GLOBAL BURDEN OF DIABETES

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Noncommunicable Diseases (NCDs)

- Account for > 60% deaths globally

- 35 million deaths

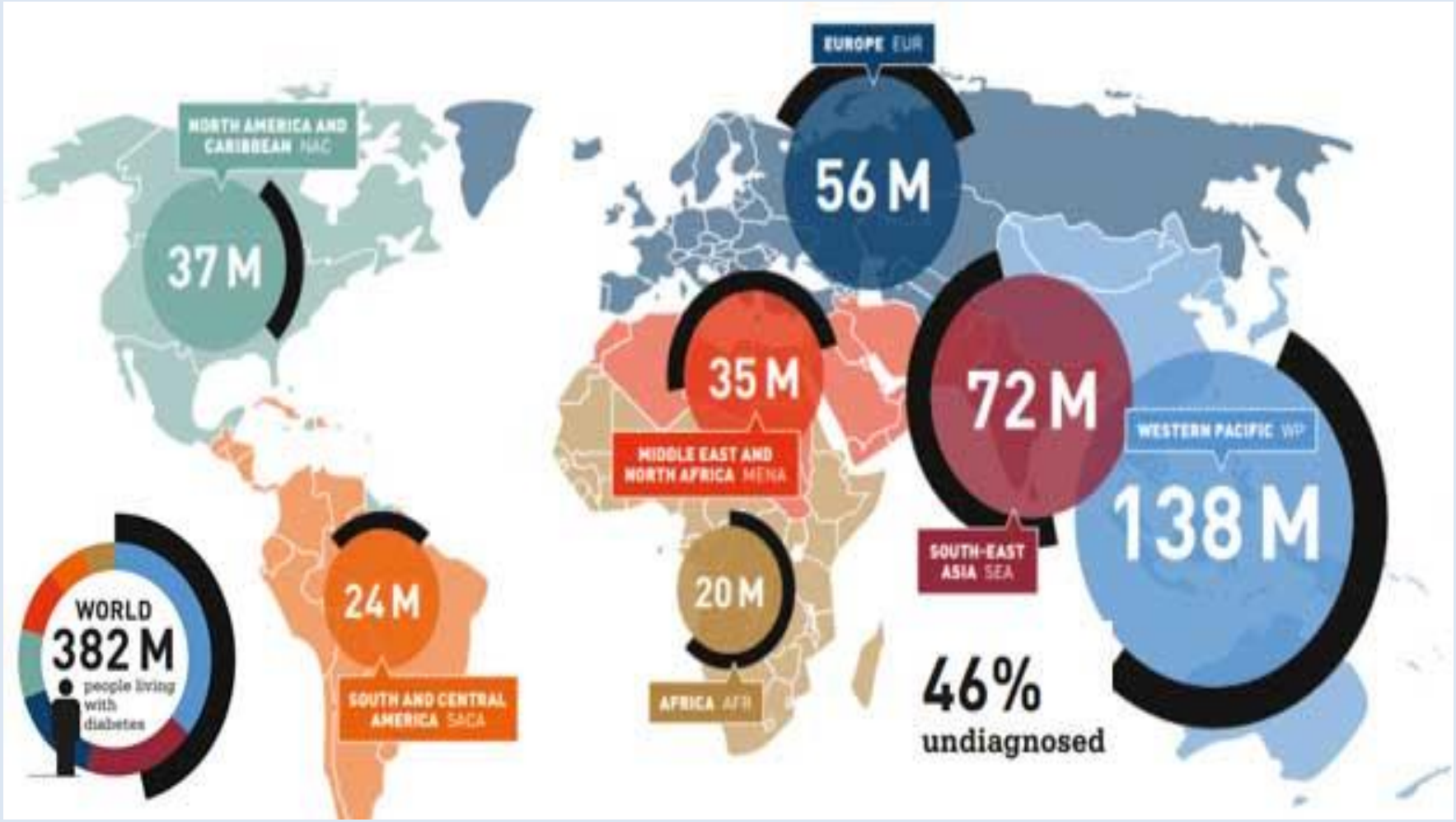
  ~ 80% occur in low- and middle-income countries

  Diabetes 4.0 million deaths/year

Key Diabetes Statistics

- **347 million people with diabetes**
- **552 million by 2030**
- **$376 billion cost to the world**

Global Burden of Diabetes



http://www.idf.org/worlddiabetesday/facts-figures

Number of people with diabetes (20-79 years), 2010 and 2030

COUNTRY/TERRITORY	2010 MILLIONS	COUNTRY/TERRITORY	2030 MILLIONS
1 India	50.8	1 India	87.0
2 China	43.2	2 China	62.6
3 United States of America	26.8	3 United States of America	36.0
4 Russian Federation	9.6	4 Pakistan	13.8
5 Brazil	7.6	5 Brazil	12.7
6 Germany	7.5	6 Indonesia	12.0
7 Pakistan	7.1	7 Mexico	11.9
8 Japan	7.1	8 Bangladesh	10.4
9 Indonesia	7.0	9 Russian Federation	10.3
10 Mexico	6.8	10 Egypt	8.6

*** CHINA now # 1** **92.4**

NYU NURSING

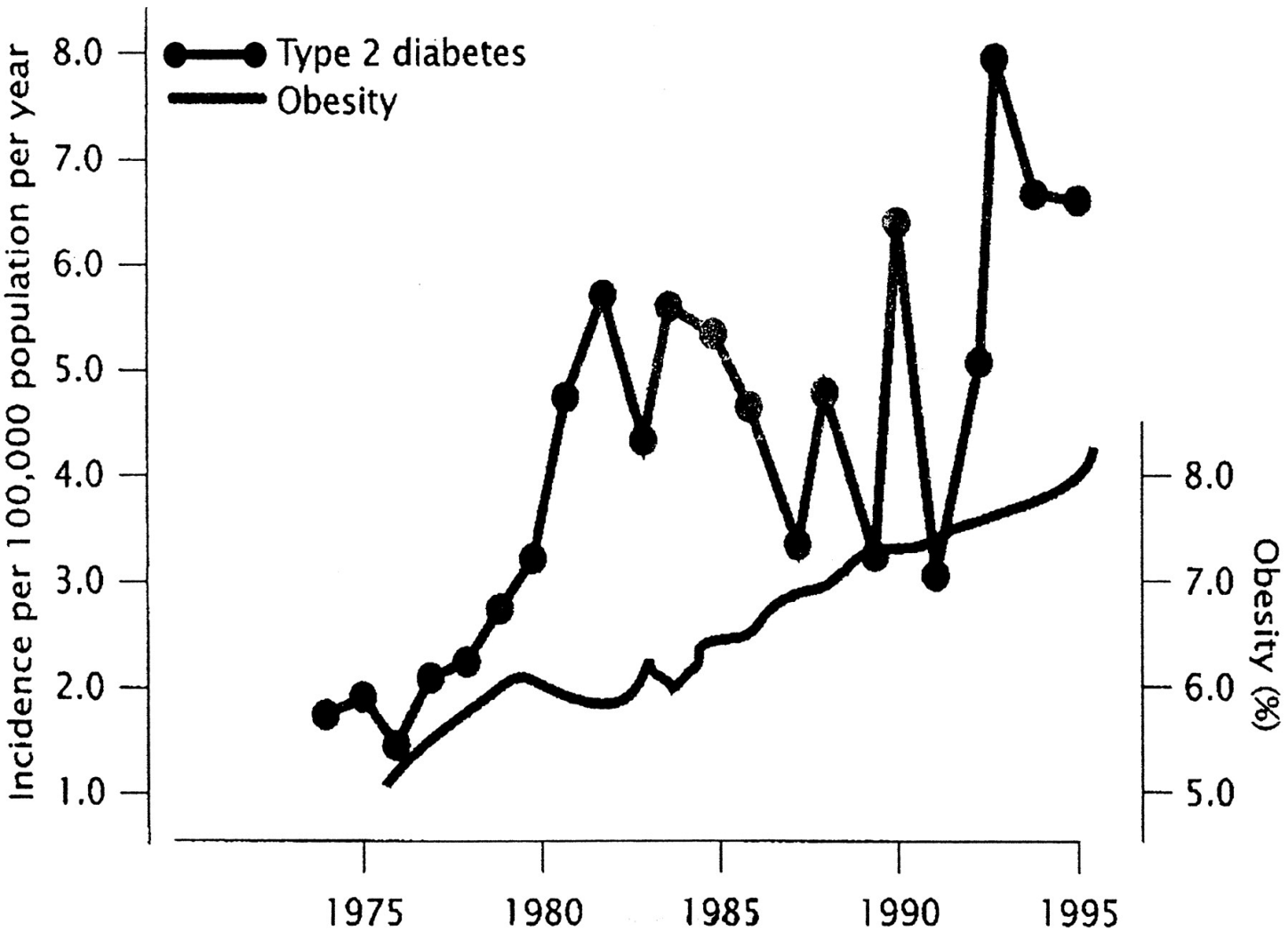
Emerging Diabetes Projections (persons 20-79 years)

	2010 millions	2030 millions	% increase
AFRICA	12.1	23.9	98
Middle East & North Africa	26.6	51.7	94
Southeast Asia	58.7	101.0	72

Characteristics of Type 2 Diabetes

- Obese or have a history of obesity
- Family history of disease
- Frequently goes undiagnosed for years
- Typically occurs in adulthood but increasing in youth

Annual incidence of type 2 diabetes and prevalence of obesity among Japanese school children



Kitagawa T, Owada M, Urakami T, Yamauchi K: *Clin Pediatriacs* 37:111-15, 1998.

Global Diabetes Complications

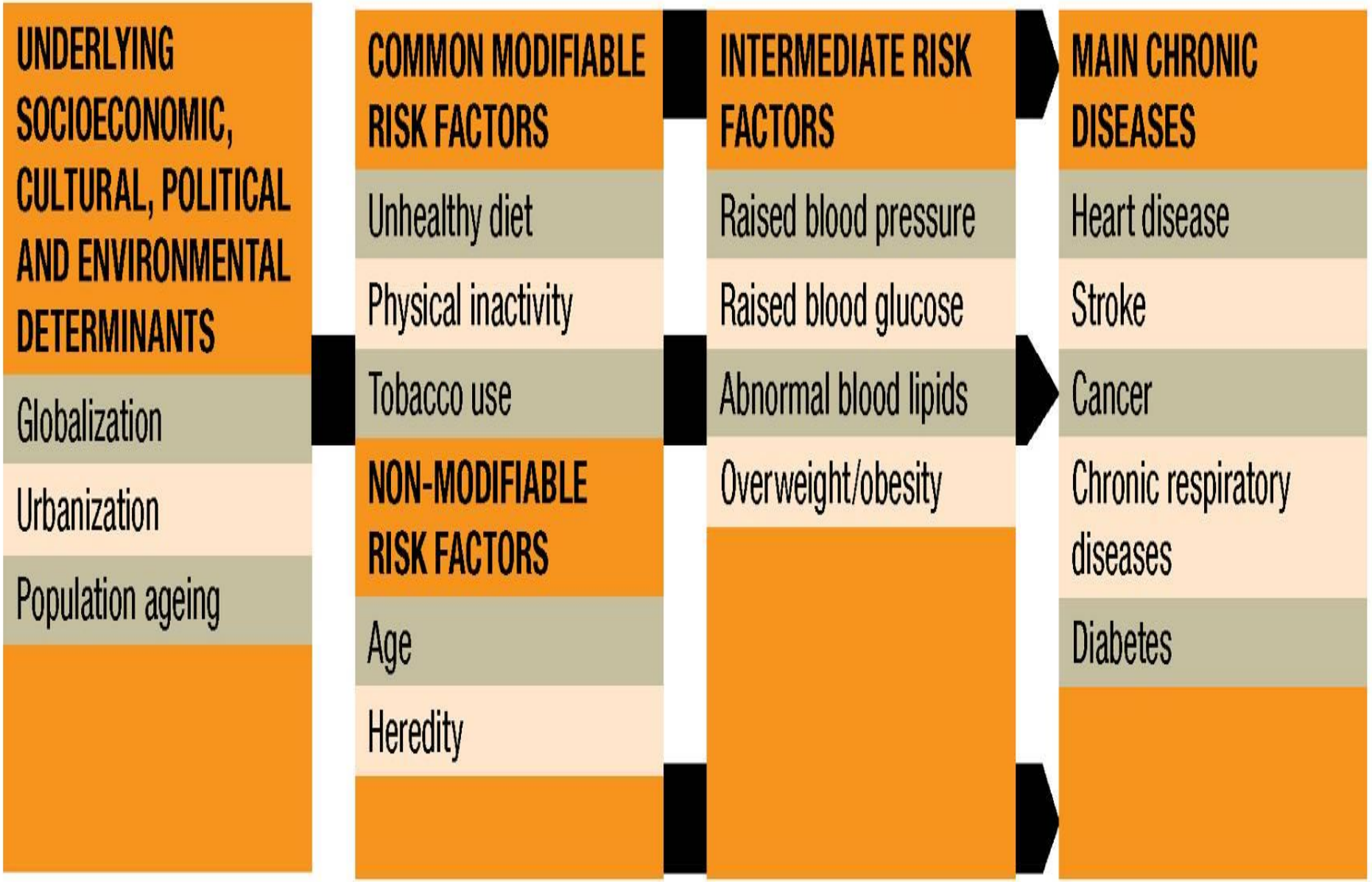
- **Three-to fourfold increase in End Stage Renal Disease (ESRD), diabetes the single leading cause of ESRD in most countries**

- **171 million with vision loss or impairment due to diabetes**

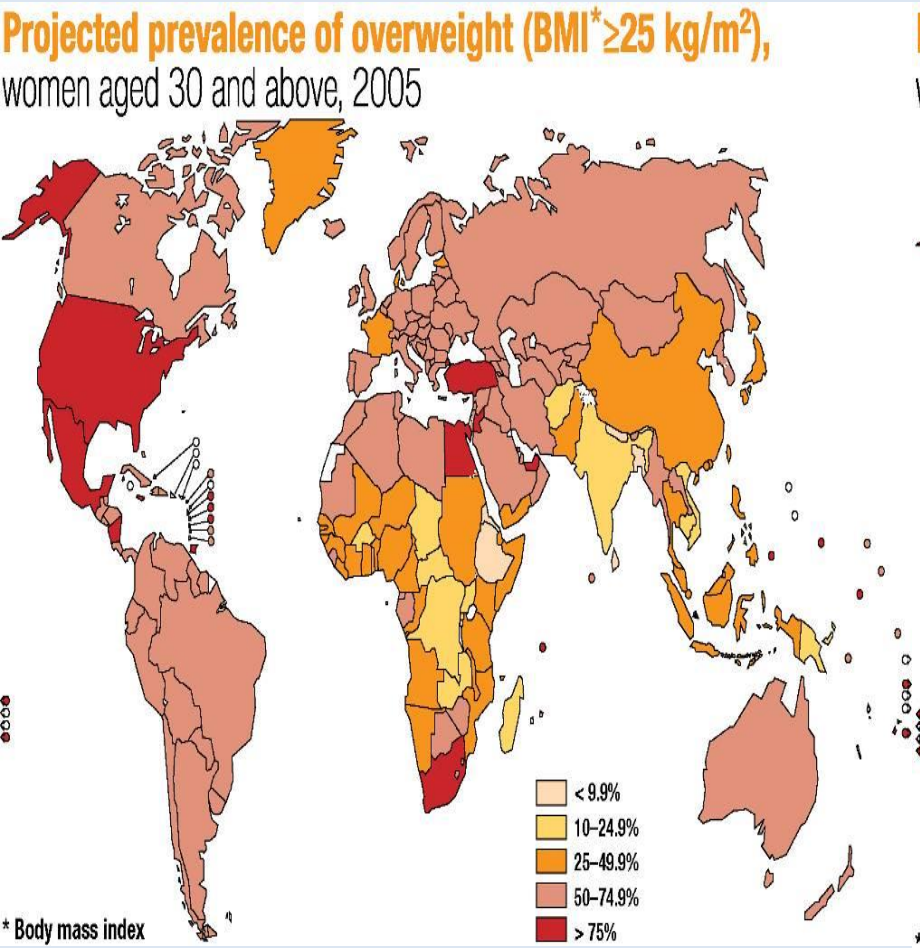
- **1 million limb amputations yearly—**

  one every 30 seconds; 85% preventable

Causes of chronic diseases



Overweight risks are increasing



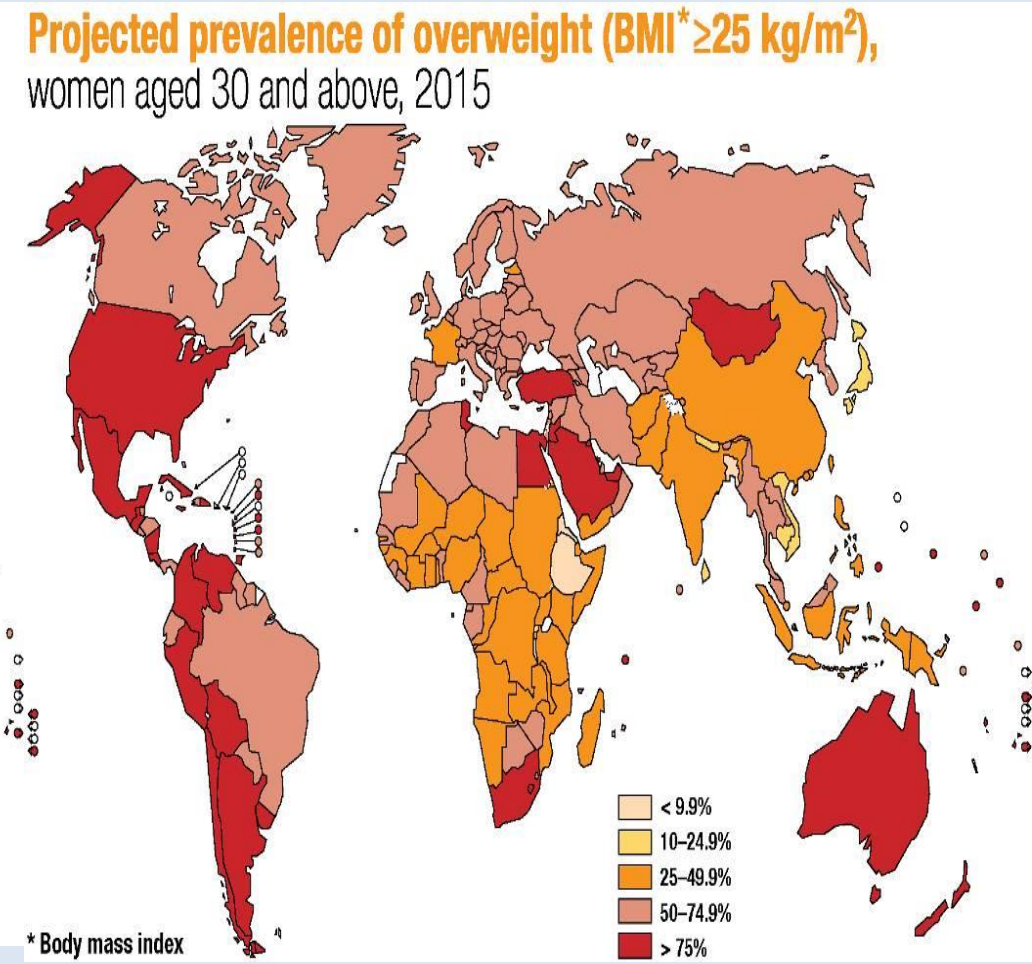
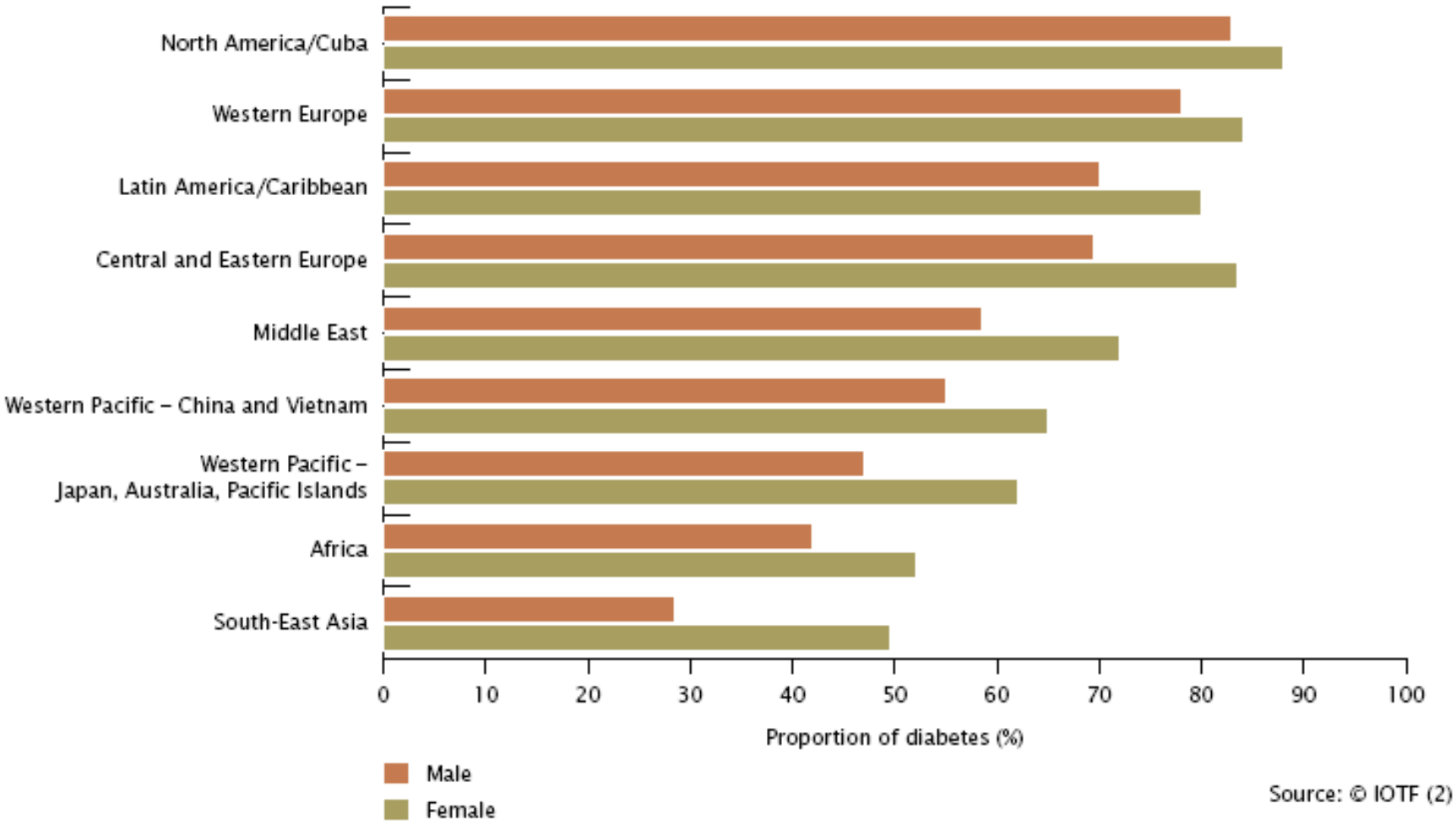


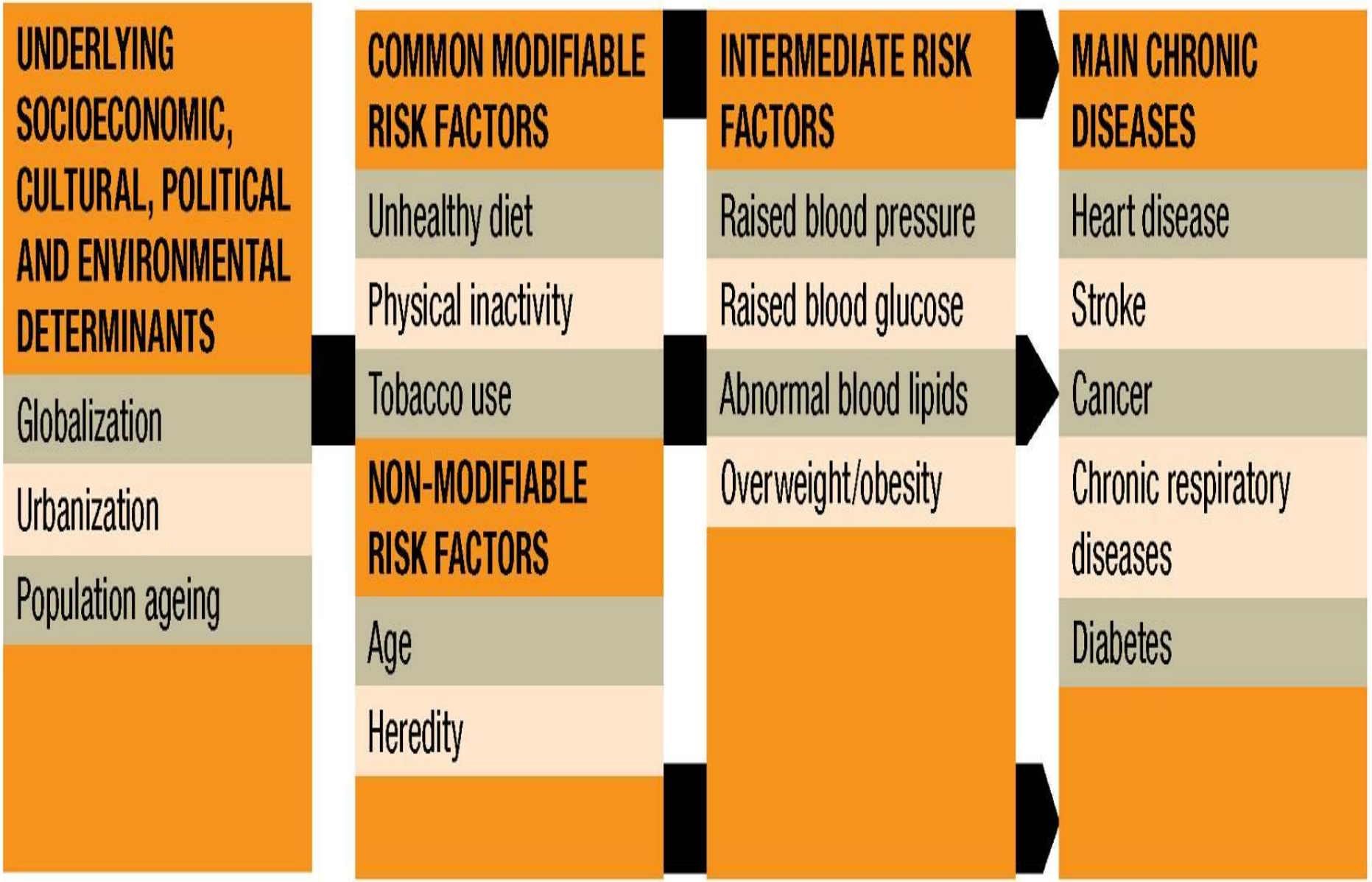
Figure 3.2

Proportion of diabetes (%) attributable to weight gain by region (30+ years)



IDF Diabetes Executive Summary

Causes of chronic diseases

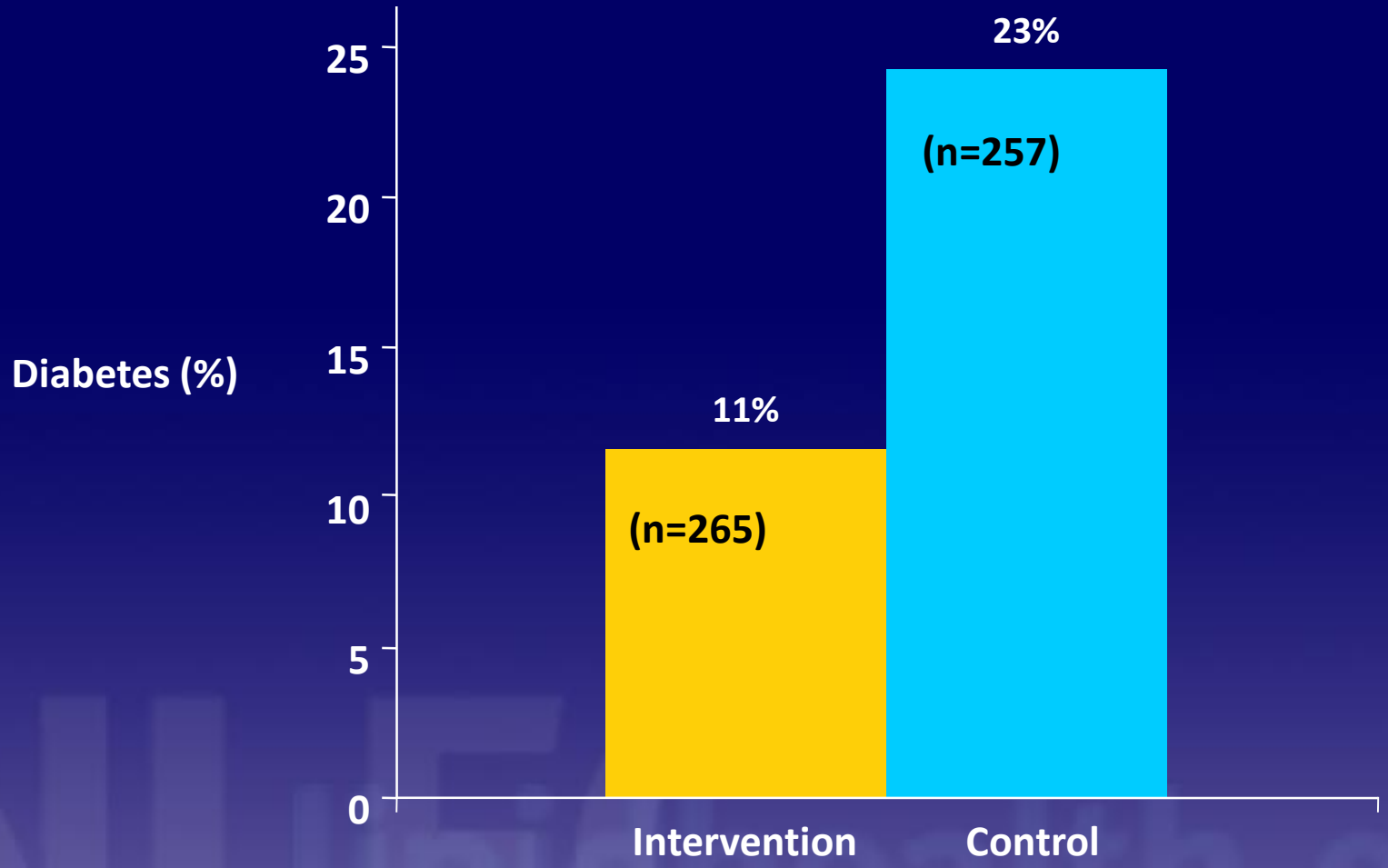


Finnish Diabetes Prevention Program

- **522 patients with Impaired Glucose Tolerance**
- **Age: 40-65 years**
- **Mean BMI: 31 kg/m^2**
- **Intervention: diet and exercise**
- **Mean duration of follow up: 3.2 years**

IGT = impaired glucose tolerance; BMI = body mass index.
Tuomilehto J et al. *N Engl J Med*. 2001;344:1343-1350.

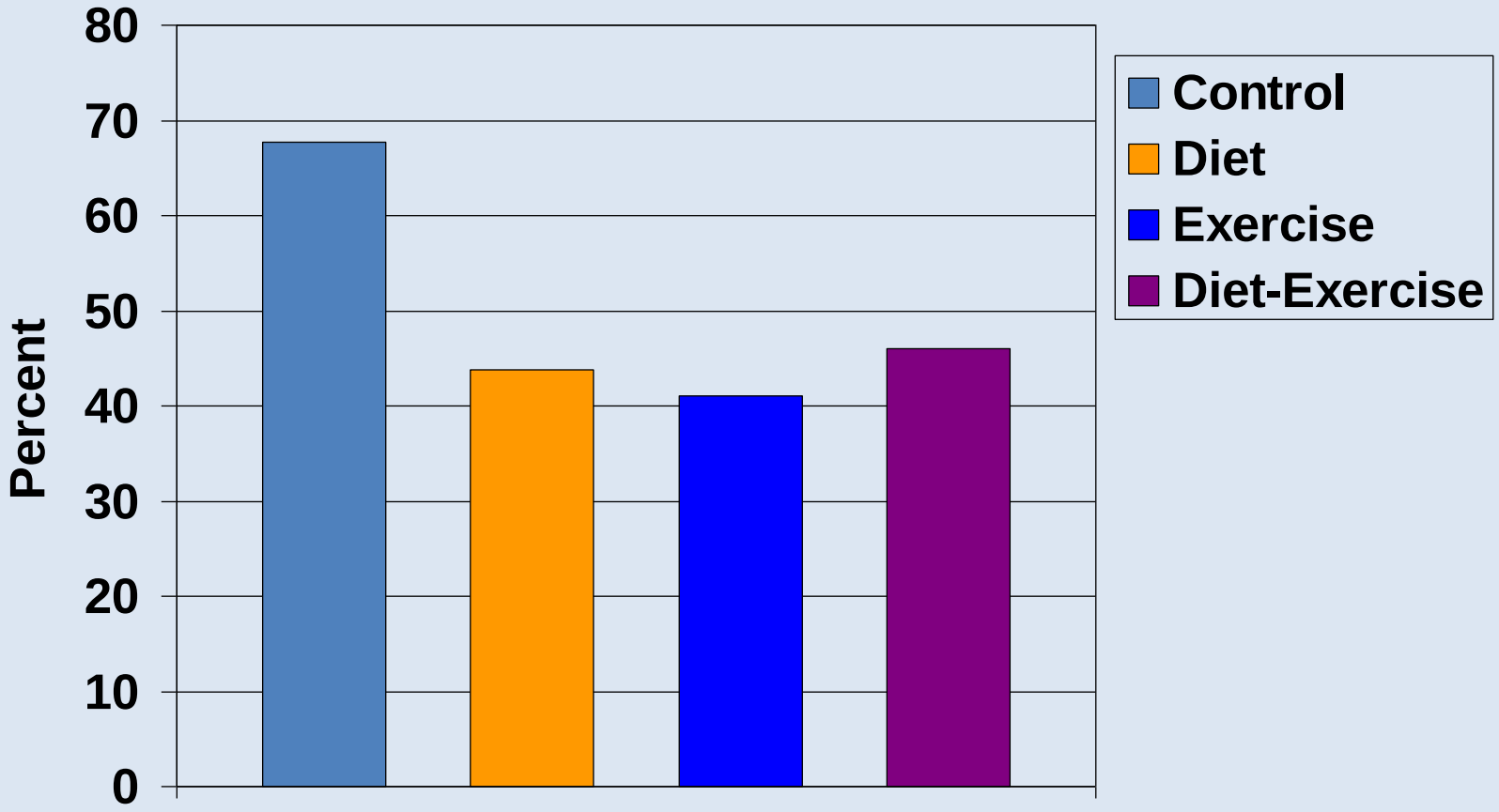
Finnish Diabetes Prevention Study: Reduction in Risk for Diabetes*



*$P<0.001$; 4-year results

Tuomilehto J et al. *N Engl J Med*. 2001;344:1343-1350.

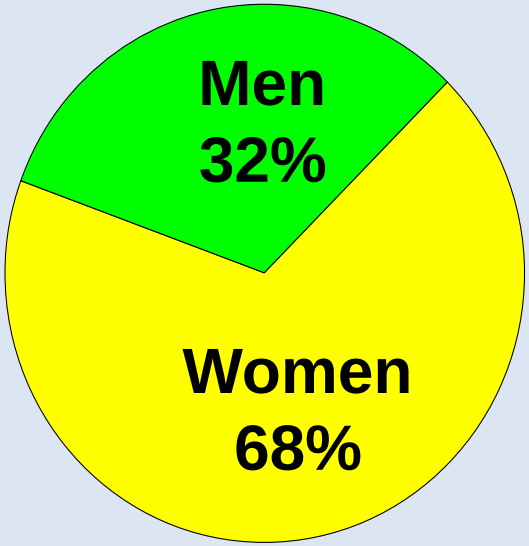
Da Qing IGT and Diabetes Study (n=577)



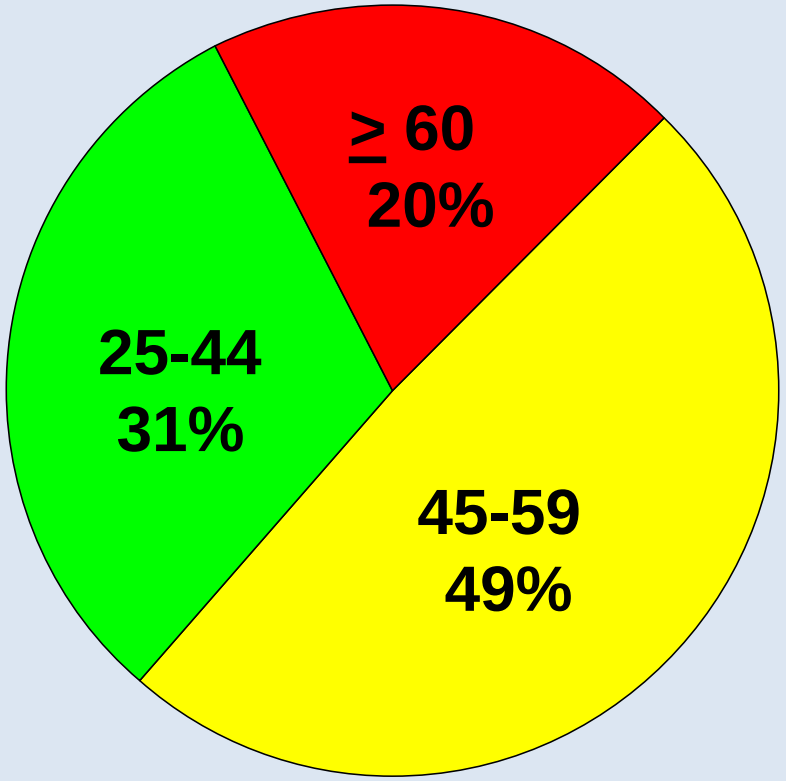
Pan et al., *Diabetes Care* 1997; 20:537-44

U.S. Diabetes Prevention Program (DPP) Population

Gender Distribution

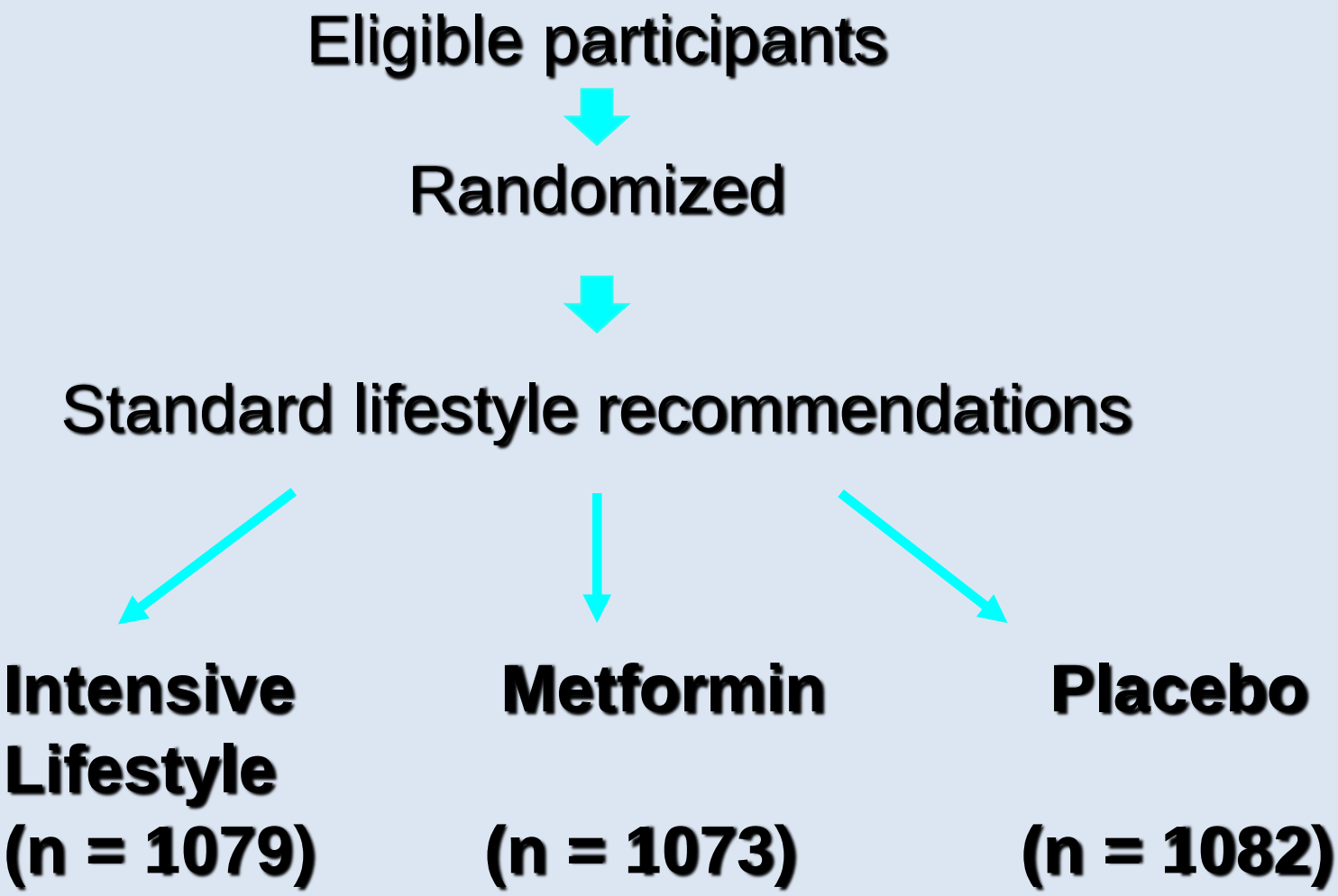


Age Distribution

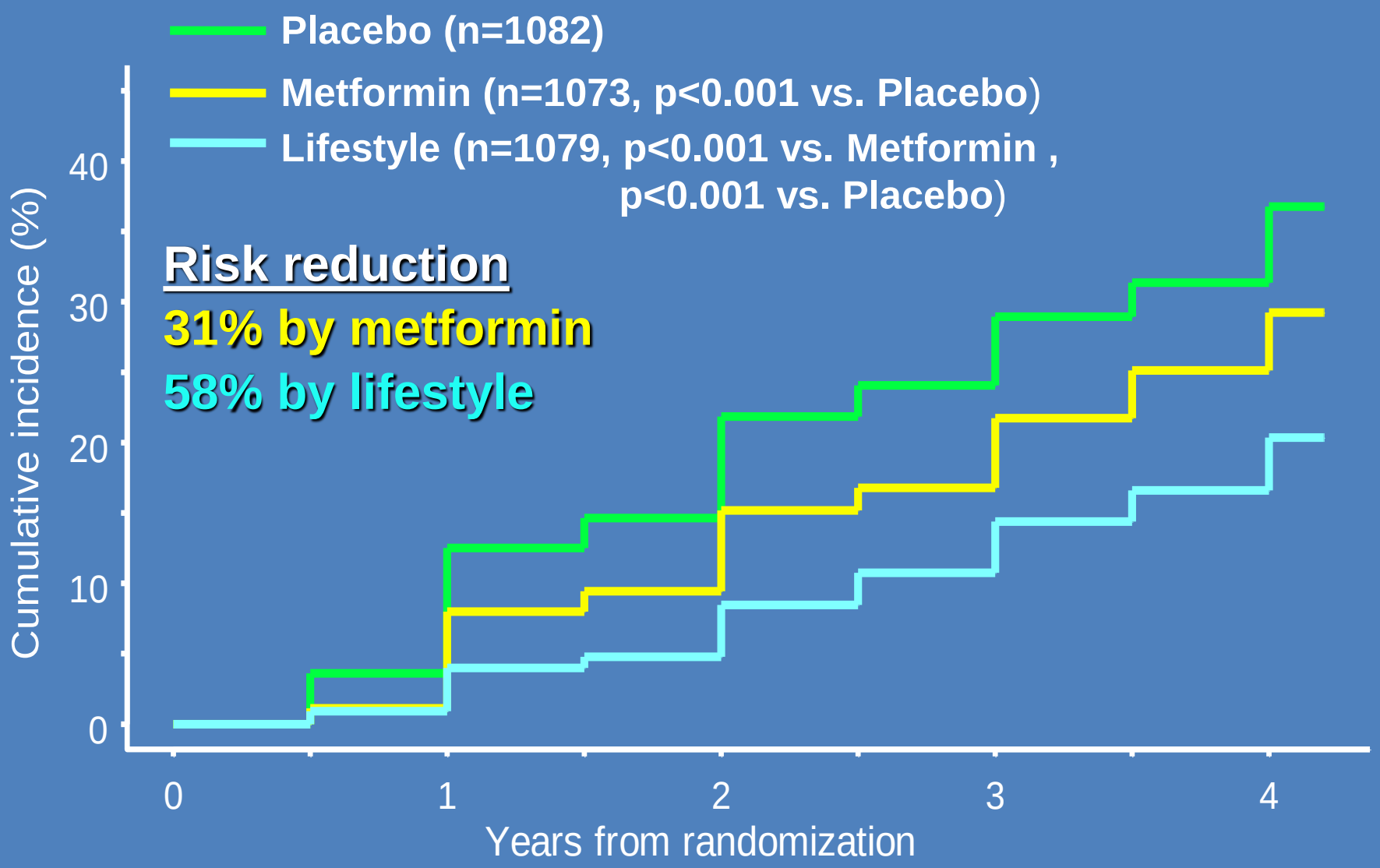


The DPP Research Group, *Diabetes Care* 23:1619-29, 2000

Study Interventions



Incidence of Diabetes



The DPP Research Group, *NEJM 346*:393-403, 2002

U.S. Diabetes Statistics

- 25.8 million — 8.3% of the U.S. population
  1 of every 10 adults
- 7 million undiagnosed

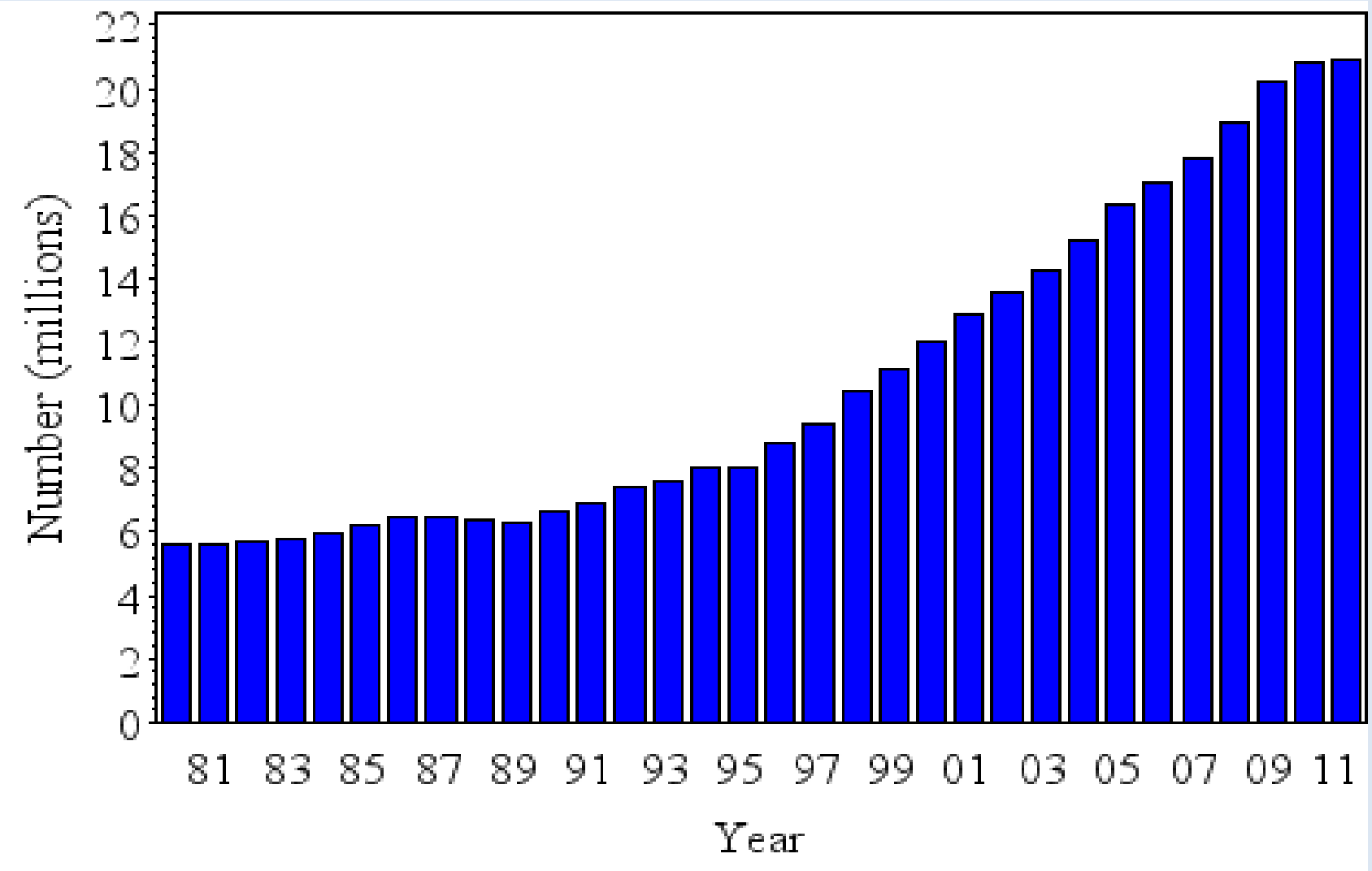
- 2011 diabetes in 65–74yr. age group 13 X greater than 45yr. age group (21.8% vs. 1.6%)

- 215,000 youth < 20 yrs. has diabetes

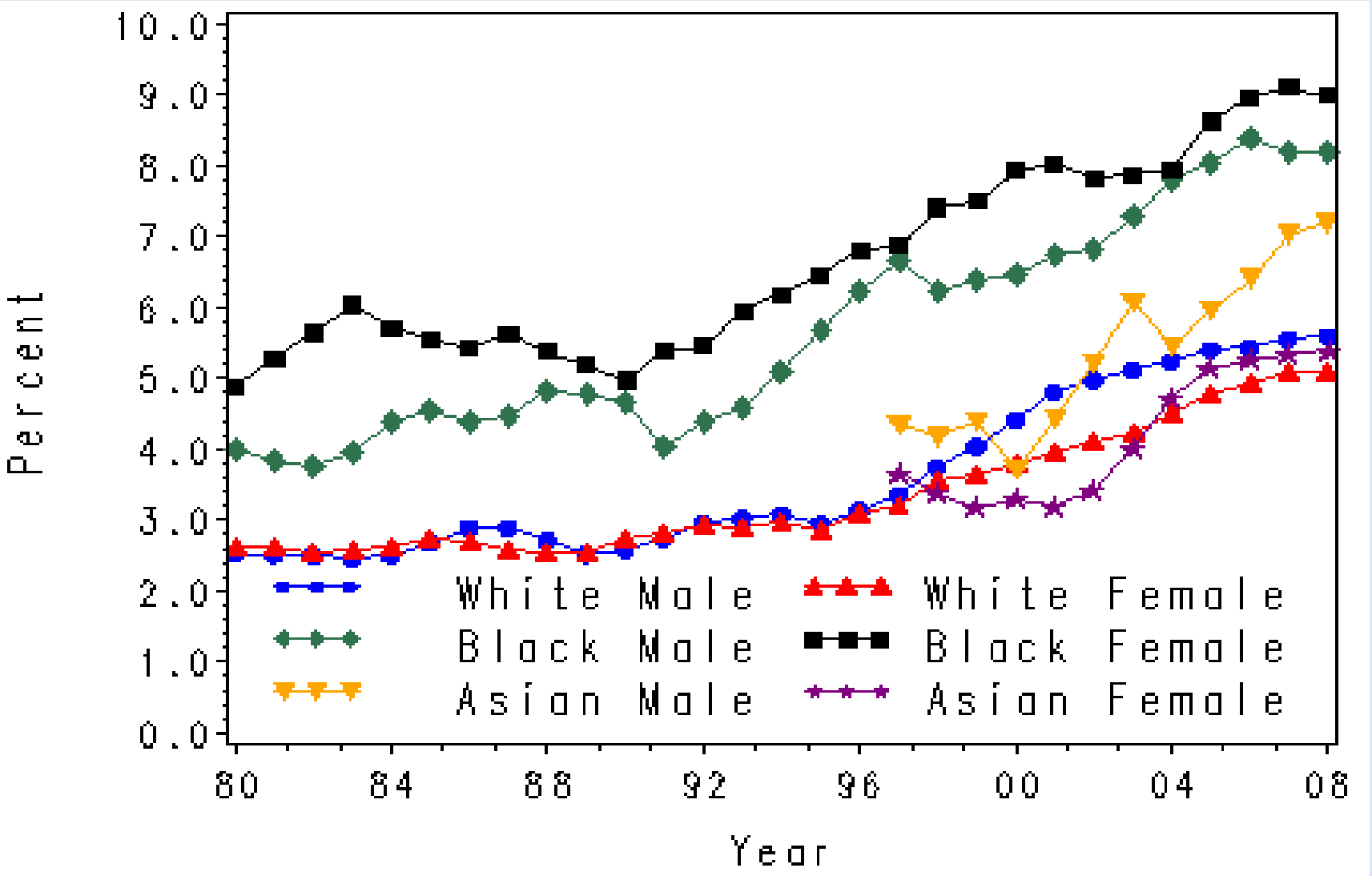
- ~ 79 million adults ≥ 20 yrs. pre-diabetes

www.cdc.gov/diabetes/statistics

Number (in Millions) of Civilian, Noninstitutionalized Persons with Diagnosed Diabetes, United States, 1980–2011



Age-Adjusted Percentage of Population with Diagnosed Diabetes, by Race and Sex, United States, 1980–2008



www.cdc.gov/diabetes/statistics/prev/national/figraceethsex.htm

- Of 28 million with diabetes, > 50% are women
- Prevalence doubles for women 40-50 years of age
- Black women compared to White women have

  3X higher incidence rate

  2X higher prevalence rate

  4X higher rate end-stage renal disease

  3X higher rate of blindness

  2X higher rate amputations

- 40% greater mortality than Black men, White men and women with diabetes

Physiological & Psychosocial Characteristics of Type 2 D in Black American Women (n=22)

	M	SD	Range
Age (yr.)	48.1	8.9	26-62
Wt. (lb.)	200	38	139-254
BMI	34	5.4	22-42
HbA1c (%)	12.8	5.7	7.1-18.5 (norm <7.0)
Education (yr.)	12.9	0.9	12-15
Primary Care visits (M)	3/year		
Diabetes Meds	68%		
Employed FT/PT	69%		
Majority married	74%		

Focus Groups of Health Beliefs & Practices of Black Women with T2D

Need for diabetes education

Implications of cultural traditions

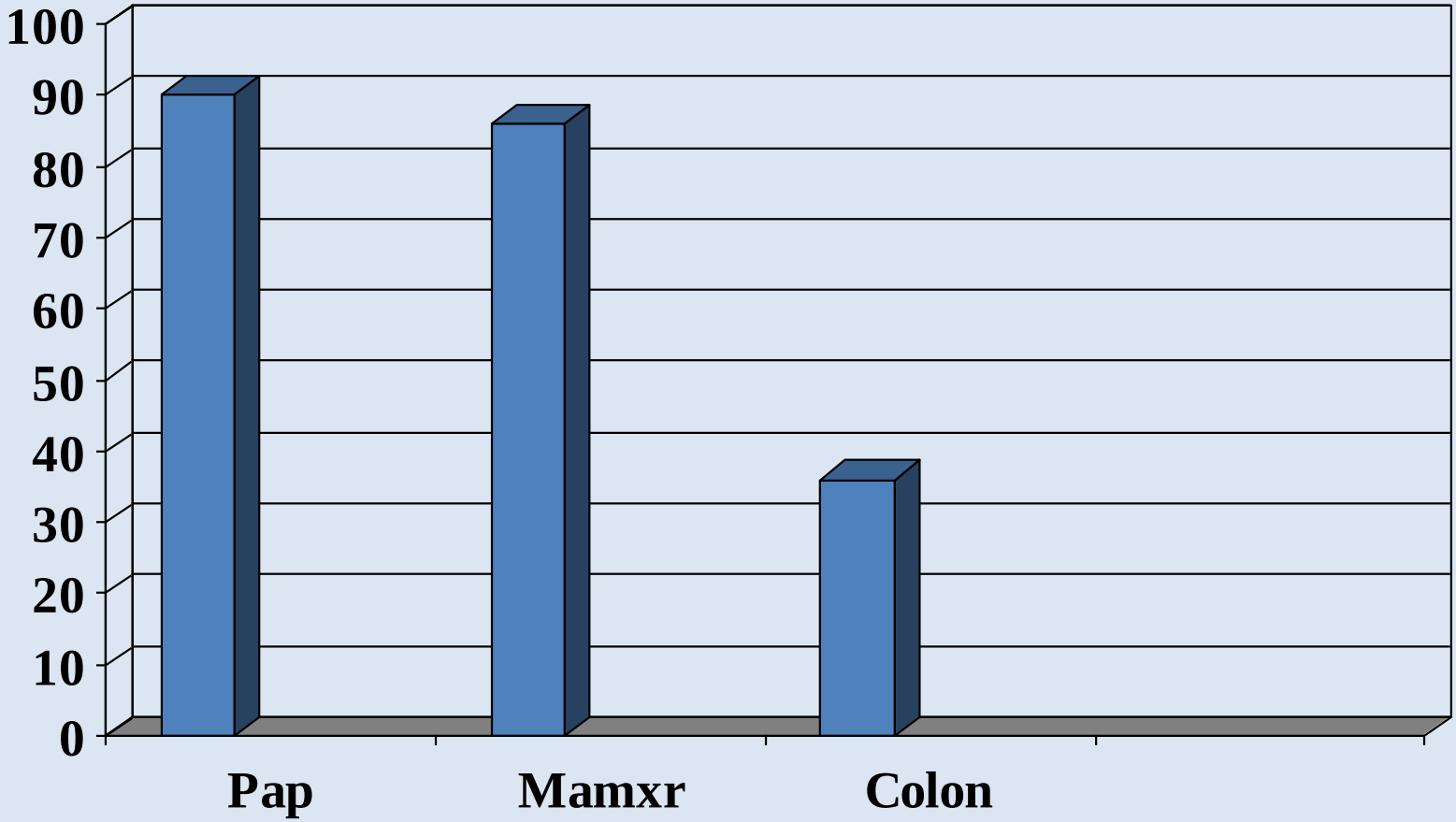
Importance of culturally appropriate education materials

Need for care provider rapport

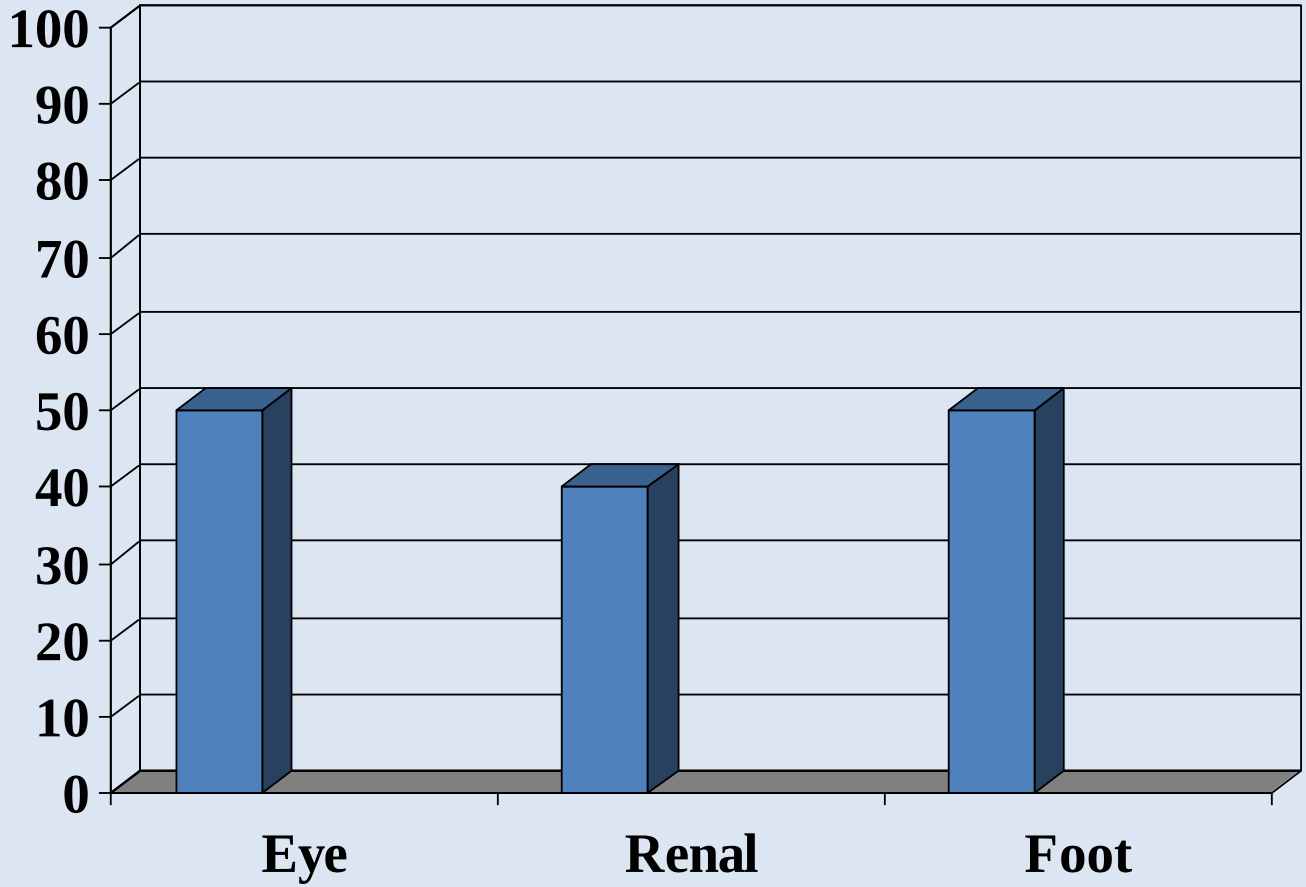
Importance of family support

Maillet, D'Eramo Melkus, & Spollett (1996). Using focus groups to characterize beliefs and practices of African American women with NIDDM. *Diabetes Educator*, 22(1), 39-45

Primary Care Cancer Screening (%)



Diabetes Complications Screening (%)



Melkus, Maillet, Novak, Womack, & Hatch-Clein, (2002). Primary care cancer screening and diabetes complications screening for Black women with Type 2 diabetes. *Jnl American Academy of Nurse Practitioners*,14(1), 43-48.

Feasibility test of a culturally relevant intervention of group self-management education (6wks) and NP care (monthly) on metabolic control and psychosocial outcomes in Black women with T2D using one group pre-test, posttest design.

Donaghue Foundation Grant
Novo-Nordisk Foundation

Yale NIH GCRC support: Teach Clinical & Research Skills to Masters & Doctoral Students in GCRC

Outcomes/Measures

Anthropometric: HT, WT, BMI
Waist, Hip Circumference

Metabolic: Fasting Blood Glucose (FBG)
HbA1c
Lipid Levels
Insulin Levels

Psychosocial Measures:

Diabetes Self-Efficacy (Skelley)

Problem Areas in Diabetes* (P.A.I.D.)- (Welch)
*** diabetes-related emotional distress (0-100 scale)**

Sample Demographics (N=25)

Age (M)	52.3 years	(SD 6.1)
Education	HS	(100%)
	Tech./College	(55%)
Employed	FT/PT	(69%)
PC visits (M)	2.5 visits/year	

Baseline Physiologic Data

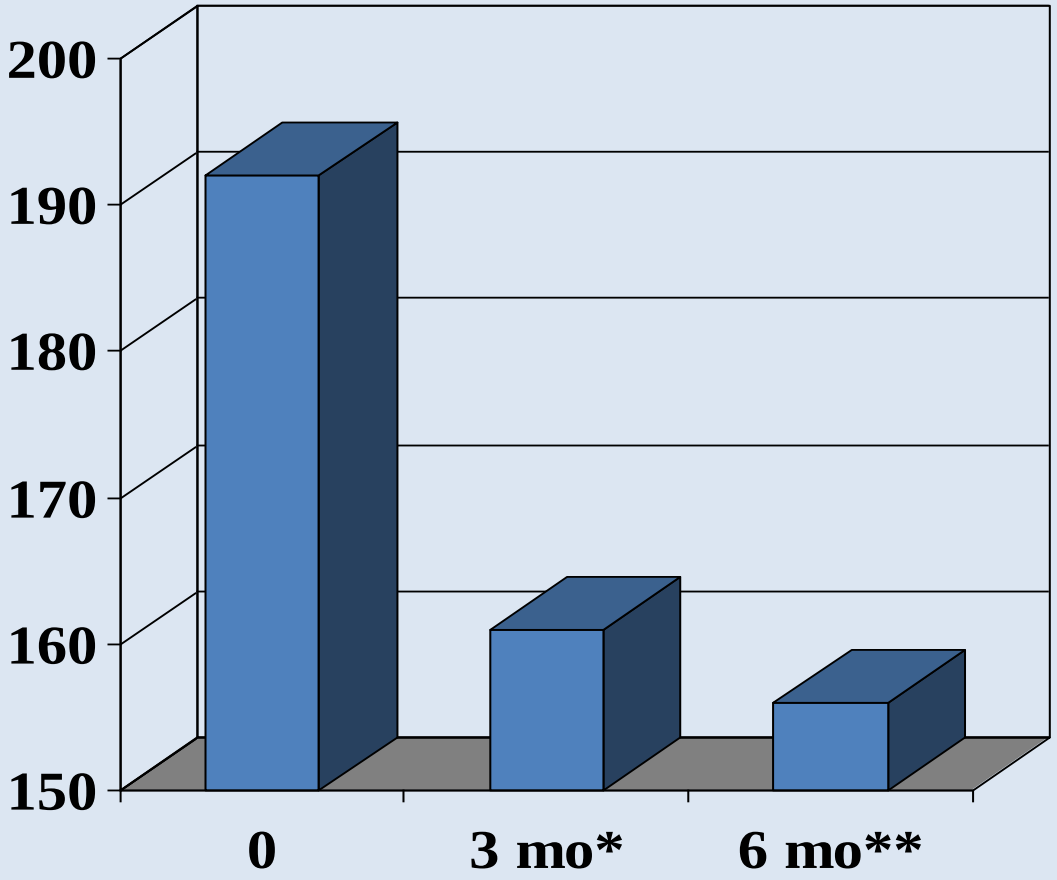
	M	SD	
WT (lb.)	191.5	(50.0)	
BMI $(m/kg)^2$	32.0	(7.0)	
T.Chol. (mg/dl)	191.9	(31.0)	
HbA1c (%)	10.3	(2.3)	(norm <7.0)
FBG (mg/dl)	192.0	(80.6)	(norm <126)

Diabetes Self-Efficacy 81.5/100

Problem Areas in Diabetes (PAID)* 78/100

*diabetes-related emotional distress

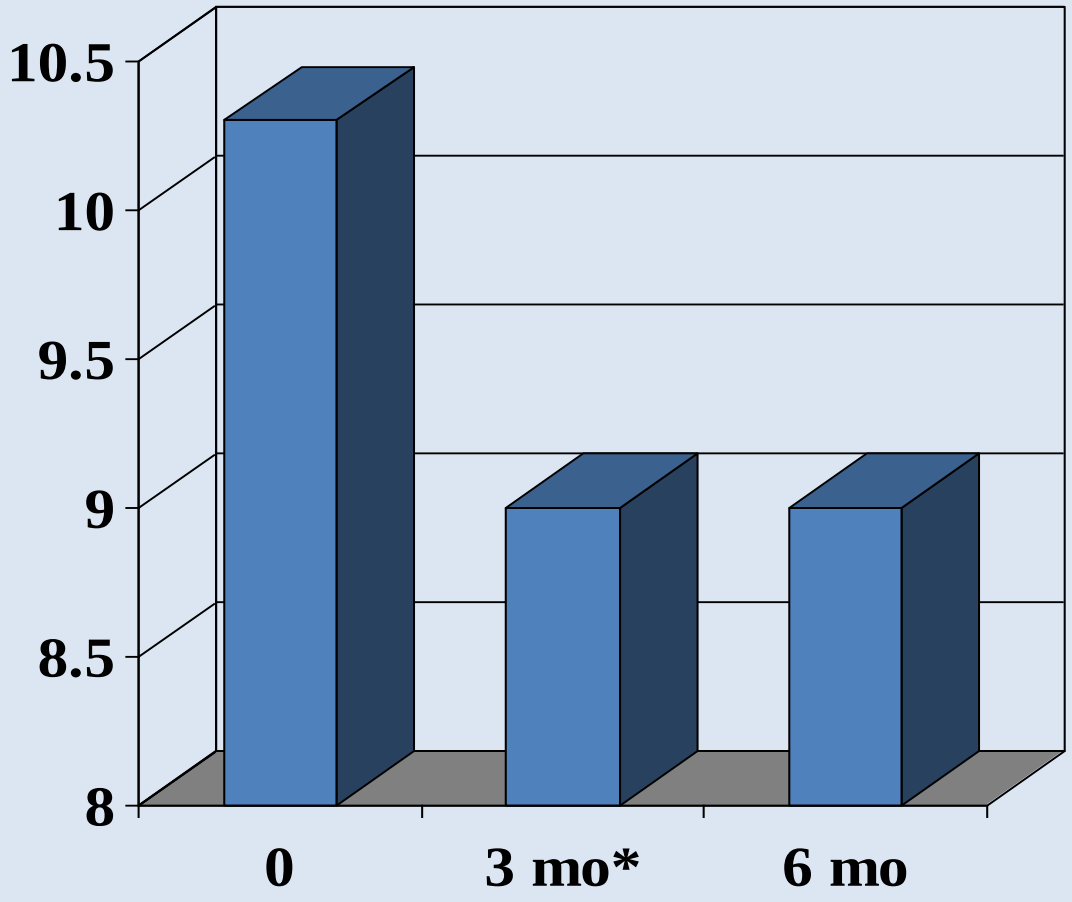
Fasting Blood Glucose



*t= -2.08, p=0.05

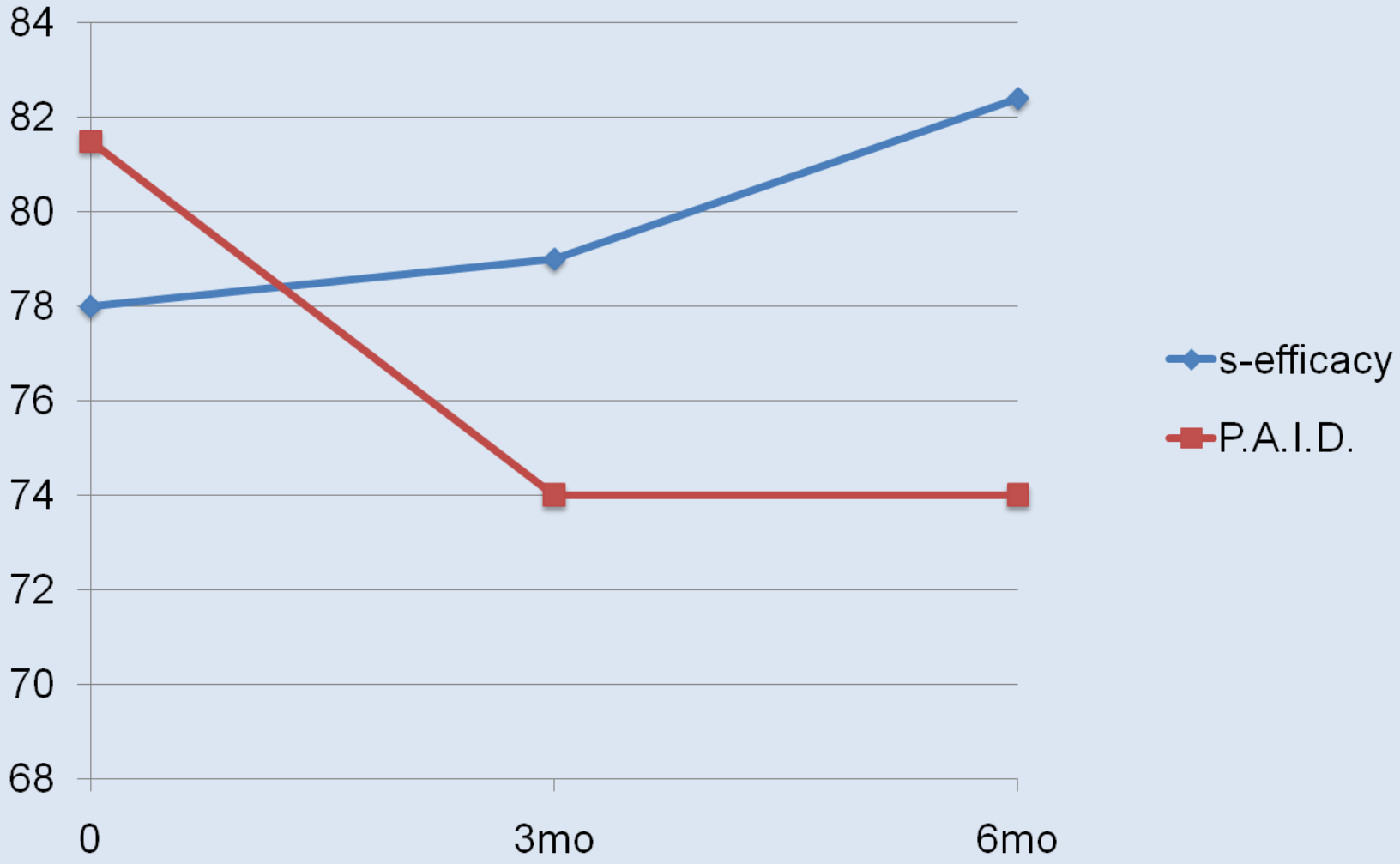
**t= -2.48,p=0.02

HbA1c



* *t=3.05, p=0.008*

Psychosocial Outcomes



p=.06

Melkus, Spollett, Jefferson, Chyun, Tuohy, Robinson, & Kaisen (2004). *Applied Nursing Research*, 17(1):10-20.

Pilot Test Efficacy of Intervention

Subjects (N=56) Randomly Assigned to:

Group 1

Culturally relevant cognitive-behavioral diabetes education, 6, 2 hour sessions

Monthly NP care visits

Group 2

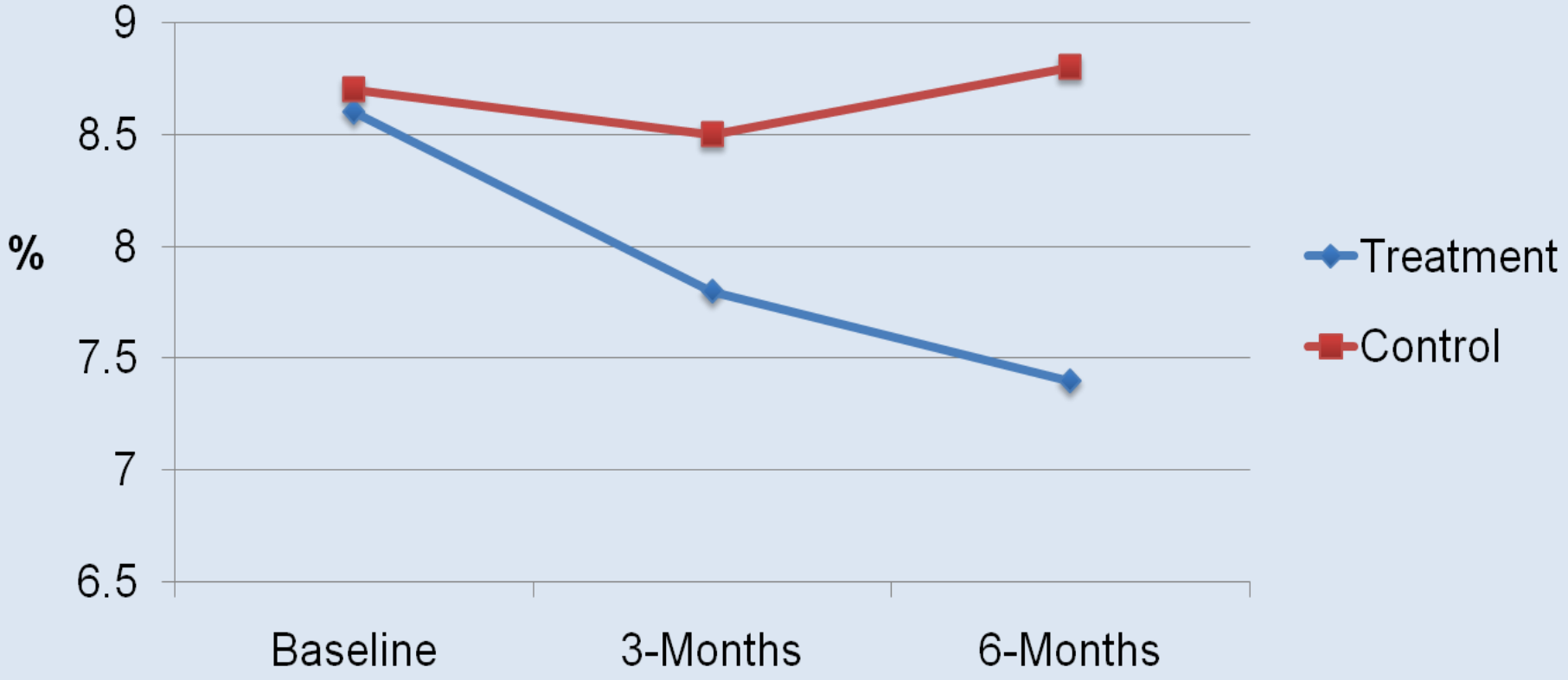
Traditional diabetes education, 5, 2 hour sessions

Monthly NP care visits

MSN, DNS students interventionists, NP, RN educators-build capacity

RCT Culturally Sensitive Intervention compared to Conventional DM Education

Mean HbA1c Levels



P=.01, F=6.154

INTERVENTION TESTED WITH:

Latino adults in a neighborhood health center

Tomando Control: A Culturally Appropriate Diabetes Education Program for Spanish Speaking Individuals

Mauldon, M., Melkus, G.D. & Cagganello, M. (2006). *Tomando Control. Diabetes Educator,* 32:751-760.

White older adults with T2D and CHD

Multidisciplinary Intervention for Asymptomatic Myocardial Ischemia (MIAMI)

Chyun, D., Melkus, G., Coviello, J., Talley, S., Langerman, S., Insabella, G., Young,L. (2007).Cardiac risk factor reduction in older adults with type 2 diabetes. *Diabetes*, 56, Suppl.1, 2521.

Effectiveness Randomized Clinical Trial

INTERVENTIONS

Experimental:

Culturally relevant group diabetes education 6 weeks,
added Coping Skills Training 5 sessions with Health Psychologist

Control:

Traditional group diabetes education sessions,
added 5 weeks of open question and answer sessions at community hospital by CDE

Both Groups:

DM care visits in primary care, 1st month then quarterly for 12 months
Based on American Diabetes Association standards
Evaluated for 24 months

Interventionist Observations; Attendance Maintained

NIH NINR Funding RO1 NR05341-01A1

SUBJECTS & SETTING

Black Women from Greater New Haven Area who were:

- Patients of community primary care centers
- 21- 65 years of age
- BMI < 37, Non-Insulin Requiring
- Able to speak and read English
- No serious psychiatric or medical illness (Cancer, AIDS)
- No serious DM complication (visual, amputation, renal)

Conference Center at School: group sessions

Primary Care Center: individual visits

Incentives of paid travel/parking, childcare, education materials, BG meter

MEASURES

Physiologic: Baseline Screen-Creatinine, TSH, C-Peptide

Glycemic control - HbA1c (≤ 7.0%)

CV Risk- LDL-C, HDL-C, T.Chol, Blood Pressure

Wt/Ht=BMI, Waist Circumference

Psychosocial: Diabetes Knowledge - 25 item multiple choice* (Melkus)

Problem Areas in Diabetes

Diabetes Care Profile-Social Support Subscale 2-item,

Medical Outcomes Study – SF-36 Quality of Life

Modified Health Care Climate Questionnaire (Pt. perception of provider supportiveness for diet and exercise).

Baseline, 3 , 6 , 9 , 12, and 24

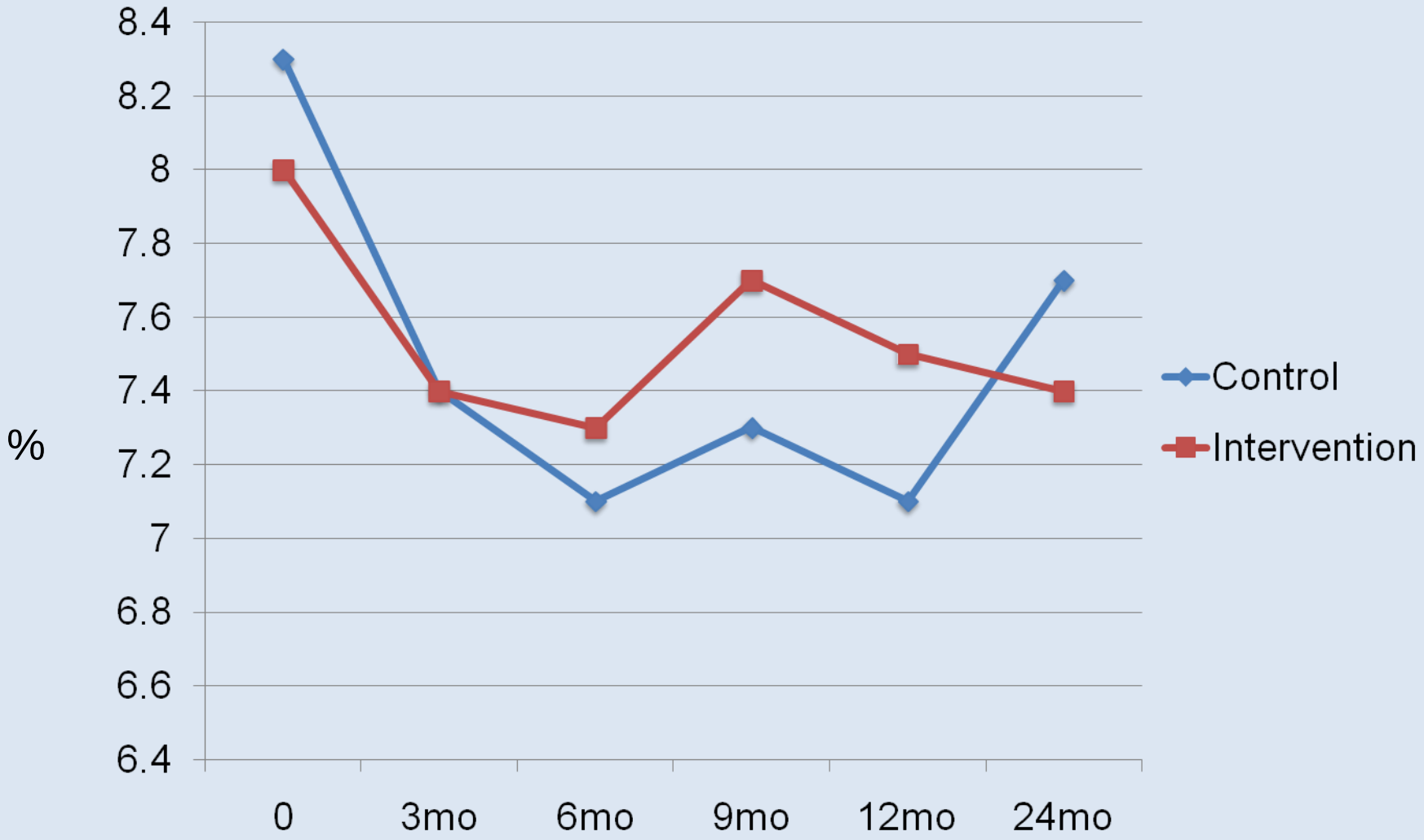
BASELINE CHARACTERISTICS N=109

	Control (n=57)	Experimental (n=52)	p
Age	**45±10**	**47±9**	**.33**
Living Alone	**38(68%)**	**34(65%)**	**.79**
Working	**34 (77%)**	**27(59%)**	**.06**
≥ H.S. Education	**28(51%)**	**21(41%)**	**.33**
Annual Income <$15K	**27(49%)**	**22(47%)**	**.84**
Current smoker	**14(25%)**	**13(25%)**	**.96**
Diabetes Related			
HbA1c	**8.3±2.2**	**8.0±2.1**	**.49**
LDL-c	**112±35**	**114±34**	**.68**
HDL-c	**50±14**	**49±11**	**.47**
SBP	**134±22**	**132±18**	**.62**
DBP	**76±11**	**77±11**	**.58**

PSYCHOSOCIAL BASELINE CHARACTERISTICS

	Control	Experimental	p
Emotional Distress	86±30	82±31	.46
Quality of Life:			
Role Physical	63±41	57±45	.92
Bodily Pain	57±29	56±26	.92
Physical Function	67±29	66±28	.99
General Health	58±20	56±21	.55
Vitality	50±21	49±21	.90
Social Function	66±28	72±27	.27
Role Emotional	60±43	61±43	.87
Mental Health	64±23	65±22	.73
Diabetes Knowledge	79±13	82±13	.92
Provider Support-Diet	5.0±1.8	5.0±1.8	.92
Provider Support-Exer.	4.8±2.0	5.0±1.9	.72
Diabetes Support	3.6±1.4	3.3±1.4	.27
Somatic Anxiety	7.0± 2.8	8.3±3.6	.05

HbA1c



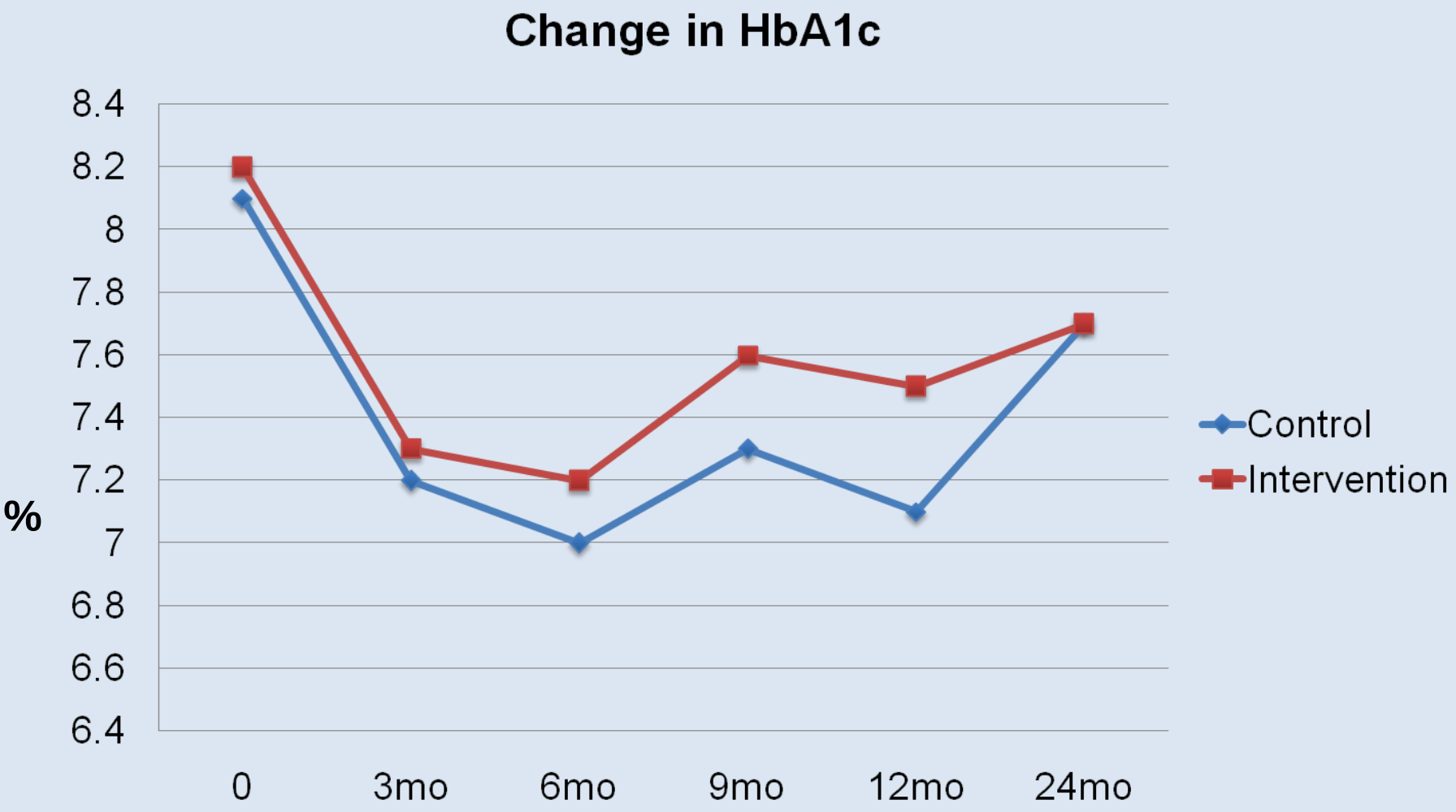
Time p < .0001

BASELINE CHARACTERISTICS

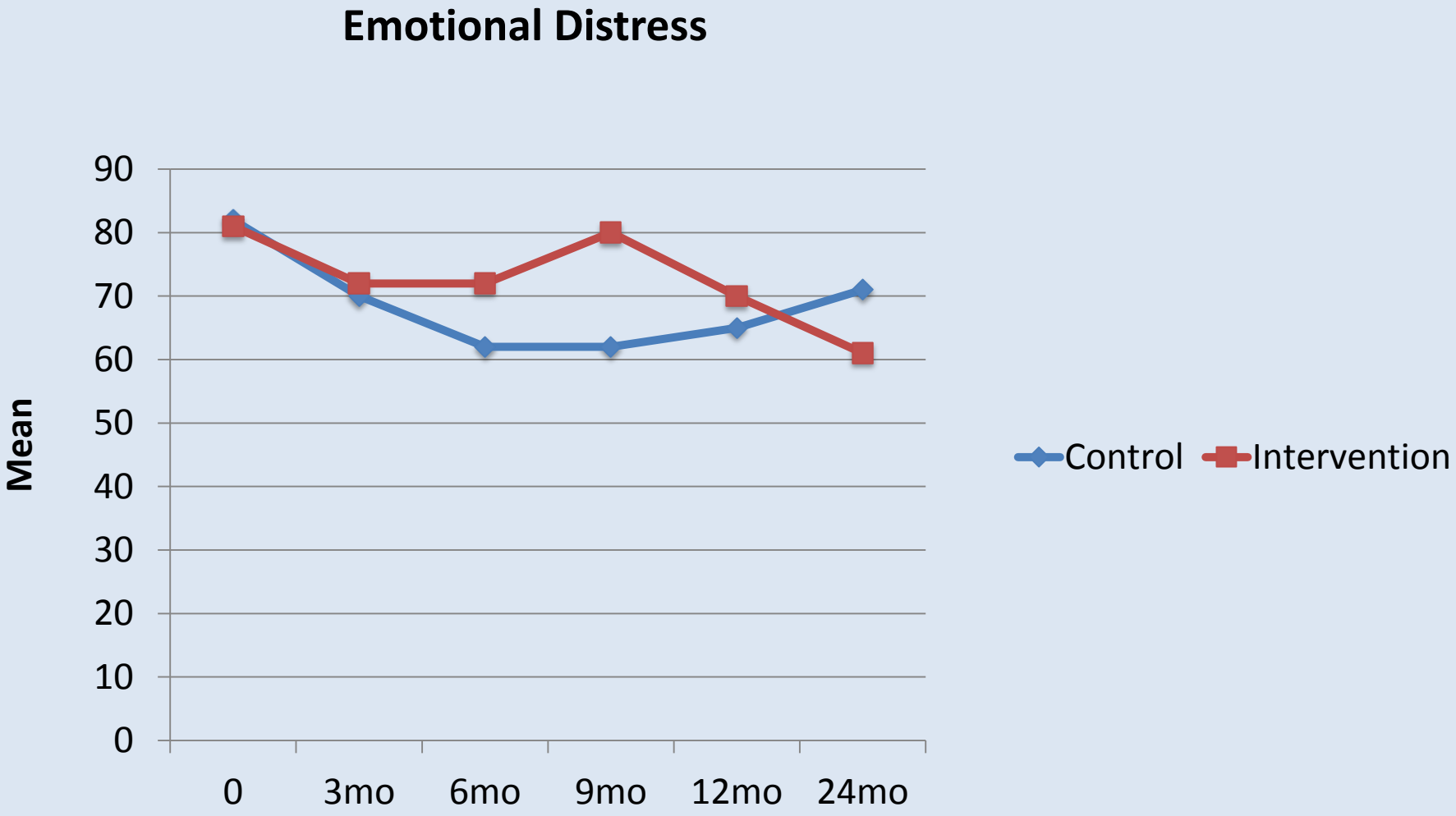
	Non-completers (n=32)	Completers (n=77)	p
Age	**47±10**	**49±10**	**.46**
Living Alone	**25 (78%)**	**47(62%)**	**.10**
Working	**14 (48%)**	**47(77%)**	**.006**
≥ H.S. Education	**8 (26%)**	**41(54%)**	**.008**
Annual Income <$15K	**22 (69%)**	**27(39%)**	**.005**
Current smoker	**7(22%)**	**20(26%)**	**.65**
Diabetes Related			
HbA1c	**8.3±2.4**	**8.1±2.1**	**.67**
LDL-c	**117±36**	**111±33**	**.48**
HDL-c	**46±8**	**51±14**	**.03**
SBP	**135±25**	**133±18**	**.63**
DBP	**77±13**	**76±10**	**.44**

PSYCHOSOCIAL BASELINE CHARACTERISTICS

	Non-Completers	Completers	p
DM Self-Efficacy	76±11	76±11	.84
Emotional Distress	87±30	83±31	.54
Role Physical	46±43	66±42	.03
Bodily Pain	44±22	62±26	.002
Physical Function	58±29	70±28	.07
General Health	48±17	60±21	.007
Vitality	39±21	54±20	.0005
Social Function	57±30	74±26	.006
Role Emotional	50±45	65±41	.11
Mental Health	59±23	67±23	.14
Diabetes Knowledge	80±12	80±14	.95
Provider Support-Diet	4.8±2.0	5.1±1.8	.36
Provider Support-Exer.	4.7±2.1	5.0±1.9	.45
Diabetes Support	3.2±1.3	3.5±1.4	.23
Somatic Anxiety	8.8± 3.2	7.2±3.2	.03


Change in HbA1c
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
%
0
3mo
6mo
9mo
12mo
24mo
Control
Intervention

Time $p < .0001$



Group X Time p=.02

Melkus, Chyun, Newlin, Vorderstrasse, Jefferson & Langerman (2010). Effectiveness of a diabetes self-management intervention on physiological and psychosocial outcomes. *Biological Research in Nursing* 12 (1), 7-19 .

CONCLUSIONS:

•Traditional/ customary Diabetes Education appears beneficial for women who have not received such services.

• When high levels of emotional distress, somatic anxiety, and low QOL exist, psychosocial/behavioral intervention, such as CST, may sustain gains.

• Self-management interventions in Primary Care “real world settings” need to consider the minimal dose - amount of time - for intervention response to decrease intervention burden and attrition.

E-Health Program Diabetes Self-Management

Diabetes LIVE: Learning In a Virtual Environment

Constance Johnson, PhD, Allison Vorderstrasse,DNSc, APRN & Gail Melkus, EdD, APRN

New York University

Duke UNIVERSITY

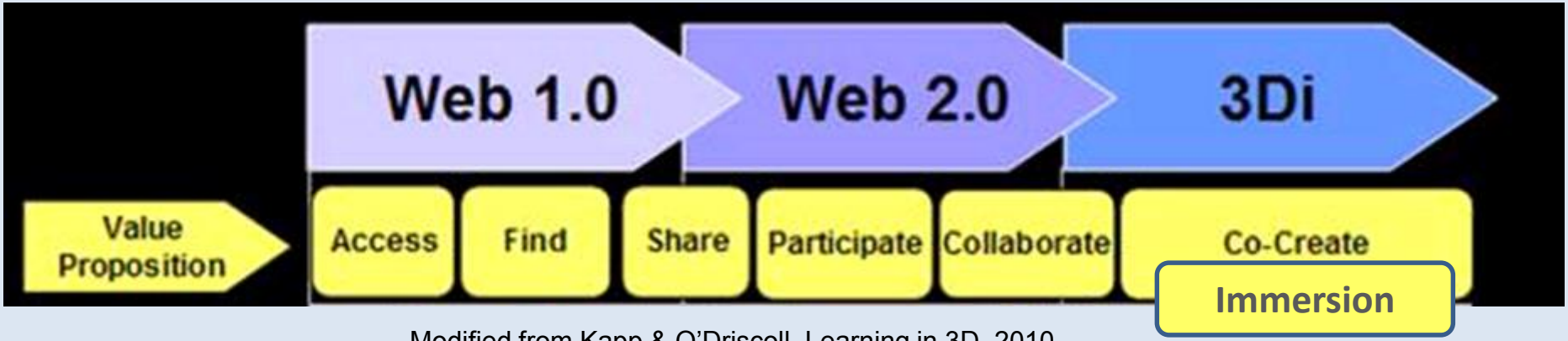
Funded by NIH NHLBI R01HL118189

Purpose

The purpose of the Learning in a Virtual Environment (LIVE) study is **to determine whether participation in LIVE**, which incorporates real-time diabetes self-management training and support, and interactive resources, will **be associated with significantly greater changes in health behaviors and metabolic outcomes** compared to a non-synchronous web-based intervention in adults with type 2 diabetes.

New Media to Assist Patients with Diabetes Self-Management

- to eliminate barriers to healthcare
- to accommodate health literacy levels
- to provide sustainable, cost-effective patient education and support



Modified from Kapp & O'Driscoll, Learning in 3D, 2010

Our Virtual Diabetes Community

Live Interactive Classes with Diabetes Educators

Over 200 Interactive Grocery Items

Nutrition Facts | Portions/Preparation | Substitutions

Food Group: Snacks
Food Description: Snacks, potato chips, plain, made with partially hydrogenated soybean oil, unsalted

Nutrition Facts

Serving Size 28 g (1 oz)

Amount Per Serving	
Calories 152	Calories from Fat 86
	% Daily Value*
Total Fat 10 g	15 %
Saturated Fat 2 g	10 %
Trans Fat	
Cholesterol 0 mg	0 %
Sodium 2 mg	0 %
Total Carbohydrate 15 g	5 %
Dietary Fibre 1 g	4 %
Sugars 0 g	
Protein 2 g	

Vitamine A	0 %	Vitamine C	15 %
Calcium	1 %	Iron	3 %

** Percent Daily Values are based on a 2,000 calorie diet. your daily values may be higher or lower depending on your calorie needs.*

Nutritional information on each grocery item

Immediate Feedback on Items Chosen

Nutrition Facts | Portions/Preparation | Substitutions

Food Group: Snacks
Food Description: Snacks, potato chips, plain, made with partially hydrogenated soybean oil, unsalted

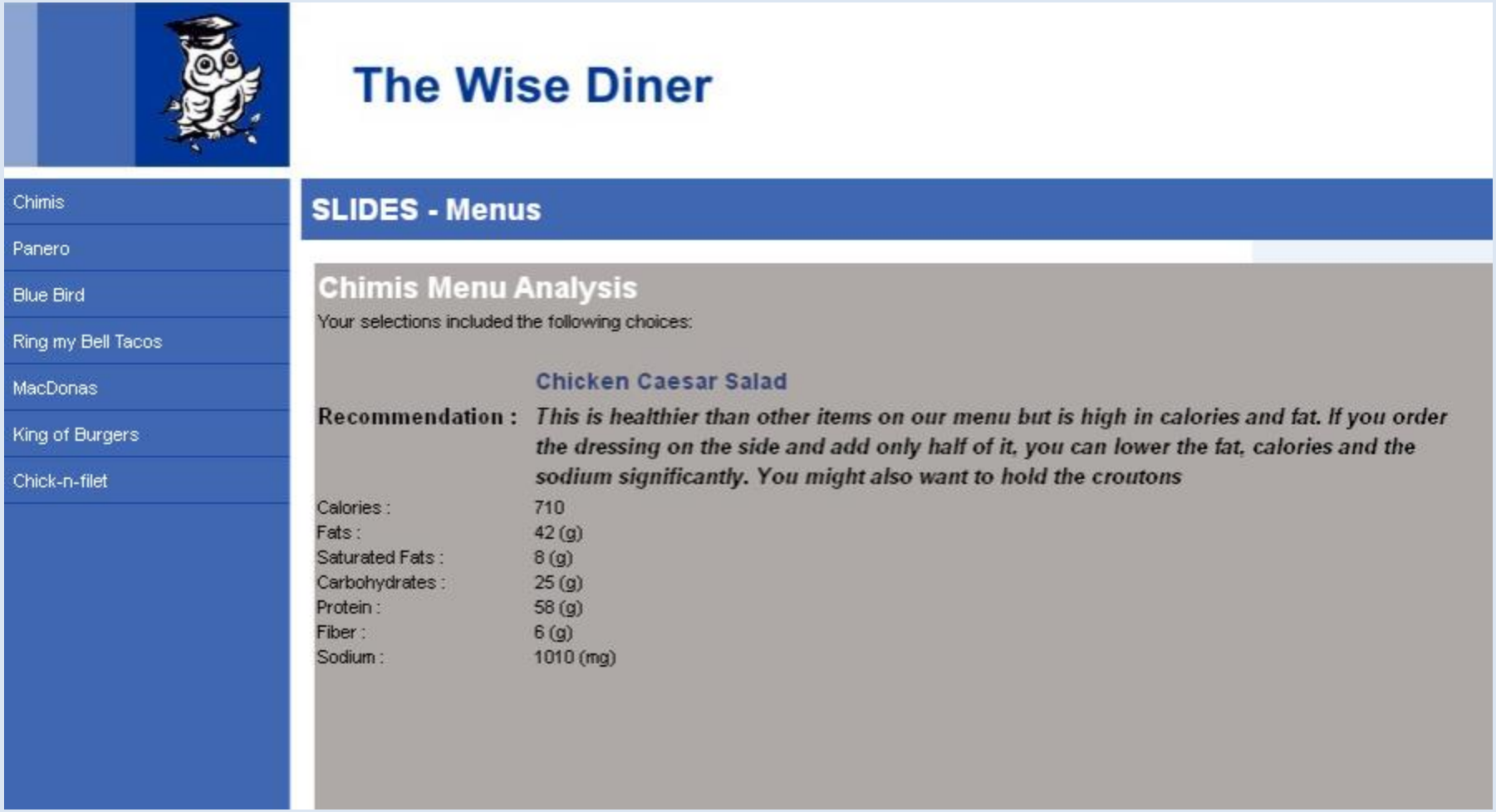
Nutrition Substitutions

Serving Size 28.4 g (1 oz)

Try a healthy crunchy snack like celery with peanut butter or some whole grain crackers.

Chain and Fast-Food Restaurant Menus

Restaurant Menu Feedback



Pharmacy with Drug Information and Items to Buy Online

What We Know To Date

- **Diabetes is increasing in epidemic proportion**
- **<50% with diabetes receive education and behavioral support (CDC, 2010)**
- **Behavioral Interventions are effective but often not sustainable**
- **New modalities of intervention are needed**
- **Need policy that legislates on-going educational and behavioral support for chronic disease self-management**

IDF World Diabetes Campaign

THANK YOU