

Ethnic Disparities in Diabetes Complications

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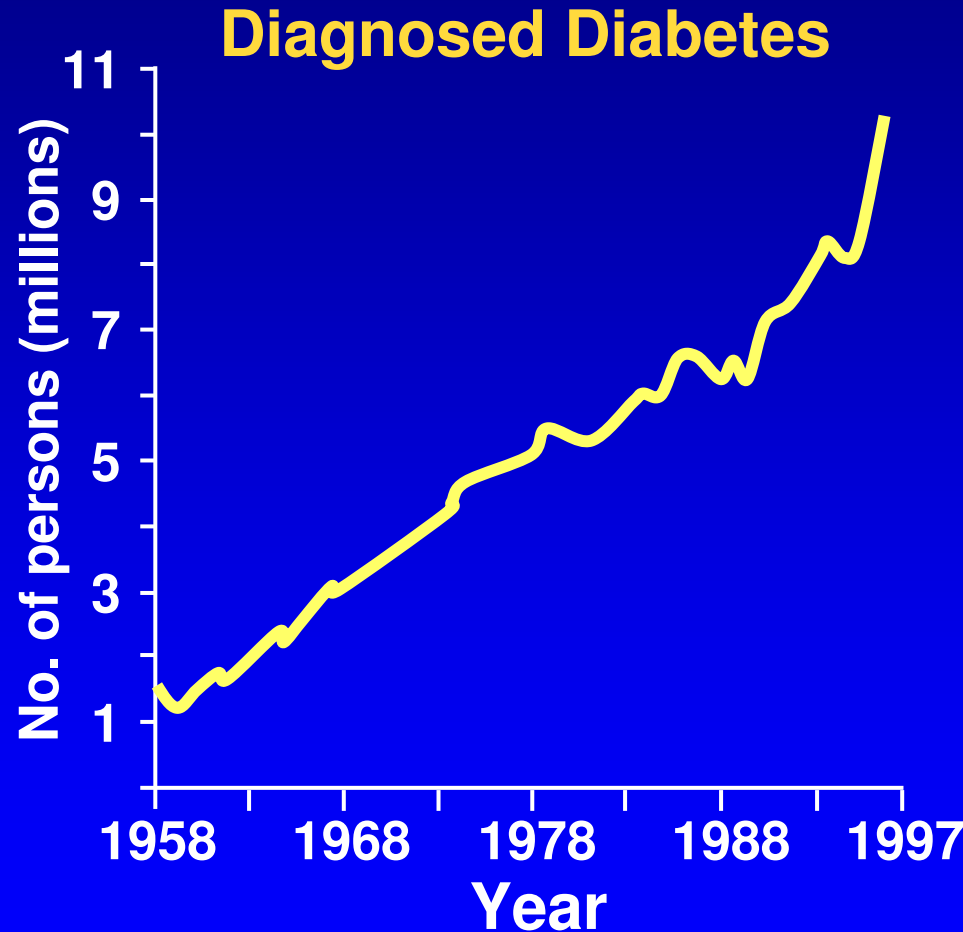
Albert Einstein College of Medicine



MONTEFIORE



Incidence and Prevalence of Diabetes (US)



- 20.8 million Americans have diabetes
 - 6.2 million unaware of the condition
 - Compared to white americans, ethnic minorities are more likely to develop diabetes
 - Blacks 1.8 times
 - Hispanic/latinos 1.8 times
 - Asian Americans 1.5 -2.2 times
- **>1.5 million new cases diagnosed yearly**

Harris et al. *Diabetes Care*. 1998;21:518.

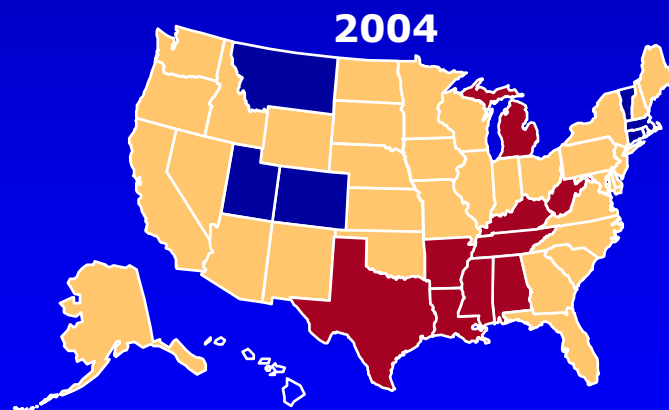
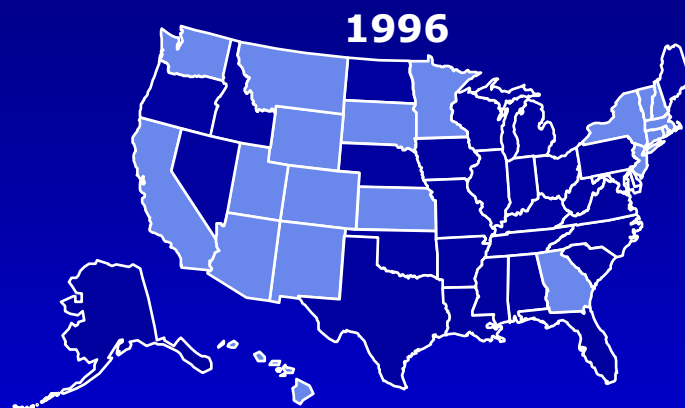
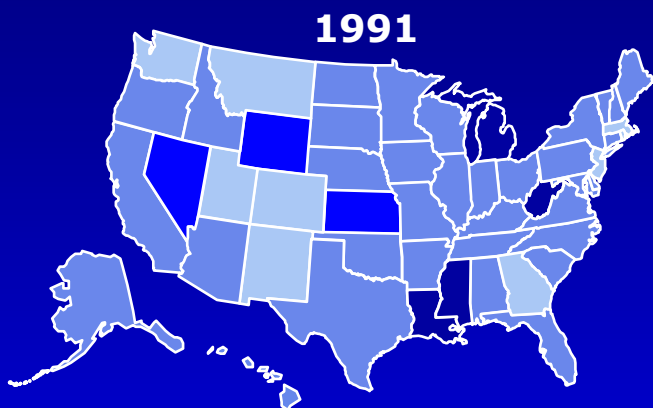
Centers for Disease Control and Prevention. <http://www.cdc.gov/nccdphp/diabetes.htm>.

American Diabetes Association. <http://www.diabetes.org/main/info/facts/impact/default2.jsp>.

Obesity Trends* Among U.S. Adults

BRFSS, 1991, 1996, 2004

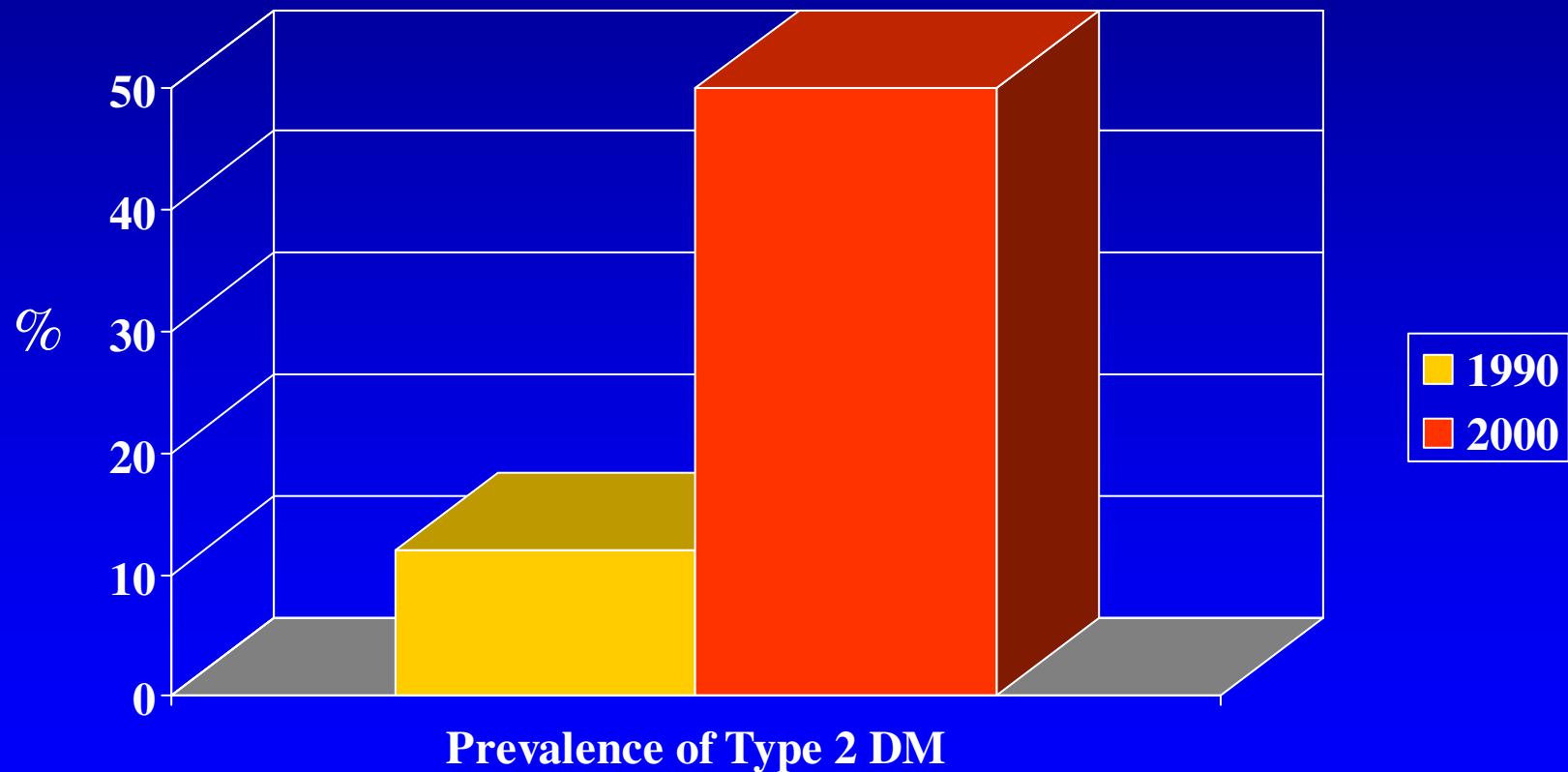
(*BMI ≥ 30 , or about 30 lbs overweight for 5'4" person)



Type 2 Diabetes Mellitus in Children

- No national database
 - Type 2 diabetes diagnosed more frequently in American Indians, African Americans and Hispanic/Latino Americans
- Trends in pediatric centers
 - 1992 - rare cases of type 2 diabetes
 - 1994 - 16% of new cases in urban areas
 - 1999 - 8 - 45% of patients had type 2 diabetes
- 2 million adolescents (or 1 in 6 overweight adolescents) age 12-19 have pre-diabetes

Prevalence of Type 2 Diabetes Mellitus in Children in the Bronx



Projections for Diabetes Burden

- 1 in 3 American males born in 2000 will develop diabetes
- 2 in 5 American females born in 2000 will develop diabetes
- 1 in 2 Latinos born in 2000 will develop diabetes

Narayan, KMV et al. *JAMA* 2003;290:1884-1890

UKPDS: Prevalence of Complications at Time of Diagnosis

Complication	Prevalence (%) [*]
Any complication	50
Retinopathy	21
Abnormal ECG	18
Absent foot pulses (≥ 2) and/or ischemic feet	14
Impaired reflexes and/or decreased vibration sense	7
Myocardial infarction/angina/claudication	2–3 [†]
Stroke/transient ischemic attack	1

^{*}Some patients had more than 1 complication at diagnosis

[†]Prevalence of each individual condition

Disease Burden of Type 2 Diabetes

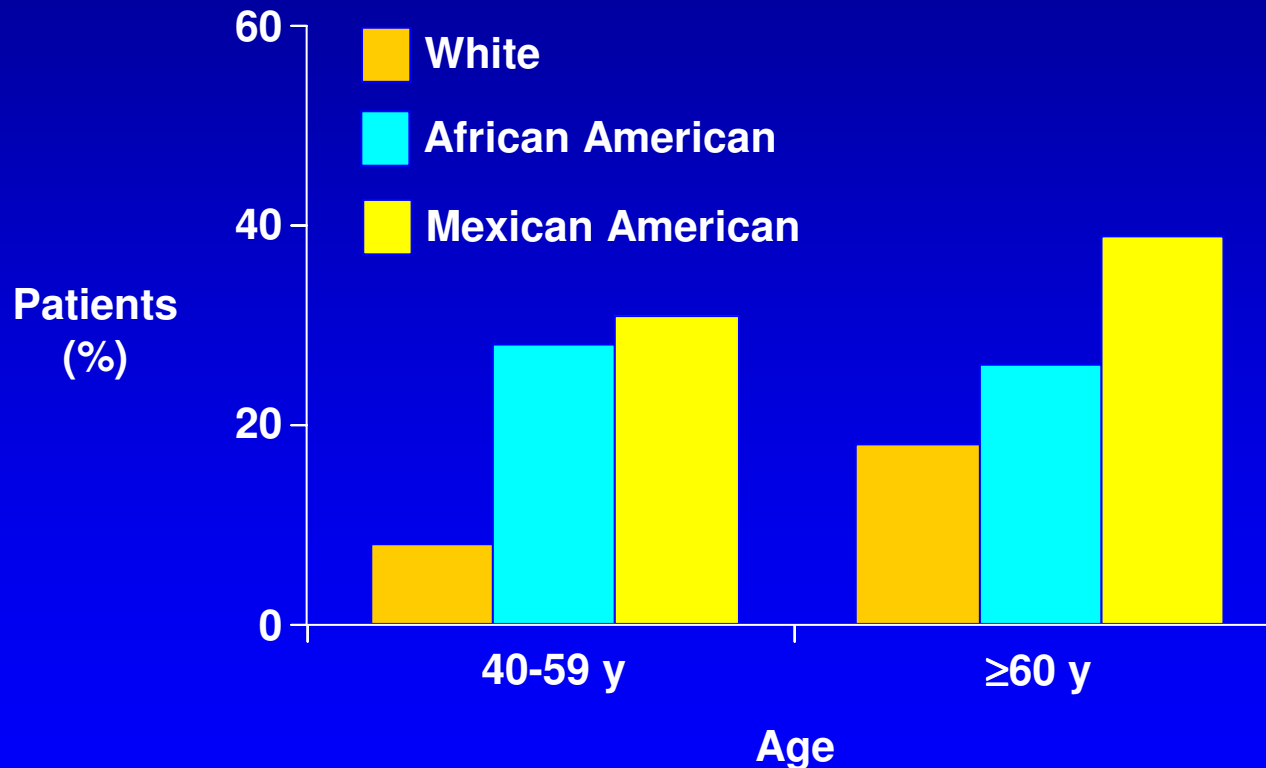
- **Macrovascular disease**
 - 2- to 4-fold more likely to have heart disease or stroke
 - 2- to 8-fold more likely to have heart failure
 - Accounts for 60% to 80% of all diabetes-related deaths
 - Results in >75% of all hospitalizations for diabetic complications
 - Preexisting condition in over 50% of patients with type 2 diabetes
- **Microvascular disease**
 - Leading cause of end-stage renal disease
 - Neuropathy (including erectile dysfunction)
 - Up to 24,000 new cases of blindness annually
- **Cost: \$132 billion dollars in 2002 (\$92 billion in direct costs)**

Centers for Disease Control and Prevention. *National Diabetes Fact Sheet*. 1998.

American Heart Association. *2001 Heart and Stroke Statistical Update*.

National Heart, Lung, and Blood Institute. *Facts about heart failure*. 1997, online edition.

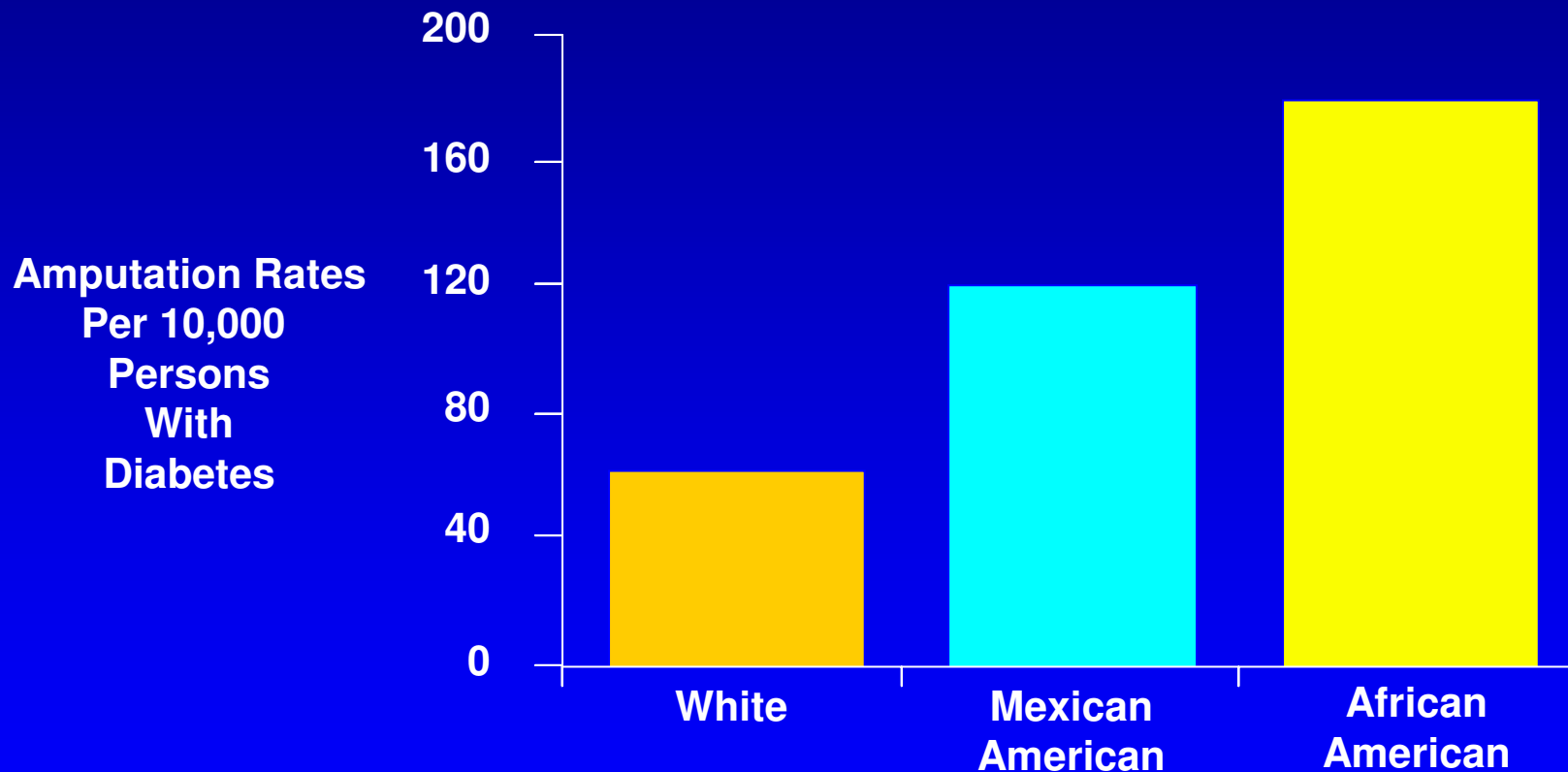
Retinopathy In Type 2 Diabetes: Cross-Sectional Prevalence, US 1988-1991



Data not adjusted for glycemia or duration of diabetes.

Adapted from Tull and Roseman. Chapter 31. In: *Diabetes in America*. 2nd ed. 1995:613-630.

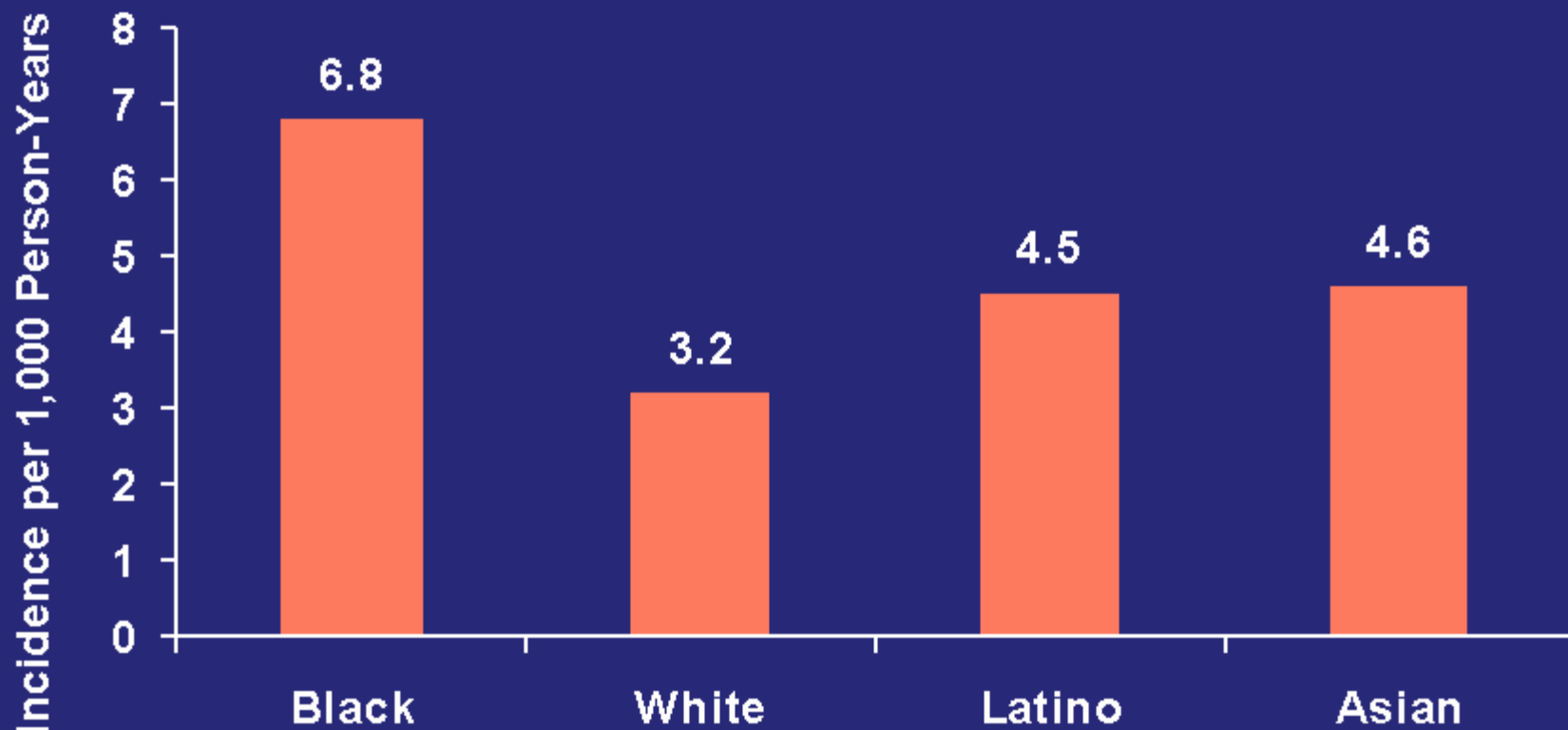
Amputations In People With Diabetes: Three Ethnic Groups



Data from San Antonio, Texas.

Adapted from Reiber et al. Chapter 18. In: *Diabetes in America*. 2nd ed. 1995:409-428.

Incidence of End-Stage Renal Disease in US Patients With Diabetes by Race/Ethnicity



Adapted from Karter AJ, et al. *JAMA*. 2002;287:2519-2527.

Complications rate among ethnic minorities

- Kidney disease
 - Non-Hispanic blacks are 2.6- 5.6 times more likely to develop with 4000 new cases of ESRD yearly
 - Mexican Americans are 5.6-6.6 times more likely
 - American Indians are 6 times more likely
- Blindness
 - Mexican Americans are ~2 times, blacks almost 50% as likely to develop diabetic retinopathy.
- Amputations
 - Mexican Americans 1.8 times, blacks 2.7 times, American Indians 3-4 times as likely to suffer from lower extremity amputations.

Microvascular Complications Of Diabetes In Minorities: Importance Of Glycemic Control

- San Luis Valley Study (whites and Hispanics)
 - similar glycemic control in both groups
 - similar rates and severity of diabetic nephropathy and neuropathy; retinopathy may be less common in Hispanic people
- Cruickshank and Alleyne Study (whites and African Caribbeans)
 - after adjustment for duration of diabetes and other risk factors, **no** difference in retinopathy
- Poor glycemic control appears to be a major determinant of high long-term complication rates in minority patients with diabetes

Hamman et al. *Diabetes Care*. 1991;14(suppl 3):655-664.

Hamman et al. *Diabetes*. 1989;38:1231-1237.

Cruickshank and Alleyne. *Diabetes Care*. 1987;10:170-179.

Good Glycemic Control (Lower HbA_{1c}) Reduces Incidence of Complications

	DCCT	Kumamoto	UKPDS
HbA _{1c}	9→7%	9→7%	8→7%
Retinopathy	63%	69%	17–21%
Nephropathy	54%	70%	24–33%
Neuropathy	60%	—	—
Macrovascular disease	—	—	16%

DCCT Research Group. *N Engl J Med.* 1993;329:977-986.

Ohkubo Y, et al. *Diabetes Res Clin Pract.* 1995;28:103-117.

UKPDS 33. *Lancet.* 1998;352:837-853.

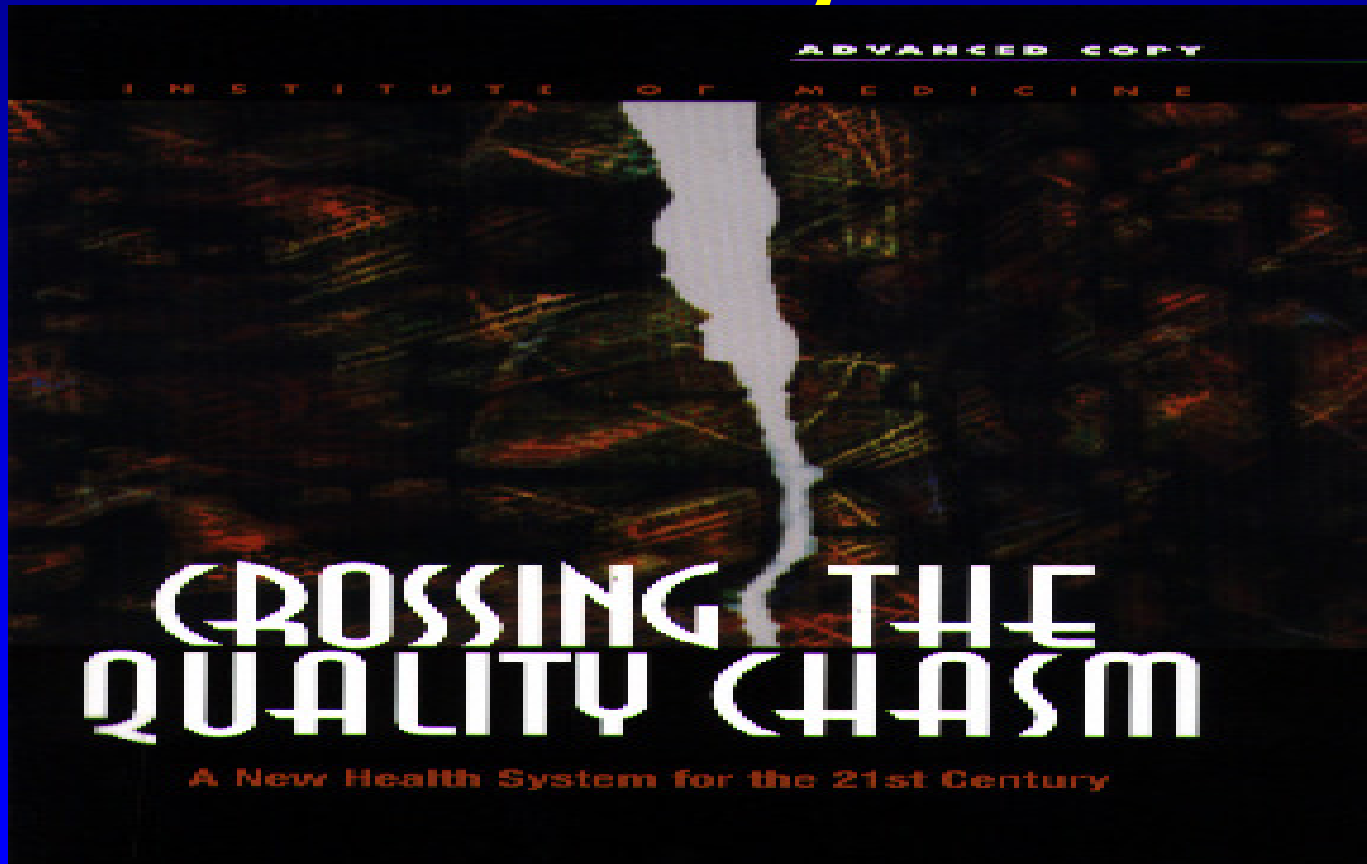
Slide modified from D. Kendall—International Diabetes Center, Minneapolis.

Efficacious treatments to prevent diabetes complications

Strategy	Benefit
Glycemic control	30% ↓ microvas disease per 1%
Blood pressure control	24% ↓ microvas disease per 10mm
Lipid control	55% ↓ CHD events; 43% ↓ death
Aspirin use	28% ↓ in M.I., 18% ↓ CVD
Eye exams	60 – 70% ↓ in severe vision loss
Foot exams	50 - 60% ↓ in serious foot disease
Flu shots	32% ↓ hosp; 64% ↓ resp. cond + death
Diabetes education	Knowledge, behaviors, glycemic control

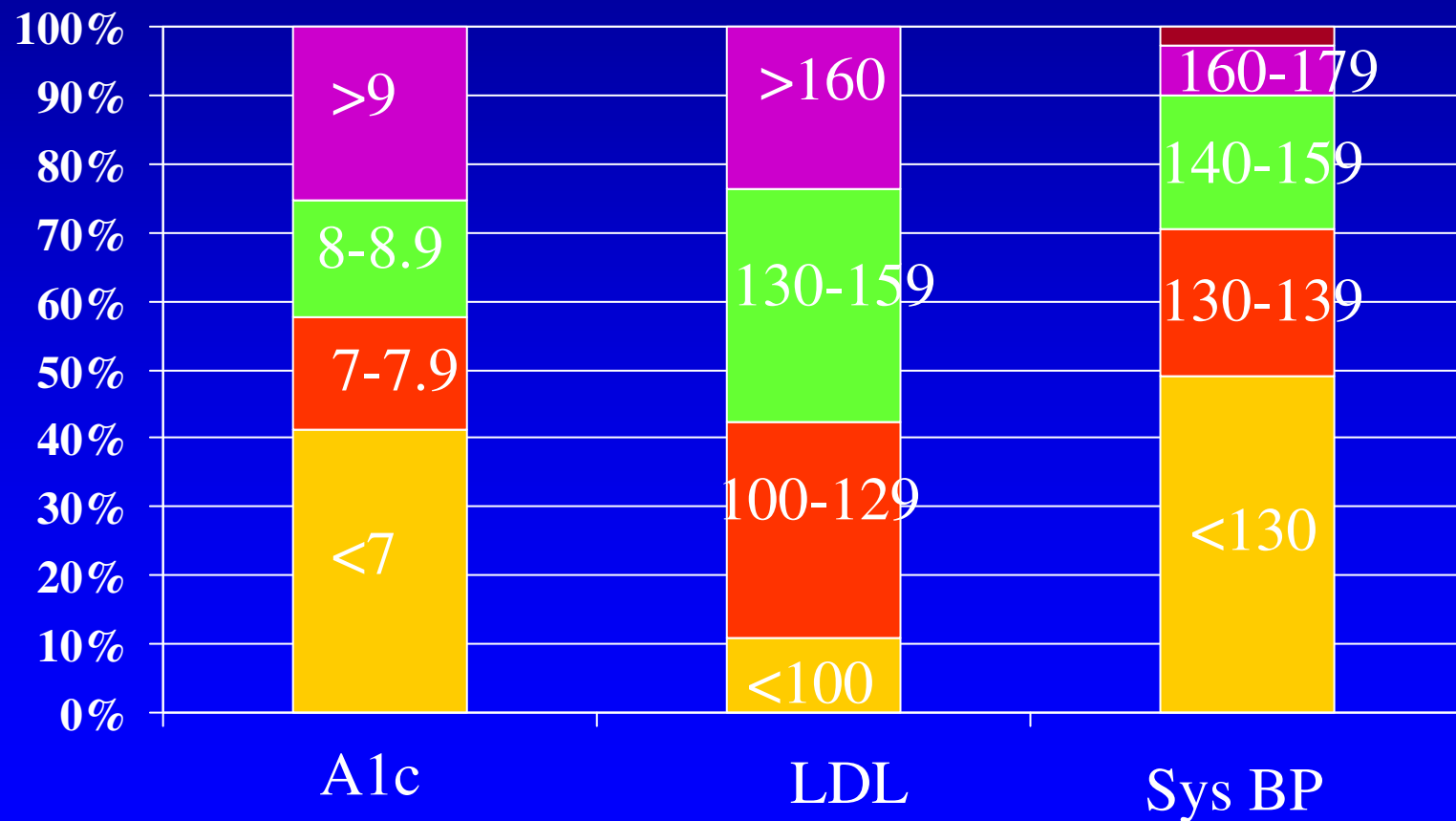
Crossing the Chasm

A New Health System for the 21st Century



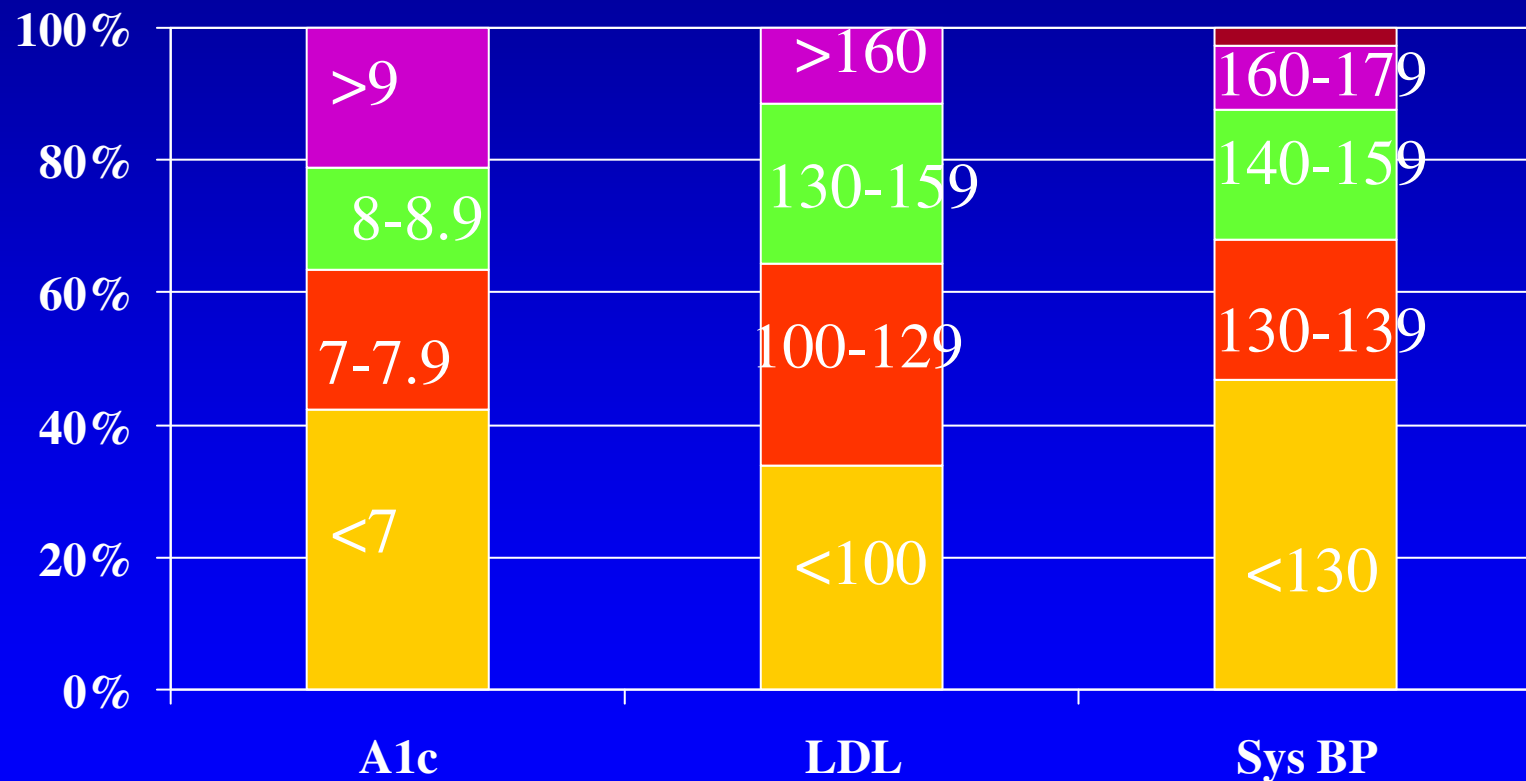
DQIP Measures, USA, 1988-95

Saaddine et al. Ann Int Med, 2002



DQIP Measures, USA, 1999-2002

Saaddine et al. Ann Int Med, 2006

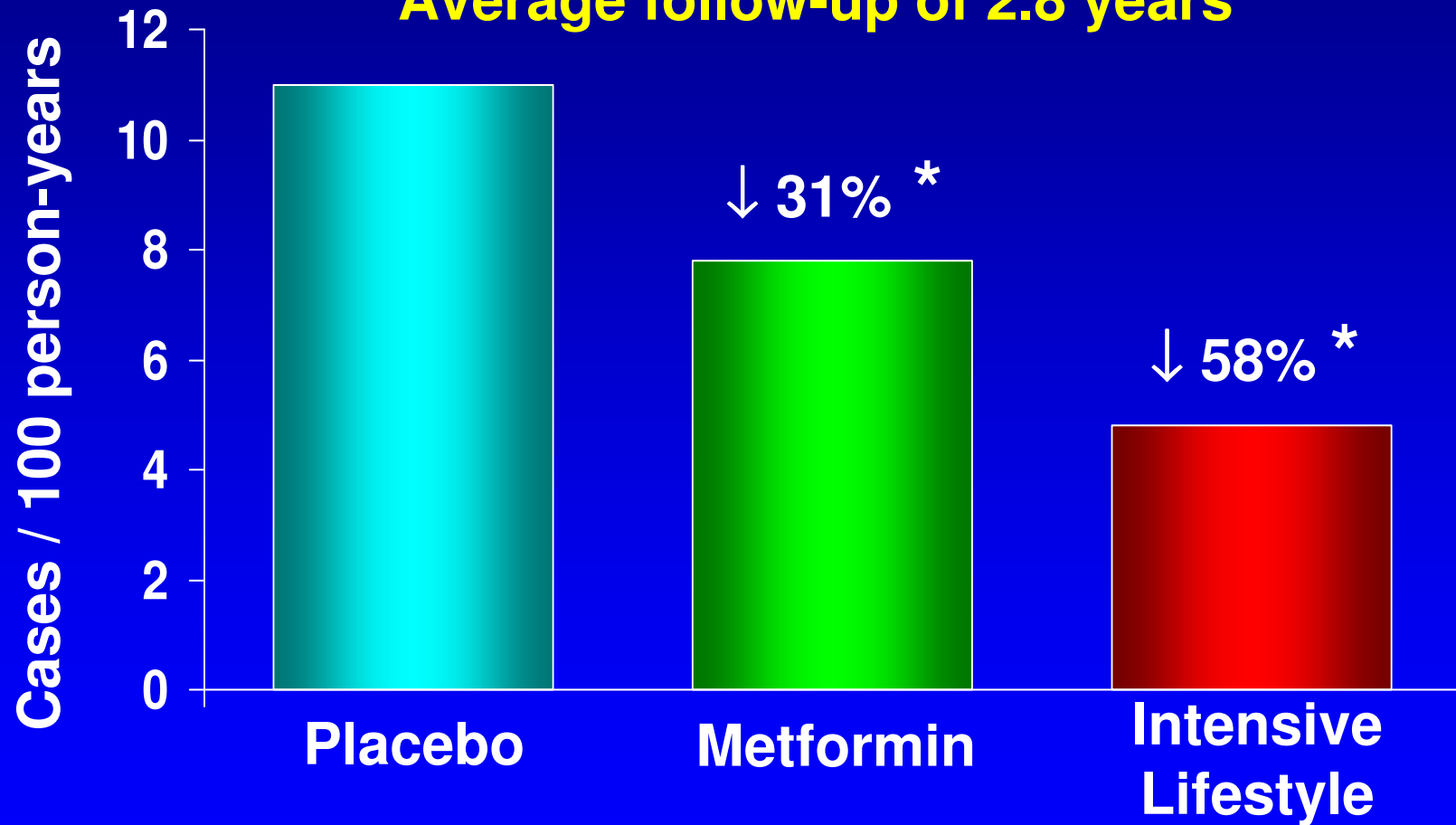


Proportion of US adults achieving ADA clinical practice recommendations, 1999-2002

- **Achieving targets**
 - 49.8% achieved A1c <7
 - 36% achieved LDL <100
 - 39.6% achieved BP < 130/80
- **Ethnic differences persist**
 - 59.5% of white women met A1c targets compared to 39.6% of Mexican American women
- **Socioeconomic differences**
 - Higher income and educational levels associated with non-significant achievement of target BP and urine protein levels, but not A1C

Diabetes Prevention Program Progression to Type 2 Diabetes

Average follow-up of 2.8 years

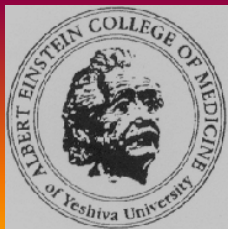


The Diabetes Prevention Program Research Group. *New Engl J Med* 2002;346:393-403.

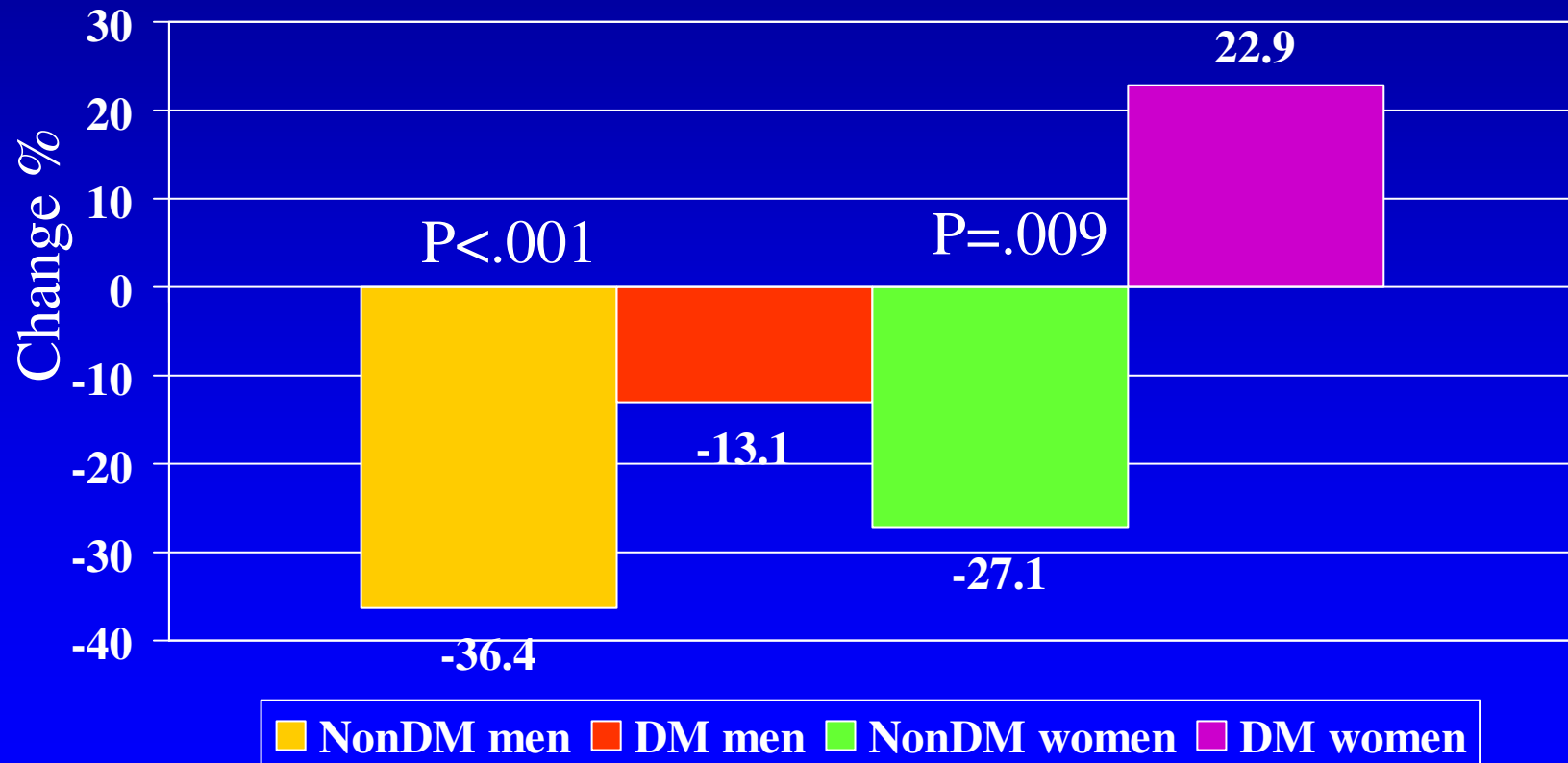
Prevention of Diabetes Complication

- **A** - A1c glucose control $<7\%$
 - 40% reduction in microvascular complications for every 1% reduction in A1C
- **B** - Blood pressure $<130/80$
 - Can reduce CV disease by 33-50% and microvascular by 33%
 - For every 10 mm Hg reduction in systolic BP risk for any complication reduced by 12%
- **C** - Control of lipids **LDL <100**
 - Can reduce CV complications by 20-50%

THANK
YOU



Age-Adjusted Mortality Rates for Heart Disease as Underlying Cause of Death in Adults Comparing 1971-75 with 1982-84 Cohorts

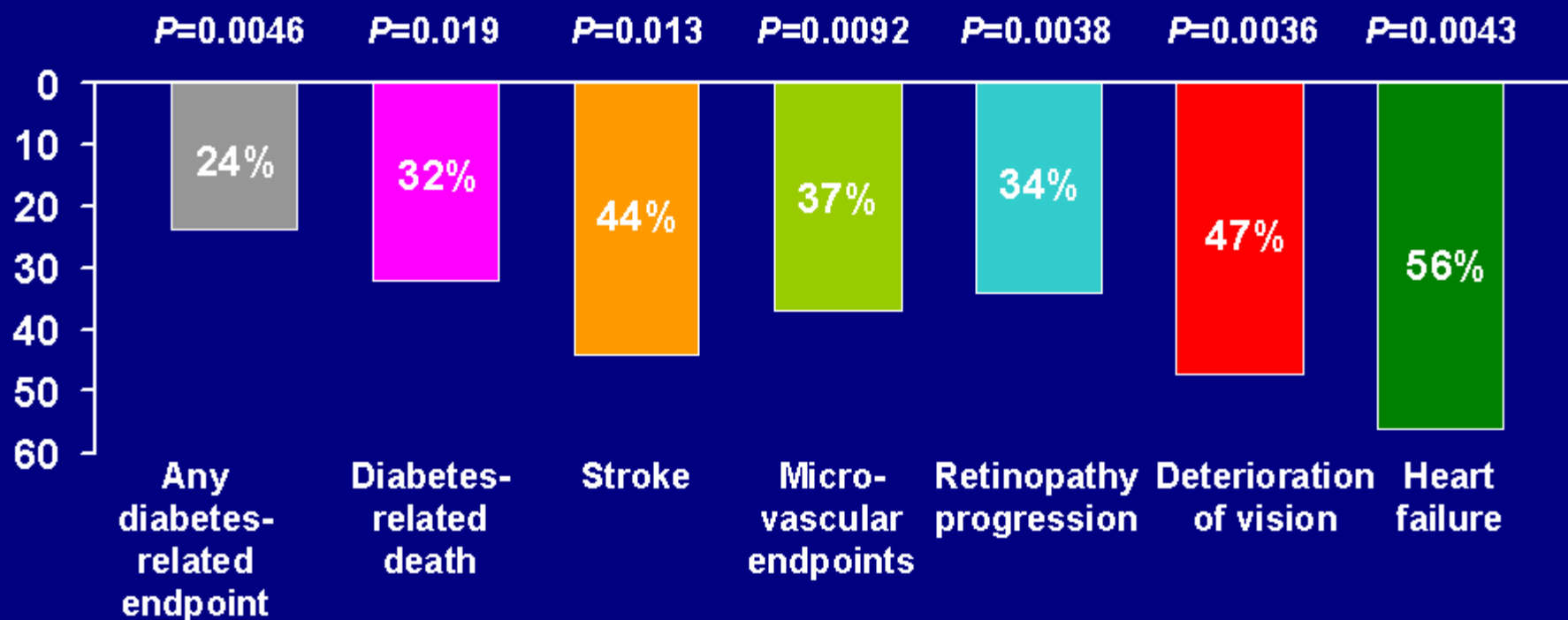


Gu K, et.al. JAMA 1999;281:1291-97



UKPDS Results: Tight BP Control

Risk Reduction*



*Compared with less tight control. Captopril and atenolol were equally effective in reducing risk and were equally safe in patients with diabetes.

Obesity:

Prevalence in Minority Populations

- Highest rates of overweight, obesity and class 3 obesity among black women
 - >50% black women \geq 40 years old are obese
 - >80% black women \geq 40 years old overweight
- 17.1% of US children are overweight
 - Hispanic and Black children have higher rates of at risk of overweight or overweight
 - Black males 30.4 vs 40 black female
 - Hispanic males 41.4 vs 32.2 hispanic females
 - White males 35.4 vs 31.5 while females