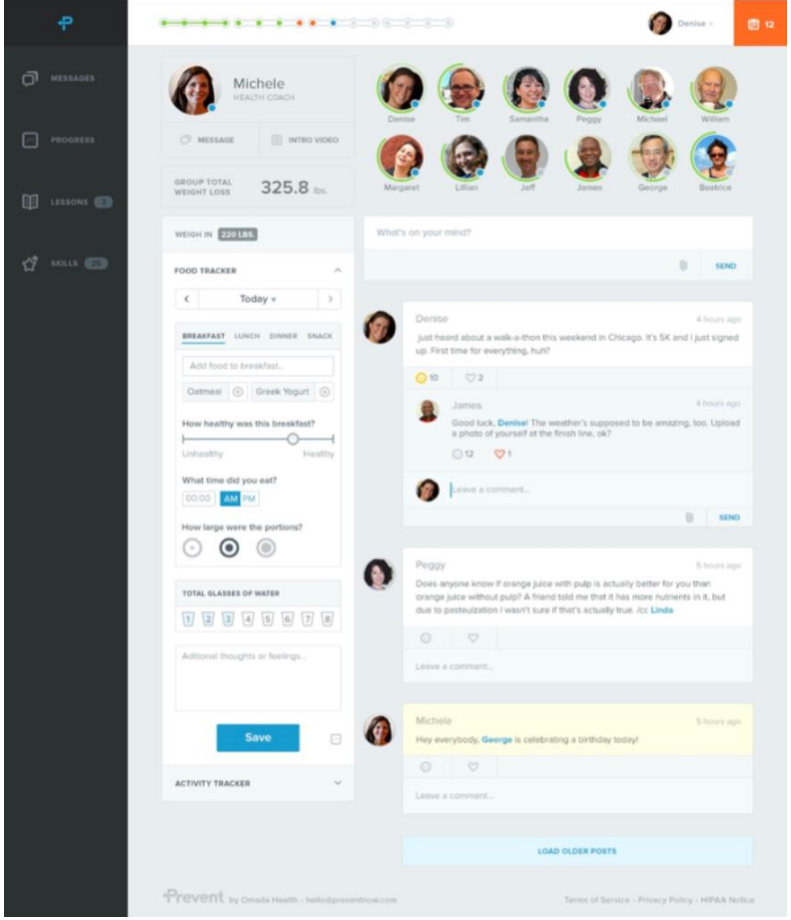
https://omadahealth.com

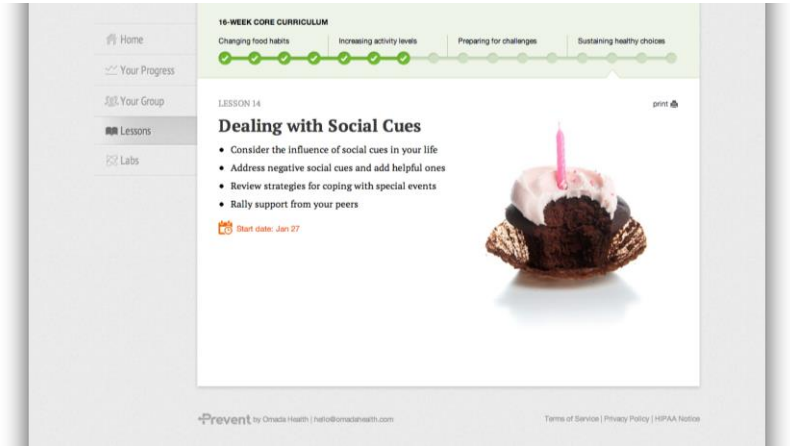


Visual displays of progress (green bars under pictures)

Messaging options

Online Lesson Modules

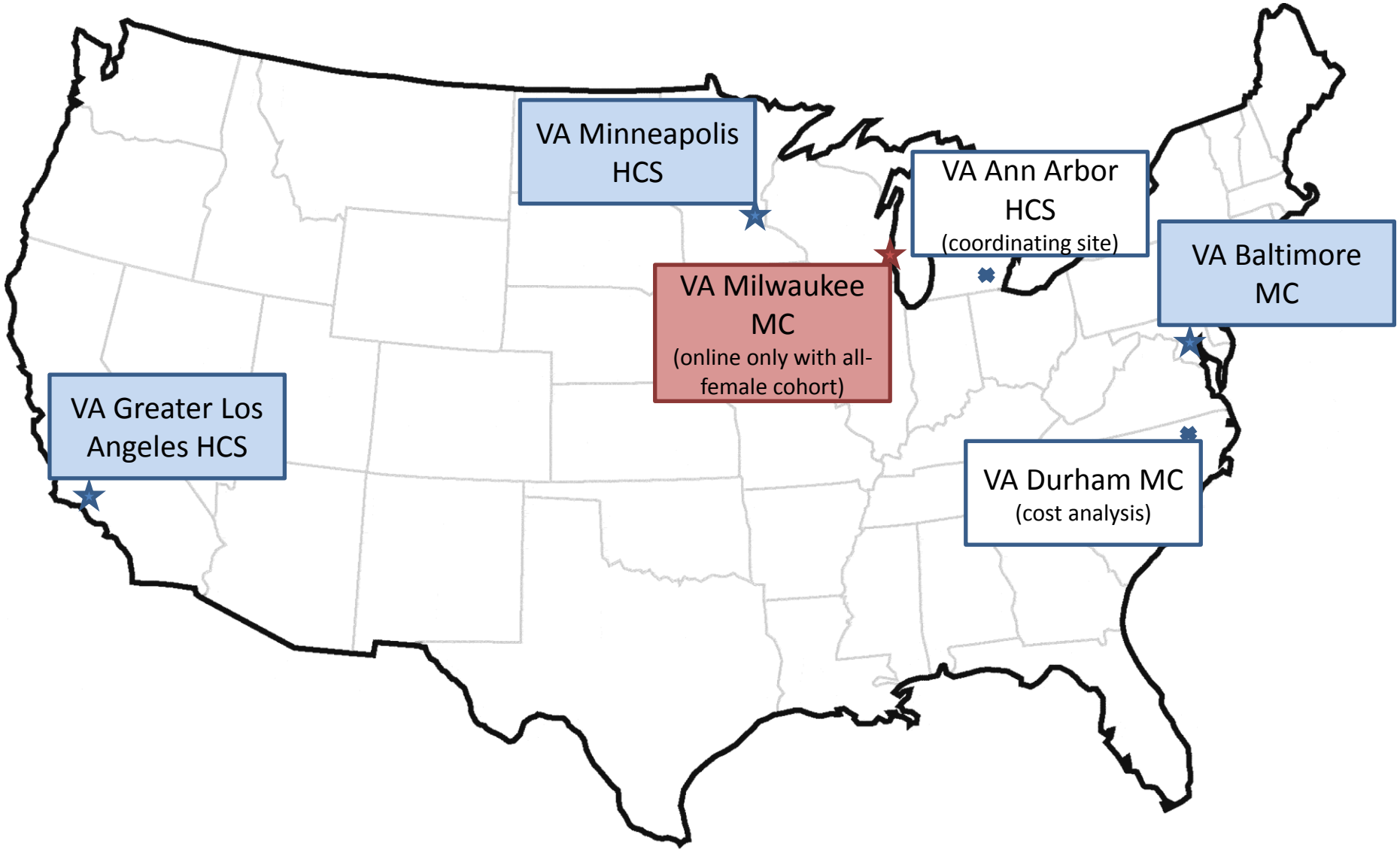




Online Eligibility Criteria

- Prediabetes based on labs within past 6-12 months
  - Fasting plasma glucose of 100-125 mg/dl OR
  - Hemoglobin A1c (A1c) of 5.7-6.4%
- Obese (BMI >30 kg/m^2) or overweight (BMI >25 kg/m^2) with ≥1 cardiovascular risk factor (e.g., hypertension)
  - MOVE! eligibility
- Exclusion criteria
  - Diabetes, eating disorders, use of antiglycemic medications (including metformin), pregnancy or a plan to become pregnant, a medical contraindication to lifestyle modification, lack of regular access to a computer with an Internet connection or email address, or participation in a VA weight management program within prior 6 months.

VA DPP Study Sites



Quantitative Evaluation

- Includes participants from all 4 VA DPP sites recruited between Fall 2013-Summer 2014
- 16-week results for weight loss and adherence across 3 arms
  - MOVE vs. In-person VA DPP vs. Online VA DPP
- Comparison of results by gender in Online VA DPP
  - One VA DPP site recruited only women participants for the online DPP

Key Measures

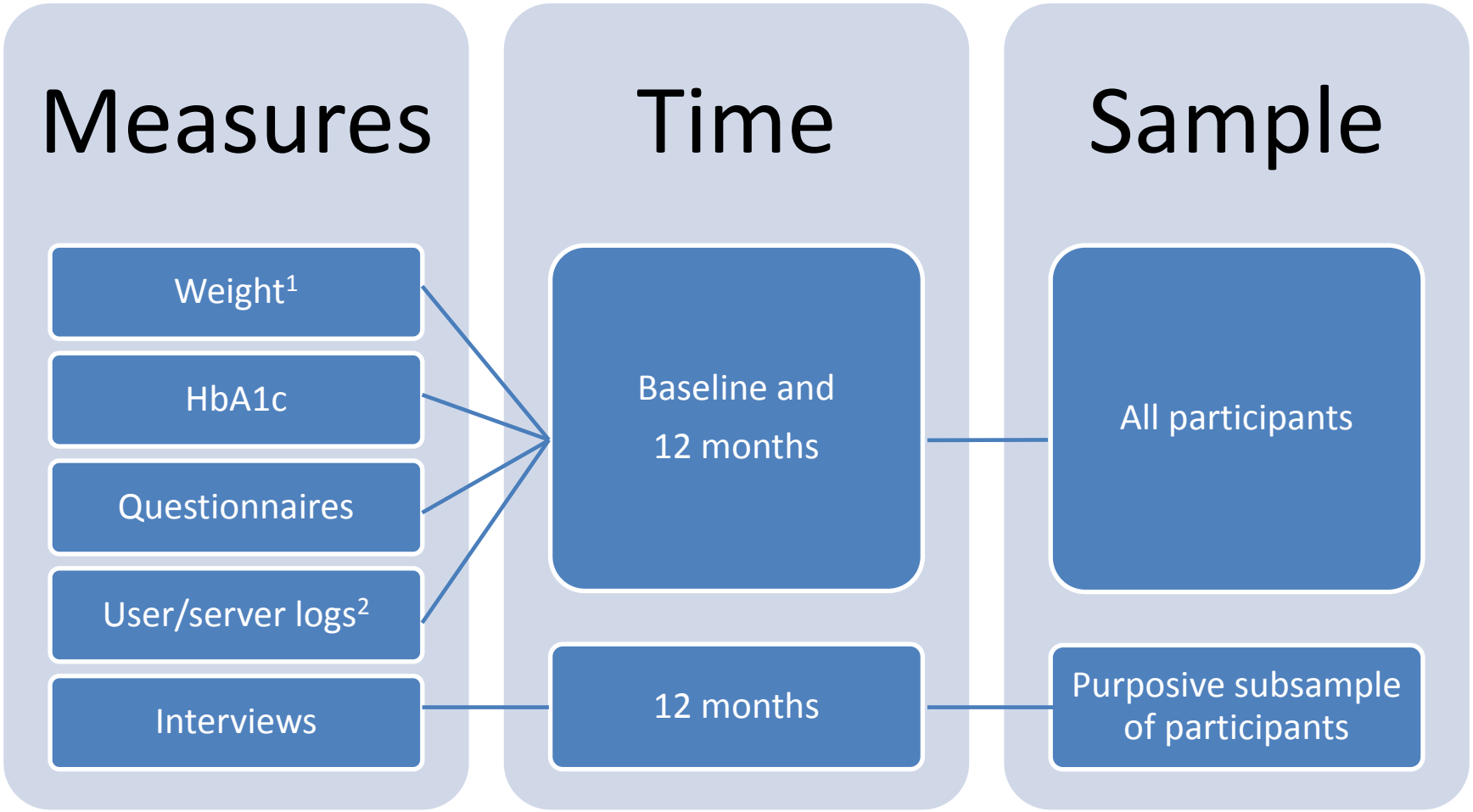
Primary Outcome

- Weight loss
  (12 months)

Secondary Outcome

- HbA1c
  (12 months)

Methods: Data Collection



[1]*weights also uploaded daily from intervention scale*
[2]*user logs provided for each user login*

Data Analysis Methods

Multilevel mixed-effects linear regression

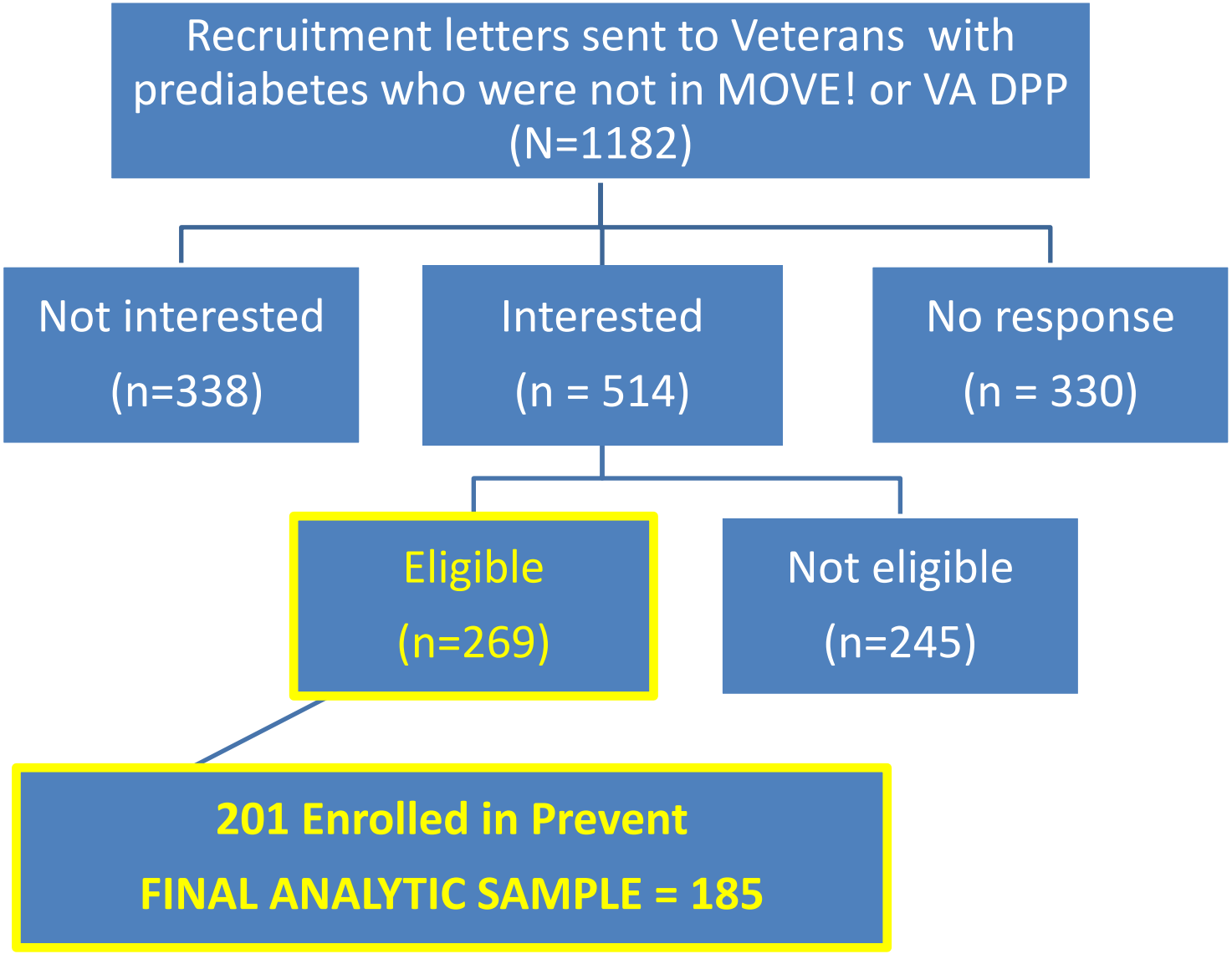
- Outcome = weight

- Predictors =
  - Baseline weight
  - Age
  - Gender
  - Mental health conditions
  - Race
  - Self-reported health
  - Time (days)
  - Arm
  - Time x time
  - Arm x time
  - Arm x time x time
  - Indicator variable (250 days)
  - Arm x indicator variable (250 days)

Pairwise comparison of %weight change across arms

- At 16 weeks

Recruitment for Online VA DPP



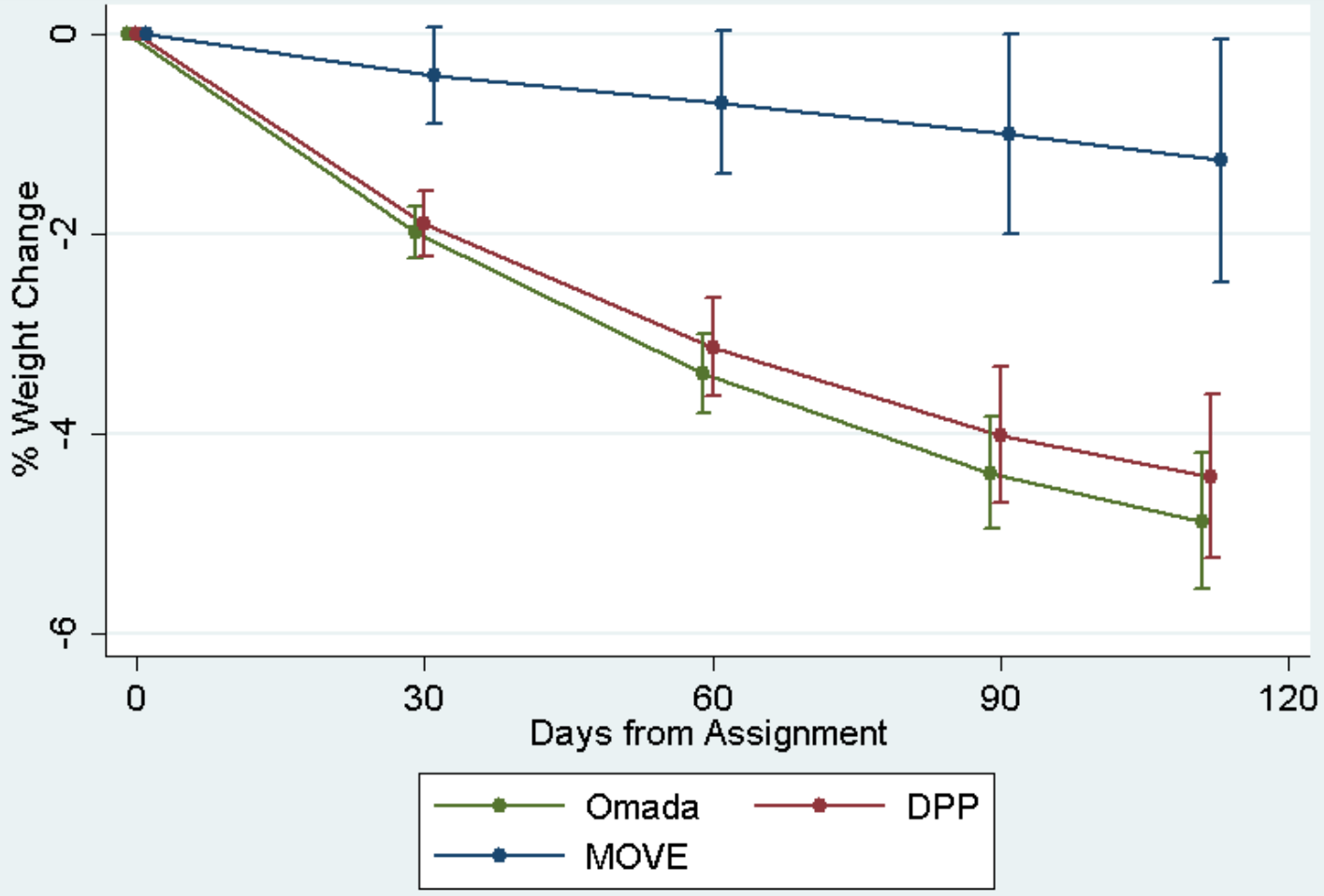
Baseline Characteristic	MOVE!	In-person VA DPP	Online VA DPP Non-randomized Parallel Arm	P-value
N	63	136	185	
Female	3 (4.8%)	20 (14.7%)	67 (36.2%)	**<0.001**
Age	60.2 (9.7)	59.2 (8.5)	60.3 (10.7)	0.59
Weight (kg)	104.5 (18.1)	110.0 (21.0)	100.1 (19.6)	**<0.001**
BMI	33.8 (4.6)	35.0 (5.7)	33.3 (5.8)	**0.02**
Race/ethnicity				**<0.001**
African American	29 (46.0%)	49 (36.0%)	34 (18.4%)	
Caucasian	25 (39.7%)	70 (51.5%)	125 (67.6%)	
Other	1 (1.6%)	4 (2.9%)	7 (3.8%)	
Hispanic	4 (6.3%)	6 (4.4%)	18 (9.7%)	
Missing	4 (6.3%)	7 (5.1%0	1 (0.5%)	
Service Connection	20.0 (31.8)	29.0 (35.8)	29.6 (36.0)	0.16
HbA1c	6.0 (0.2)	6.0 (0.2)	6.0 (0.3)	0.57
Comorbidities				
HTN	44 (69.8%)	92 (67.6%)	119 (64.3%)	0.67
CAD	10 (15.9%)	18 (13.2%)	20 (10.8%)	0.55
Mental Health	29 (46.0%)	76 (55.9%)	80 (43.2%)	0.08

16-Week Weight Outcomes

Outcome	MOVE!	In-person VA DPP	Online VA DPP (Non-randomized Parallel Arm)	MOVE! vs VA DPP	MOVE! vs Online VA DPP	VA DPP vs Online VA DPP
%weight chg @16 wks *for those who attended **≥1** sessions/modules*	-1.3 (-2.5,0.0)	-4.4 (-5.2, -3.6)	-4.9 (-5.6, -4.2)	**< 0.001**	**< 0.001**	0.67
% weight chg (kg) @16 wks *for those who attended >1 sessions/modules*	-1.5 (-2.8, -0.2)	-4.8 (-5.6, -3.9)	-4.9 (-5.6, -3.1)	**< 0.001**	**< 0.001**	0.83
%weight chg @16 wks *for those who attended **≥4** sessions/modules*	-1.4 (-2.8, 0.0)	-4.9 (-5.9, -4.0)	-5.2 (-5.9, -4.5)	**< 0.001**	**< 0.001**	0.65
%weight chg @16 wks *for those who attended **≥8** Sessions/modules*	-1.5 (-3.3, 0.2)	-5.5 (-6.6, -4.4)	-5.5 (-6.2, -4.7)	**< 0.001**	**< 0.001**	0.94

%Weight Change at 16 Weeks

Includes individuals who completed 1 or more Sessions/Modules



16-Week Program Adherence

Outcome (Incl. participants completing ≥1 session/module)	**MOVE!**	**In-person VA DPP**	**Online VA DPP** (Non-randomized Parallel Arm)	**MOVE! vs VA DPP**	**MOVE! vs Online VA DPP**	**VA DPP vs Online VA DPP**
Average # sessions/modules	7.4 (4.5)	8.6 (5.0)	13.4 (4.7)	0.06	**< 0.001**	**< 0.001**
% who completed ≥8	50.8%	58.1%	86.0%	0.24	**< 0.001**	**< 0.001**
% who completed all 16	3.2%	5.1%	64.3%	0.53	**< 0.001**	**< 0.001**

Online VA DPP: Baseline Characteristics by Gender

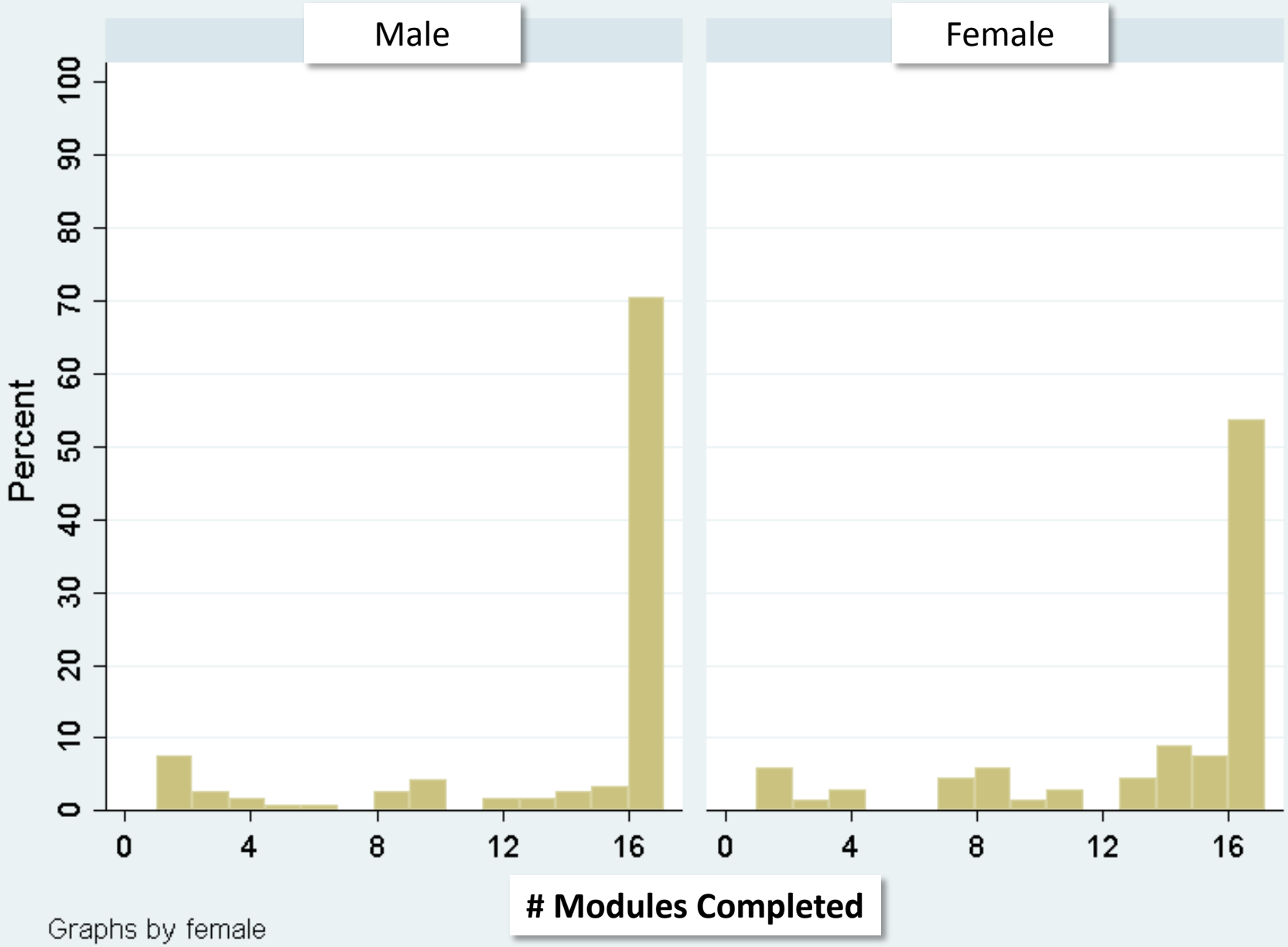
Characteristic	Male	Female	P value
N (%)	118 (64%)	67 (36%)	
Age	62.8 (11.1)	55.9 (8.4)	**<0.001**
Weight (kg)	102.6 (19.9)	95.8 (18.5)	**0.02**
BMI	32.3 (5.3)	35.2 (6.2)	**0.001**
Race/ethnicity			
African American	17 (14.4%)	17 (25.4%)	0.10
Caucasian	80 (67.8%)	45 (67.2%)	
Other	7 (5.9%)	0 (0%)	
Hispanic	13 (11.0%)	5 (7.5%)	
Missing	1 (0.8%)	0 (0%)	
Service Connection	30.6 (35.4)	27.9 (37.4)	0.63
HbA1c	6.0 (0.3)	5.8 (0.2)	0.11
Comorbidities			
HTN	82 (69.5%)	37 (55.2%)	**0.05**
CAD	18 (15.3%)	2 (3.0%)	**0.01**
Mental Health	45 (38.1%)	35 (52.2%)	**0.06**

Online VA DPP:
Weight Outcomes by Gender

Outcome	Male	Female	P Value
% weight loss at 16 weeks	-5.1 (-6.0, -4.1)	-4.5 (-5.7, -3.2)	0.63
weight loss at 16 weeks (kg)	-5.3 (-6.3, -4.4)	-4.1 (-5.4, -2.8)	0.14
% weight loss at 16 weeks for those who attended **≥4 modules**	--5.5 (-6.5, -4.5)	-4.7 (-6.1, -3.4)	0.39
% weight loss at 16 weeks for those who attended **≥8 modules**	-5.7 (-6.7, -4.6)	-5.1 (-6.5, -3.8)	0.54
% weight loss at 16 weeks for those who attended **all 16 modules**	-6.1 (-7.1, -5.0)	-6.5 (-8.1, -4.9)	0.66

Online VA DPP: Program Adherence by Gender

Outcome	Male	Female	P Value
Average #modules completed	13.5 (4.7)	13.1 (4.5)	0.53
% who completed ≥8 modules	86.4%	85.1%	0.80
% who completed all 16 modules	**70.3%**	**53.7%**	**0.02**


Male
Female
Percent
0
10
20
30
40
50
60
70
80
90
100
0
4
8
12
16
Modules Completed
Graphs by female

Summary of Quantitative Findings

- VA DPP interventions (in-person and online) resulted in significantly higher weight loss at 16 weeks compared to MOVE!
  - Online VA DPP had higher rates of adherence
    - Non-randomized, parallel arm
- In the Online VA DPP, weight loss at 16 weeks was similar for both men and women
  - Women were less likely to complete all 16 modules, however

QUESTION

- Are you a (check all that apply):

A. Researcher
B. Clinician
C. Involved with VA's MOVE! Program
D. Involved with another weight management program
E. Other

Qualitative Findings

Qualitative Evaluation of Women Veterans' Early Experiences

- Limited to the subset of women Veterans participants from one VA DPP site
  - Enrolled in *Prevent* by January 19, 2014
  - Consented participants were assigned to a *Prevent* group on a rolling basis
    - Groups included veterans and non-veterans and female and male participants.
- All participants who completed an interview received a US $25 gift card.

Qualitative Evaluation of Women Veterans' Early Experiences

- In-person, semi-structured interviews conducted in a private room
- Transcripts manually coded using a content analysis approach
  - Codes were developed inductively by coding the first 6 interviews using a consensual process.
  - Descriptive, inductive content analysis was used to identify common themes.
  - Two coders independently coded each interview manually and analyzed them for common themes.
- While it was not a criterion for stopping interviews, we did reach thematic saturation.

Qualitative Results

- Participants had mean age of 56.8 years, mean BMI of 35.6 and 41% were African American
- **Seven** broad themes emerged from 15 interviews:
  - 1: The Program is a Good Fit With Perceived Health Needs
  - 2: The Program Is Convenient
  - 3: The Program Integrates With Daily Life
  - 4: “I Feel Accountable”
  - 5: “I Hate Logging”
  - 6: “If the Program Were In-person, My Group Would Know Me Head-to-Toe”
  - 7: Difficult to Figure It Out

Themes 1 & 2

- Participants perceived the online DPP as:
  - **1. A good fit for their health needs**
  - **2. Convenient**

"I was just thinking and praying about the fact that I need to get my weight under control. Gotta get my health under control and I was just feeling so lucky and this program came along. And it was just perfect." [ID11]

Theme 3

- **Program integrated easily into daily routines**
  - Increased participation and engagement

"I get on the scale every day. That's a no-brainer 'cause it's in the bathroom, you know, after I brush my teeth and all that stuff…." [ID8]

"I don't have to drive into the [medical center] every, you know, every day, that kind of thing. I have had to do that with other programs in the past and it's just, it can take up a lot of my time in the day" [ID7]

Theme 4

- **Participants felt accountable to the online DPP**
  - Significant motivation to meet daily goals

"I think that the program helped a lot. When I made a commitment to weigh myself every day that was huge, you know, that kept me honest….I was sort of accountable to the program, that was a big motivator." [ID13]

"Well, there's a little bar that says what the group's goal is for steps… I always want to look to make sure I'm keeping up my steps so I'm not the slacker in the group." [ID10]

Theme 5

- **Tracking and entering data was a deterrent**
  - Food and exercise trackers are used to increase accountability

"I'm not one to log. I hate logging stuff. I can't stand to log. I'm lazy. When it comes up to logging my activities, you know. I know what I'm doing, but I don't want to log my life. I'm not interested in logging my life" [ID4].

Themes 6 & 7

- **Online is less personal**

"…if we were sitting in a room face-to-face, they'd know me from head to toe by now. Sitting before people I seem to be a little bit more open than online…." [ID8]

- **Technology can be difficult to figure It out**

"My computer acts up a lot, so I don't get to log in and do all the stuff that they would like me to do, but versus going to meetings and all of that, I would prefer to do it online" [ID9].

Summary of Qualitative Findings

- An online DPP intervention may be an appealing option for women Veterans
  - Convenience and accountability
  - However, some felt that it was less personal
- Several opportunities for improvement
  - Manual logging
  - Difficult to figure out
  - Hybrid programs?

Summary of Preliminary Online VA DPP Findings

Feasible for and acceptable?	• Yes
Pre-post outcomes at 16 weeks?	• Significant weight loss
Comparison to MOVE! at 16 weeks?	• Greater weight loss and adherence
Comparison to In-person DPP at 16 weeks?	• Similar weight loss but higher adherence
Upcoming Analyses	• 12-mo weight outcomes • 12-mo HbA1c outcomes • 12-mo patient interviews

QUESTION

Based on what you have learned in this cyberseminar, how useful do you think it would be to have an online DPP intervention for Veterans?

A. Extremely useful
B. Somewhat useful
C. Not useful
D. Not sure

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Questions/Comments

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VA DPP References

http://www.ncbi.nlm.nih.gov/pubmed/25962598

Damschroder *et al. Implementation Science* (2015) 10:68
DOI 10.1186/s13012-015-0250-0

IMPLEMENTATION SCIENCE

STUDY PROTOCOL Open Access

Implementation and evaluation of the VA DPP clinical demonstration: protocol for a multi-site non-randomized hybrid effectiveness-implementation type III trial

Laura J Damschroder[1,2*], Tannaz Moin[3,4,5], Santanu K Datta[6,7], Caitlin M Reardon[1], Nanette Steinle[8,9], Jane Weinreb[3,4], Charles J Billington[10,11], Matt L Maciejewski[6,7], William S Yancy Jr.[6,7], Maria Hughes[1], Fatima Makki[1] and Caroline R Richardson[1,2,12]

http://www.ncbi.nlm.nih.gov/pubmed/26006697

JOURNAL OF MEDICAL INTERNET RESEARCH Moin et al

Original Paper

Women Veterans' Experience With a Web-Based Diabetes Prevention Program: A Qualitative Study to Inform Future Practice

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Websites

VA MOVE!

http://www.move.va.gov

CDC National Diabetes Prevention Program

http://www.cdc.gov/diabetes/prevention/