

Diabetes Prevention in Latinos



Matthew O'Brien, MD, MSc
Assistant Professor of Medicine and Public Health

Northwestern Feinberg School of Medicine
Institute for Public Health and Medicine
October 17, 2013

Overview

- **Background**
- **Diabetes prevention study**
- **Related studies**
- **Future directions**

BACKGROUND

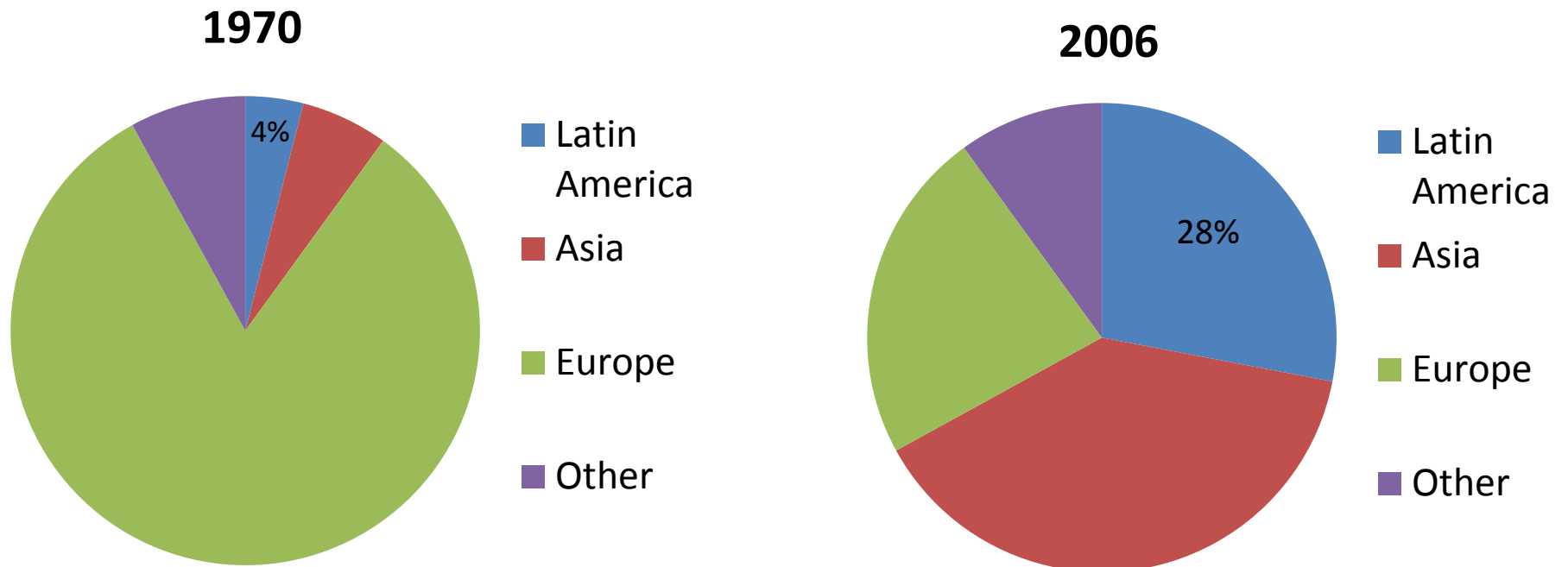


Matthew J. O'Brien, MD, MSc
mobrien@temple.edu



School of Medicine
TEMPLE UNIVERSITY®

Immigration to Philadelphia



Source: Brookings analysis of U.S. Census data

Puentes de Salud



- **Founded in 2006**
- **Non-profit organization**
- **Collaborative model**
- **Medical, dental, and mental health services**
- **Community-based educational programs**

Puentes de Salud's promotoras

- **Service**
 - Clinical support
 - Health education
 - Patient navigation
 - Outreach
- **Research**
 - Cervical cancer prevention
 - Obesity
 - Diabetes prevention



DIABETES PREVENTION RESEARCH



Matthew J. O'Brien, MD, MSc
mobrien@temple.edu



School of Medicine
TEMPLE UNIVERSITY®

Background on diabetes in Latinos

- **Mexican Americans have...**
 - the highest prevalence of prediabetes (37.8%)¹
 - the highest prevalence of diabetes (20.1%)²
 - worse glycemic control than whites or blacks³
 - the greatest increase in diabetes-related mortality from 1989-2005⁴

1 Bullard, et al. Diabetes Care 2013 (epub April 19)

2 Cowie, et al. Diabetes Care 2009;32(2):287-294

3 Casagrande, et al. Diabetes Care 2013;36(8):2271-79

4 Miech, et al. Am J Prev Med 2009;36(2):126-132.

Research Agenda

To study the primary prevention of type 2 diabetes in urban Latinos using community- and clinic-based interventions

Research Agenda

FORMATIVE
WORK

Qualitative research

Epidemiologic research

INTERVENTIONS

Community- and clinic-
based trials to prevent
diabetes

OBJECTIVE

Prevention of type 2
diabetes in urban
Latinos

The Diabetes Prevention Program

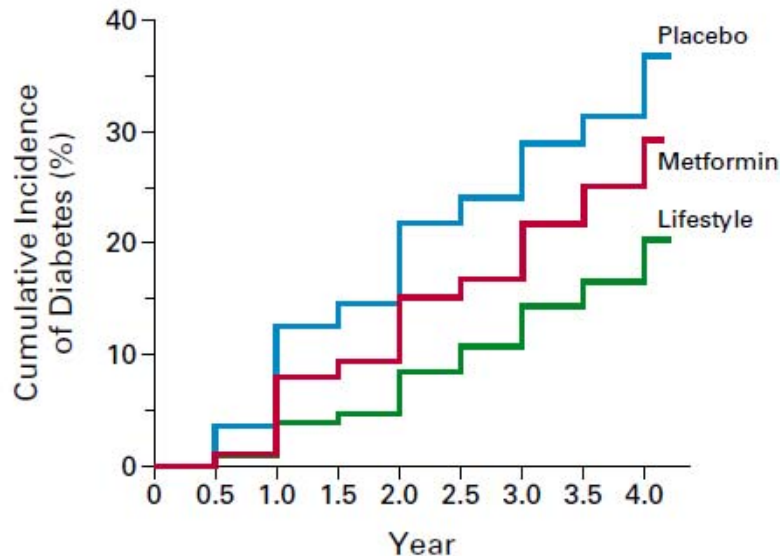


Figure 2. Cumulative Incidence of Diabetes According to Study Group.

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).

Knowler WC et al. N Engl J Med 2002;346:393-403

Incidence of diabetes by treatment arm (per 100 person-years of f/u)

- Placebo: 11 cases
- Metformin: 7.8 cases
- Lifestyle: 4.8 cases

- 58% reduction in diabetes incidence with lifestyle intervention
- 31% reduction with metformin

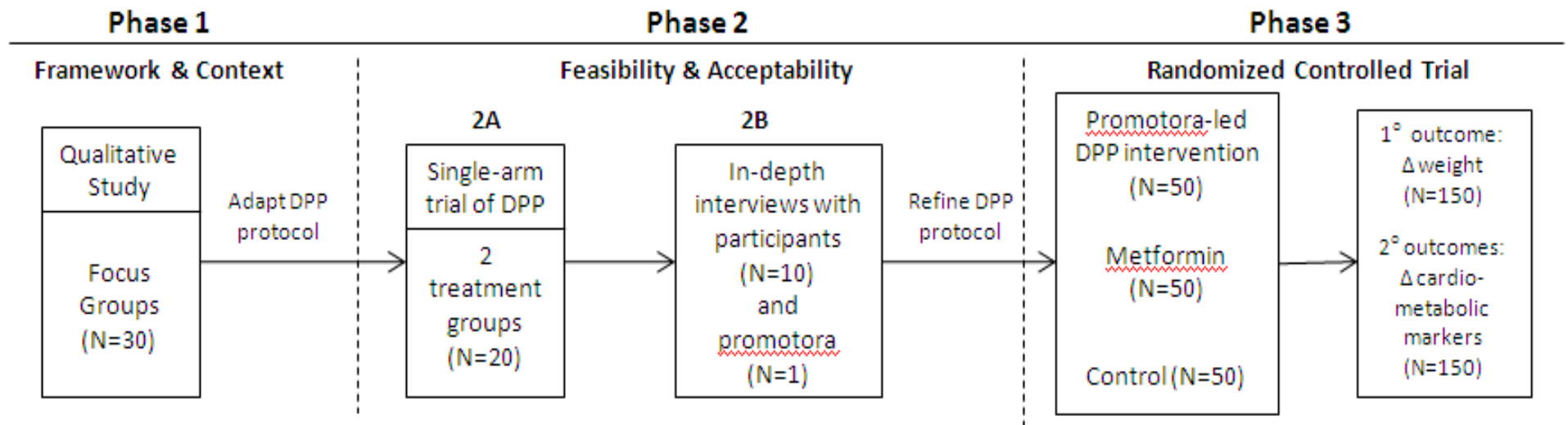
DPP lifestyle intervention

- 16-session lifestyle curriculum focused on 2 principal goals
 - Weight loss of at least 7% of initial body weight
 - 150 minutes/week of moderate physical activity
- Monthly post-core maintenance sessions
- Delivered by individual case managers

DPP Group. Diabetes Care 2002;25:2165-2171

Promotora-Led Diabetes Prevention Program

- 5-year, NIH-funded study adapting the DPP for local use by Puentes de Salud's promotoras
- Targeting Latinas in 2 community sites



Diabetes-related behaviors in Latinas and non-Latinas

Background

- **Latinas have a 53% lifetime risk of developing diabetes¹**
- **Certain dietary and physical activity behaviors are associated with diabetes risk**
- **Little is known about the prevalence of these behaviors in Latinas**

1 Narayan 2003. JAMA. 2003;290(14):1884-1890

Objective

To compare the prevalence of the following diabetes-related behaviors in Latinas and non-Latinas

Physical activity

- walking
- moderate-to-vigorous physical activity (MVPA)

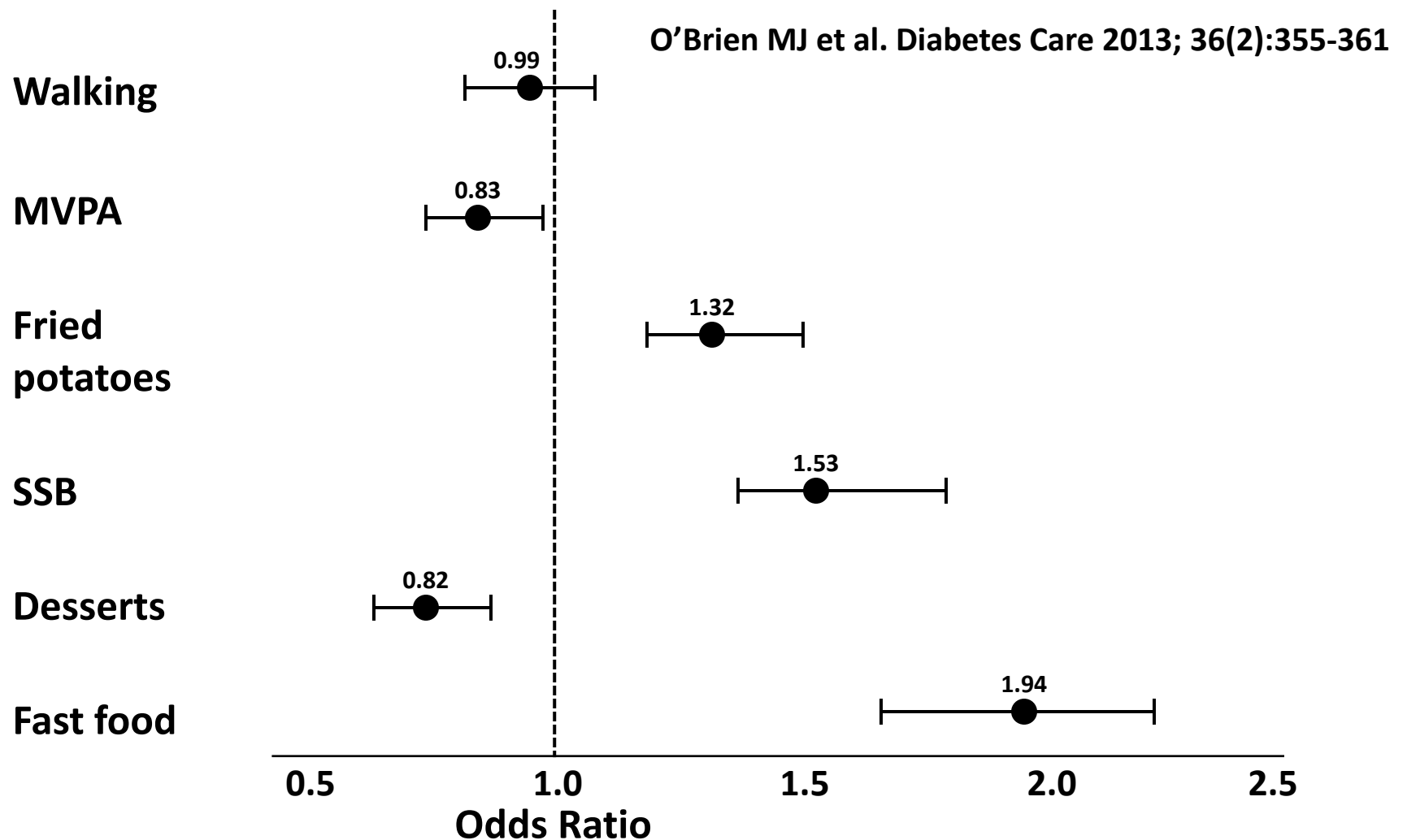
Dietary behaviors

- fried potatoes
- sugary drinks
- desserts
- fast foods

Methods

- **Study population**: 25,433 women—17% Latinas, 83% non-Latinas—without diabetes and not currently pregnant
- **Exposure**: Latina ethnicity (self-reported)
- **Outcomes**: Least-healthy tertile for behaviors
 - Walking: 0 – 2 times per week for at least 10 minutes
 - MVPA: 0 days per week
 - Fried potatoes: ≥ 4 times per month
 - Sugar-sweetened beverages (SSB): ≥ 31 times per month
 - Desserts: ≥ 14 times per month
 - Fast food: ≥ 8 times per month
- **Confounders**: age, income, education, marital status, health status, smoking, and acculturation

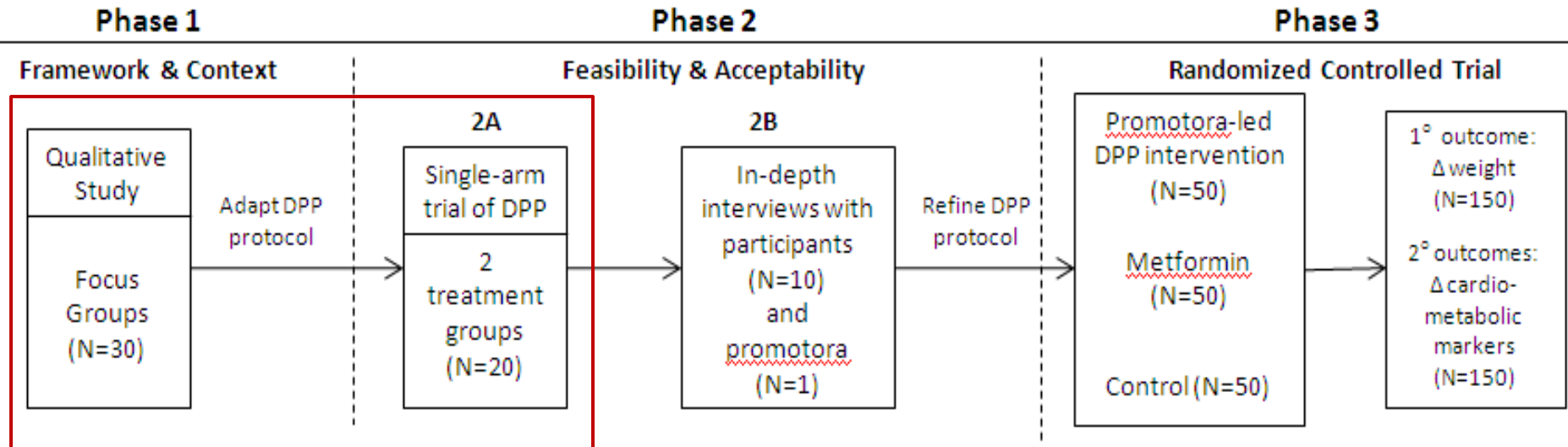
Odds of Latinas being in the least healthy tertile



Conclusions and implications

- **One of the first reports of diabetes-related behaviors in Latinas**
- **Greatest differences between Latinas and non-Latinas were in sugary drinks and fast food**
- **Findings support targeted dietary counseling**
- **Lifestyle programs to prevent diabetes could focus on these food groups**

Progress on promotora-led DPP



- Key observation from pilot work
 - Vastly different cultural backdrop in 2 study sites

Acculturation and diabetes in Latinos

- **Acculturation is positively associated with many behavioral risk factors and health conditions**
- **Existing literature on acculturation and diabetes is contradictory**
 - Different levels of data examined
 - Heterogeneous study populations
 - Diverse operational definitions of exposure and outcome

Objective

To explore the association of acculturation and diabetes in the first nationally representative sample of all U.S. Latinos

- Examine BMI as a potential mediator**

Methods

- **Study population:** 3,218 Latinos from NHANES 2007-2010 excluding those in whom diabetes prevalence could not be determined
- **Exposure:** Summary acculturation score (0-3)
 - Nativity: foreign-born (0 points) vs. U.S.-born (1 point)
 - Language: Spanish-speaking (0 points) vs. English-speaking (1 point)
 - U.S. residence: < 20 years (0 points) vs. ≥ 20 years (1 point)
- **Outcome:** Diabetes prevalence
 - Self-reported history of diabetes
 - Undiagnosed DM determined using A1C criteria
- **Covariates:** Age, sex, ancestry, education, household income, marital status, body mass index

Characteristics of U.S. Latino adults (N=3,218)

Characteristics	N (%)
Diabetes	579 (12.2)
Acculturation score	
0	1,011 (35.5)
1	838 (21.3)
2	416 (12.2)
3	950 (31.0)
Age <40 years	1,193 (52.4)
Body Mass Index	
≤ 25.0 kg/m ²	680 (23.0)
25.0 – 29.9 kg/m ²	1,235 (38.8)
≥ 30.0 kg/m ²	1,258 (38.2)

Odds of diabetes in U.S. Latinos by acculturation score

	Unadjusted OR (95% CI)	Model 1^a OR (95% CI)	Model 2^b OR (95% CI)
Acculturation score			
0	1.0 (REF)	1.0 (REF)	1.0 (REF)
1	3.60 (2.76-4.68)	1.72 (1.33-2.21)	1.61 (1.23-2.12)
2	2.37 (1.72-3.26)	1.66 (1.16-2.39)	1.52 (1.04-2.24)
3	1.95 (1.38-2.77)	2.11 (1.40-3.18)	1.91 (1.24-2.93)

a Adjusted for age + socioeconomic status

b Adjusted for Model 1 + body mass index

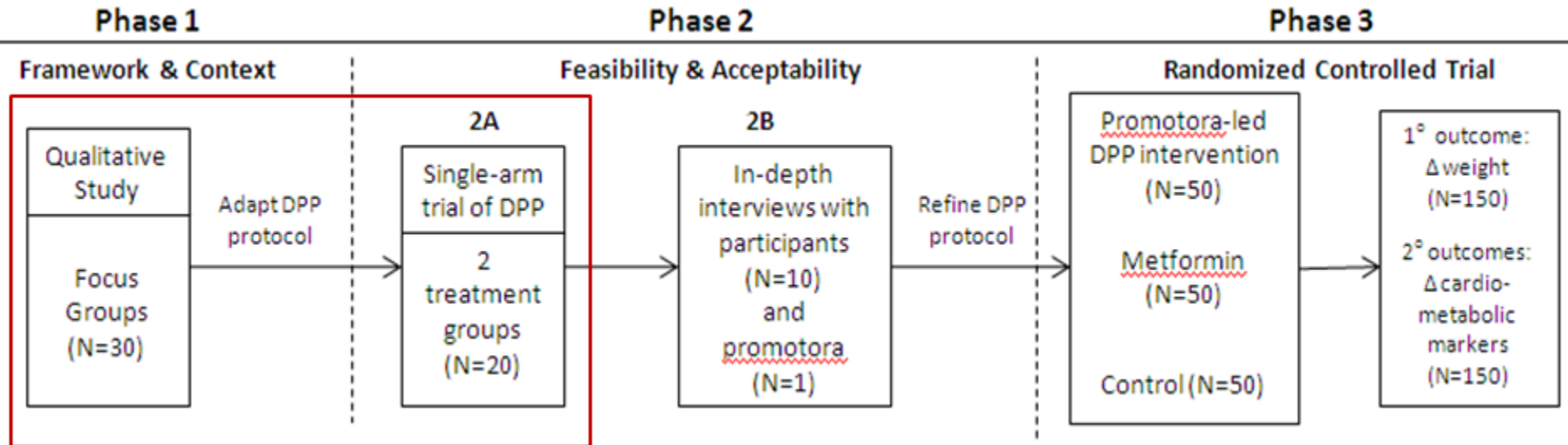
Strengths and weaknesses

- **First nationally representative sample of Latinos to examine this topic**
- **Full accounting of diagnosed and undiagnosed diabetes**
- **Cross-sectional design of study**
- **Use of A1C limits comparison with previous studies**

Conclusions and implications

- **Findings support positive association between acculturation and diabetes in Latinos**
 - Not mediated by BMI
- **Clinicians may focus screening and prevention efforts on less acculturated Latinos**
- **Directions for future research on this topic**
 - Explore other Latino subgroups
 - Study potential mechanisms (stress hypothesis)
 - Inform intervention studies in this population

Progress on promotora-led DPP



- Key observation from pilot work
 - Great difficulty with dietary self-monitoring

The effect of educational attainment on diabetes prevention

Background

- Cohort studies have shown a protective effect of education on incident diabetes^{1,2}
- DPP lifestyle intervention requires literacy and numeracy skills
- DPP data present opportunity to explore further

1 Maty, et al. Int J Epidemiol 2005;34:1274-1281

2 Robbins, et al. Diabetes Res Clin Pract 2005;68:230-236

Objective

To determine the association between educational attainment and the incidence of diabetes among participants in the Diabetes Prevention Program

Methods

- **Study population:** 2,910 participants in the Diabetes Prevention Program randomized to lifestyle program, metformin, or placebo
- **Predictor:** Educational attainment (\geq college vs. $<$ college)
- **Outcome:** Diagnosis of diabetes during follow-up
- **Covariates:** Age, weight, plasma glucose, sex, race/ethnicity
- **Statistical Analysis:**
 - Bivariate analyses with chi-square tests
 - Cox proportional hazards regression for diabetes risk reduction

Baseline characteristics of study participants (N=2910)

Characteristic	N (%) / Mean (SD)
Educational attainment	
< College	1,543 (53)
≥ College	1,367 (47)
Age 45-59 yr	1,426 (49)
Female sex	1,948 (67)
Minority race/ethnicity	1,280 (44)
Plasma glucose (mg/dl)	
In the fasting state	107.1 (7.7)
2h post-oral glucose load	164.7(17.0)
Weight (kg)	94.7 (20.3)

Incidence of diabetes

	No. of Participants (%)	% Reduction in Incidence (95% CI)	
		Lifestyle vs. Placebo	Metformin vs. Placebo
Overall	2,910 (100)	56 (44 - 64)	30 (15 - 42)
Educational attainment			
< College	1,543 (53)	43 (28 - 53)	11 (3 - 25)
≥ College	1,367 (47)	66 (55 - 78)	47 (29 - 60)

Research Agenda

FORMATIVE
WORK

Qualitative research

Epidemiologic research

INTERVENTIONS

Community- and clinic-
based trials to prevent
diabetes

OBJECTIVE

Prevention of type 2
diabetes in urban
Latinos

Future directions: formative work

- **Latino subgroups**
 - Diabetes prevalence, risk factors, sociocultural characteristics
- **Promotoras/community health workers**
 - Acceptability of intervention model
 - Training, expanding roles, scaling model
- **Linking community and clinic settings**
 - Developing models for collaboration

Future directions: interventions

- **Large-scale promotora-based DPP translation**
 - **Comparative effectiveness of lifestyle intervention vs. metformin**
 - **Tailor to cultural background and health literacy**
 - **Introduce participants' choice of treatment**
 - **Engage multiple stakeholders**
 - **Leverage social networks in Latino communities**
 - **Enhance treatments with technology**
 - **Explore treatment effects by Latino subgroup**

Acknowledgements

- **Mentors/collaborators: Bob Whitaker, MD, MPH; Gary Foster, PhD; Cynthia Ogden, PhD; Ron Ackermann, MD, MPH**
- **Community partners: Puentes de Salud, Catholic archdiocese, Mexican consulate, Congreso**
- **Funders: National Institutes of Health (DK095981), Claneil Foundation, Garces Family Foundation**

Discussion

- Contact: mobrien@temple.edu
- Website: www.puentesdesalud.org