Cardiovascular Disease (CVD) in Texas

A Surveillance Report

December 2008

Health Promotion Unit

Texas Department of State Health Services

Burden of CVD

- Leading cause of death in Texas and in the United States
- 32% of all deaths in Texas in 2005
- 1,441,000 Texas adults reported that they have had heart disease or stroke in 2007

PROGRAM STRATEGIES

- Surveillance, Data and Outcome Management
- Health Education and Outreach
- Clinical Prevention and Treatment Services
- Community Policy and Environmental Changes

The Burden of CVD: Measures

Measure	Data Source	Years Available
Prevalence of Disease and Behavioral Risk Factors	Behavioral Risk Factor Surveillance Data (BRFSS)	1999-2007
	Youth Surveys (YRBS)	2001, 2005, 2007
Mortality	Mortality Data (Death)	1999-2005
EMS for CVD and Stroke	Texas EMS/Trauma Registry Data	2003/2004
Financial Burden	Hospital Discharge Data	2001-2006
	Medicaid Data	2003-2007
Medical Condition Control	Health Plan Employer Data and Information Set (HEDIS)	2001-2007

Prevalence

Prevalence

- The number of existing cases of a disease or health condition in a population at some designated time
- How *common* a disease is in a population
- An indication of the extent of a health problem

Prevalence

Prevalence measures the frequency of disease at a given point in time. The measure is defined as follows:

$$\text{Prevalence} = \left(\frac{\text{Number of persons ill}}{\text{population}} \text{ at a given time}\right)\%$$

(Usually expressed as a % of the population at a given time)

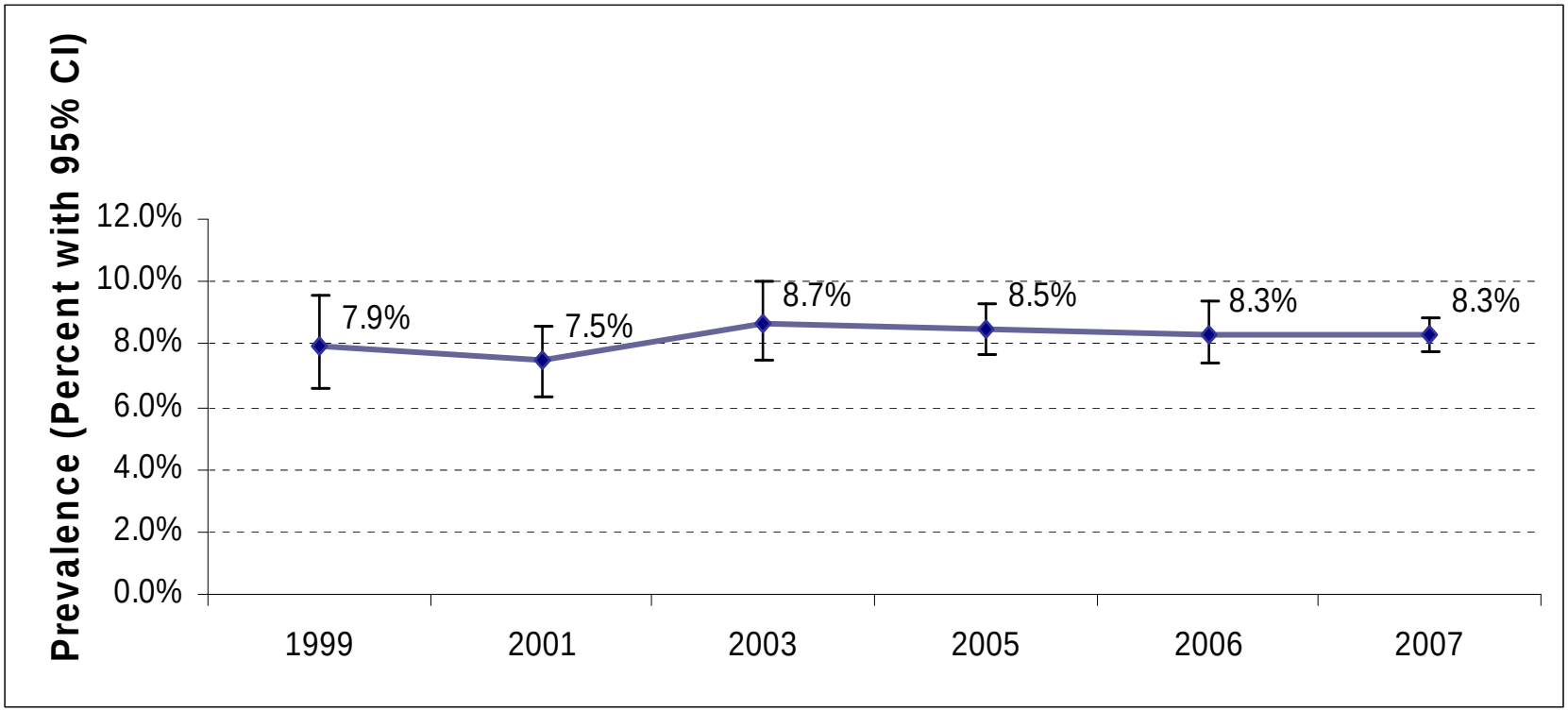
Behavioral Risk Factor Surveillance System (BRFSS)

- Population-based, random-digit dialed telephone survey sponsored by DSHS in partnership with CDC
- Conducted annually by all 50 states, 3 territories, and the District of Columbia
- Randomly selected Texans 18 years or older are asked questions about their health and life style habits
- More than 550 Texans are surveyed per month.

Prevalence Questions for CVD

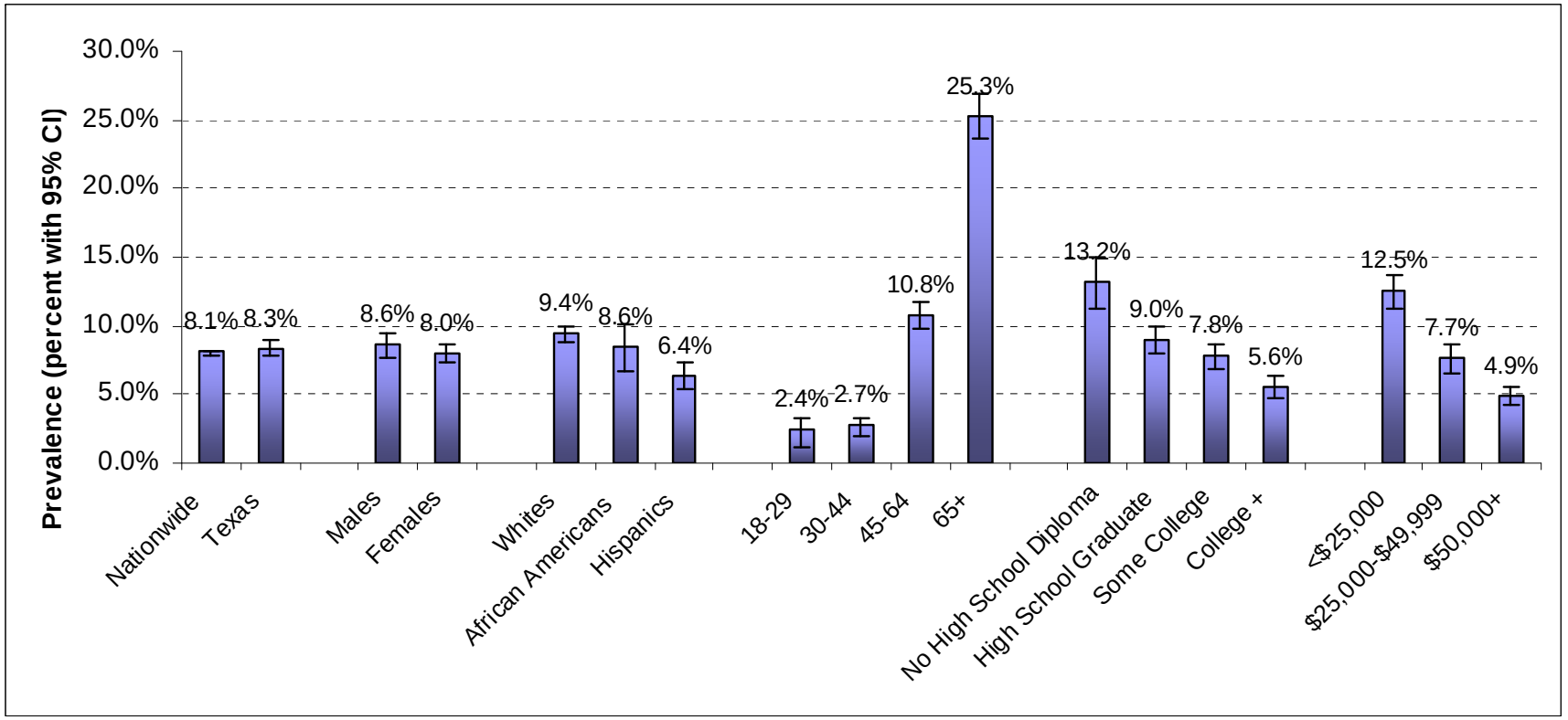
- **CVD**--Respondents 18 years and older who report that they have been diagnosed as having had a Heart Attack, Myocardial Infarction, Angina, Coronary Heart Disease, or Stroke.
- **Heart Disease**--Respondents 18 years and older who report that they have been diagnosed as having had a Heart Attack, Myocardial Infarction, Angina, or Coronary Heart Disease.
- **Stroke**--Respondents 18 years and older who report that they have been diagnosed as having had a Stroke.

Prevalence of Cardiovascular Disease (CVD), Texas 1999-2007



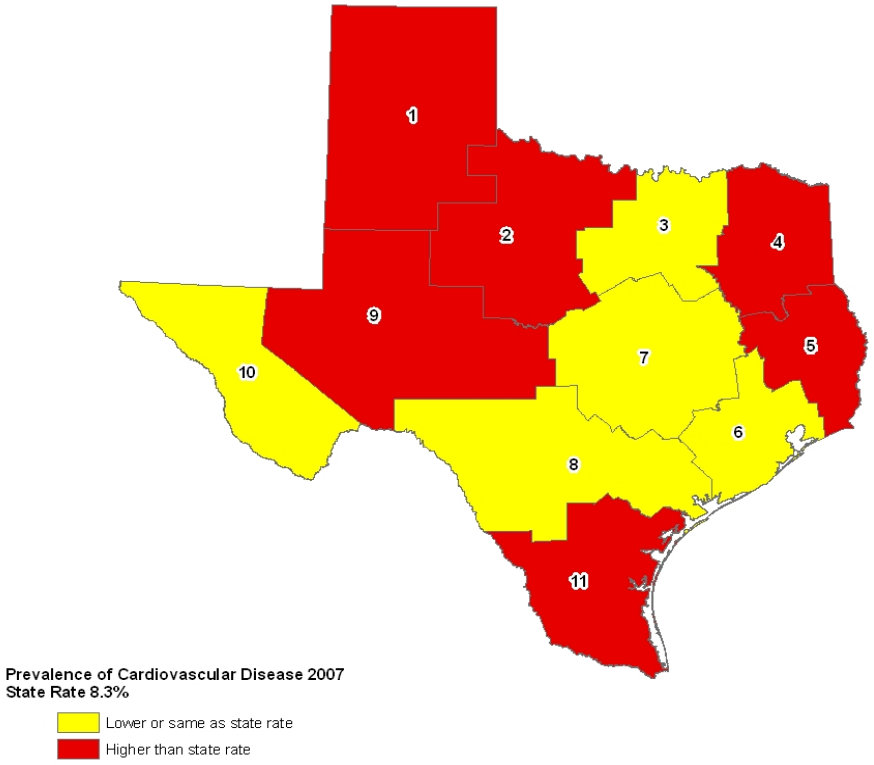
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2007

Prevalence of CVD by Demographic, Texas, 2007



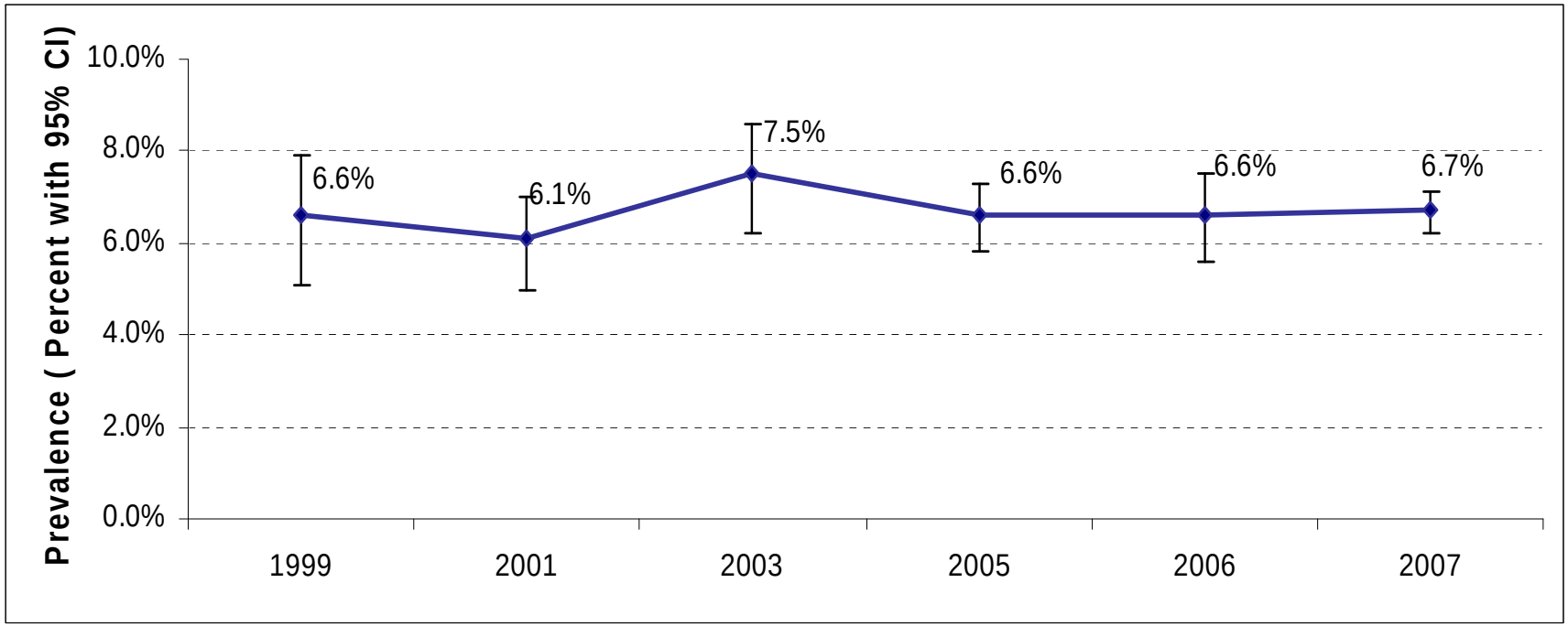
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Prevalence of CVD by Public Health Service Region, 2007



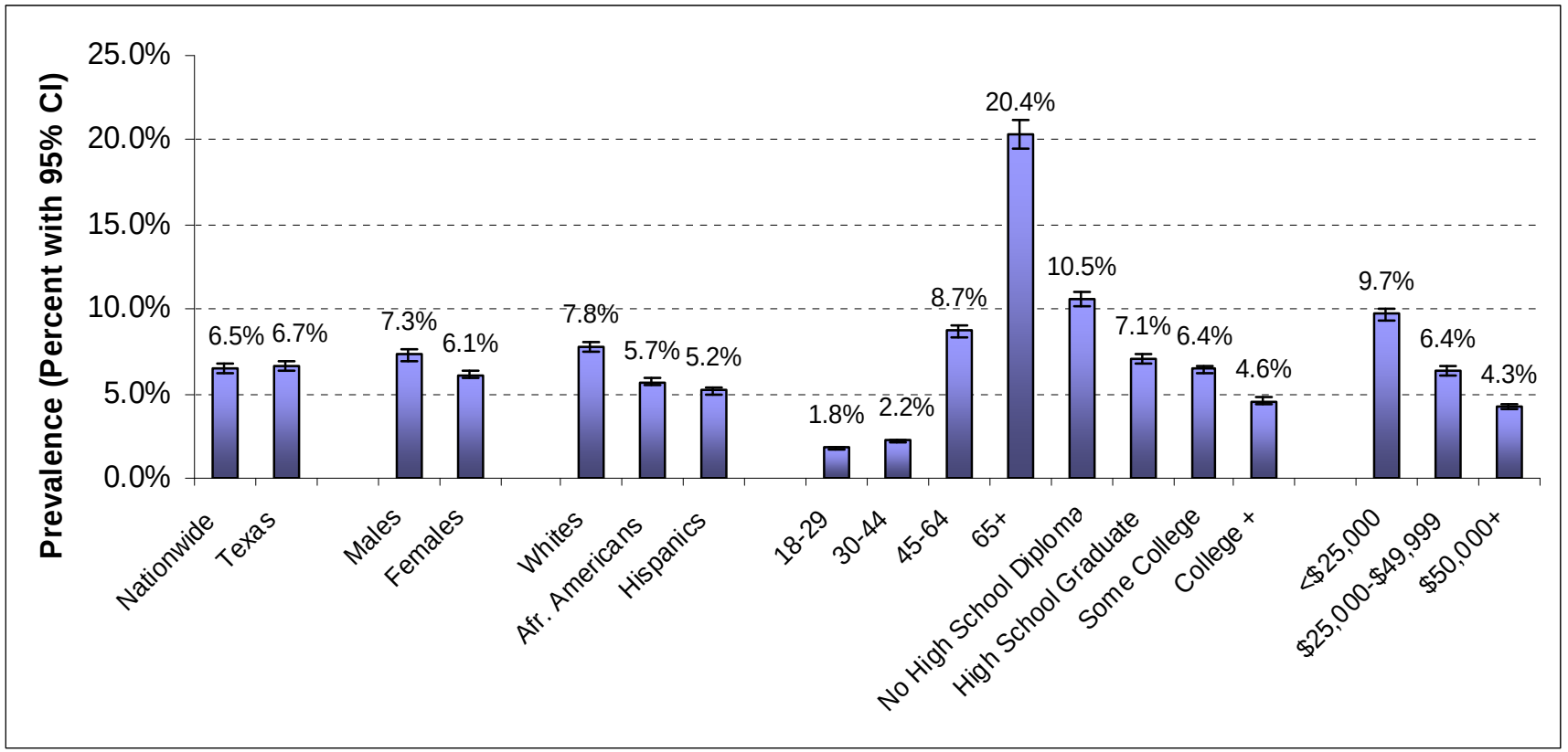
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Prevalence of Heart Disease Texas 1999-2007



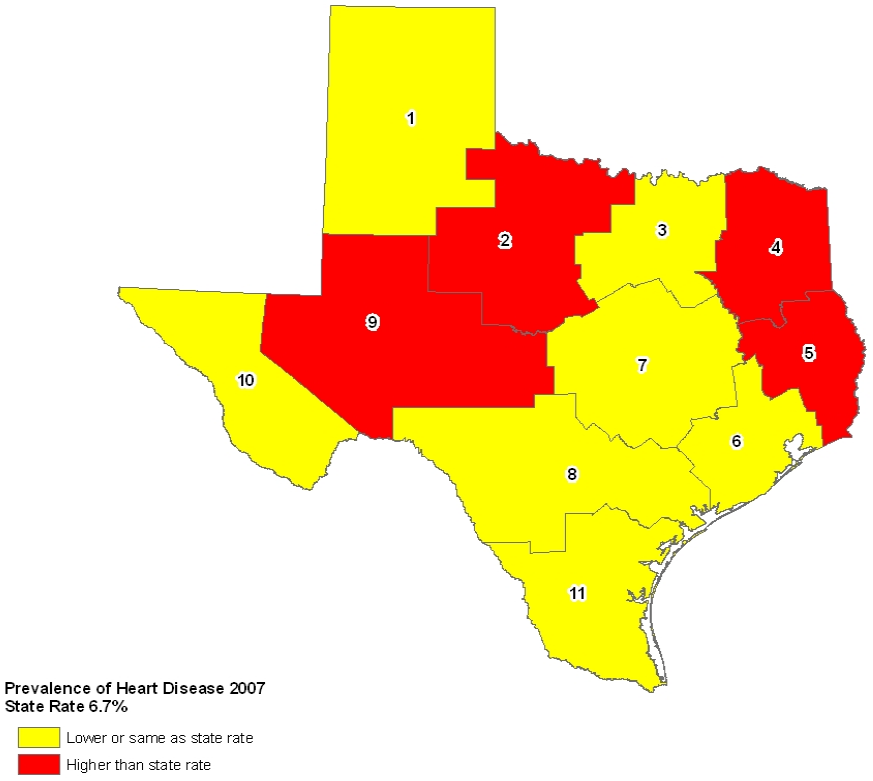
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2007

Prevalence of Heart Disease by Demographic, Texas, 2007



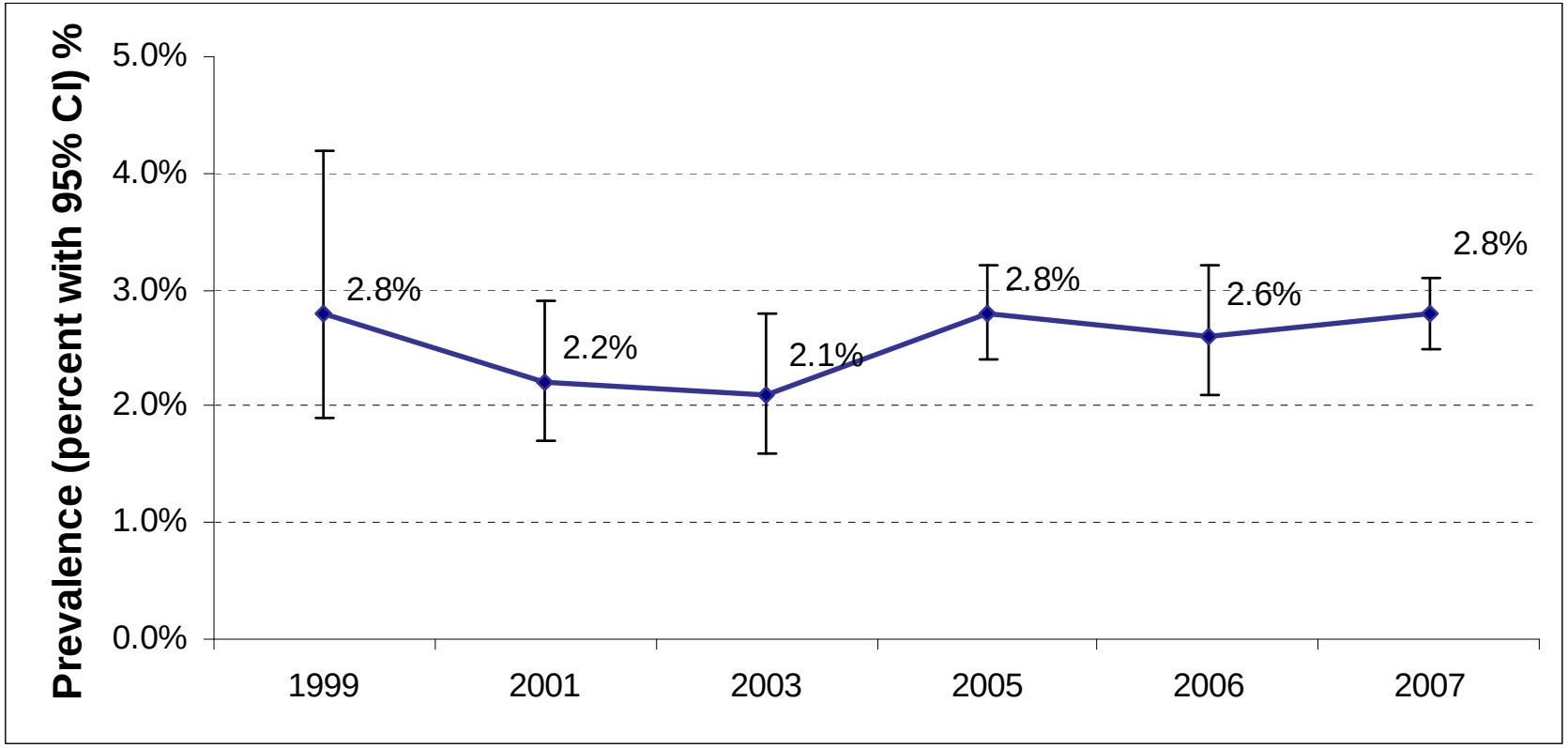
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Prevalence of Heart Disease by Public Health Service Region, 2007



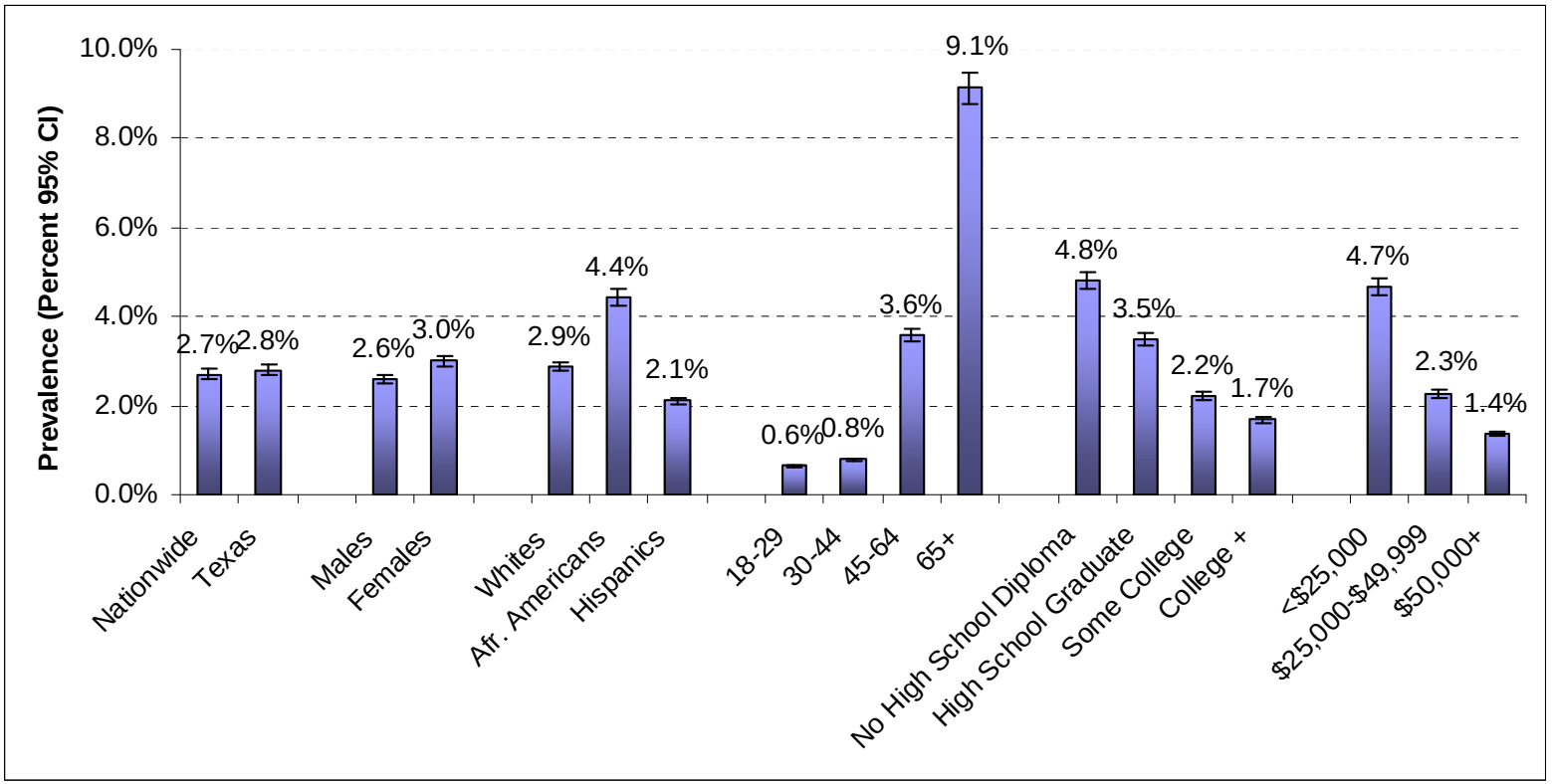
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Prevalence of Stroke, Texas 1999-2007



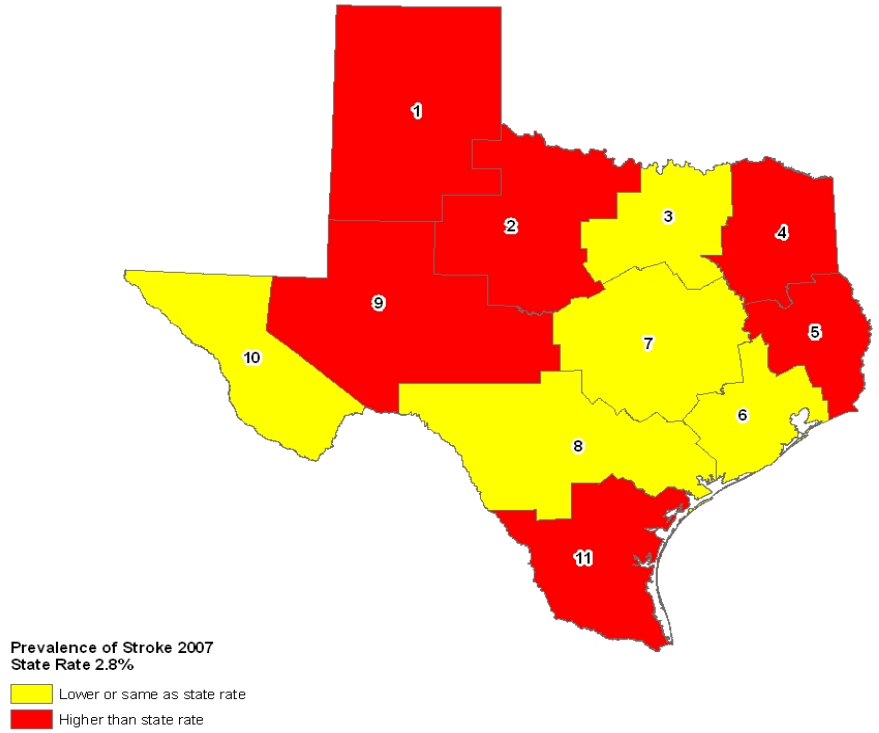
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2007

Prevalence of Stroke by Demographic, Texas, 2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

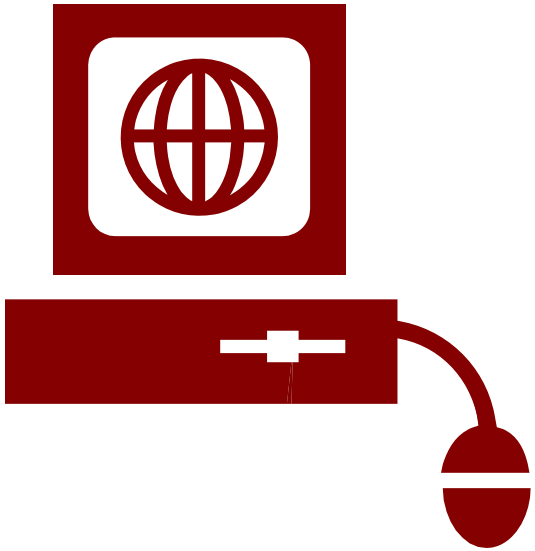
Prevalence of Stroke
by Public Health Service Region, 2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

More Information on BRFSS

- http://www.dshs.state.tx.us/chs/brfss/default.sht
- http://www.cdc.gov/brfss/index.htm



MORTALITY DATA

Mortality Data

- Death certificate data compiled and tabulated by the Statistical Services Division of the Texas Vital Statistical Unit (VSU)
- Sex-, race- and age-specific mortality data were computed for 1999 through 2005
- All death rates are age-adjusted using the 2000 US standard population

Mortality Rate Calculation

Mortality: The occurrence of death in a population

$$\text{Age-adjusted rate per } 100{,}000 = \left(\frac{\text{total expected number of deaths}}{\text{2000 US population}} \right) * 100{,}000$$

ICD Codes for CVD Mortality Data

Cause of Death	ICD-9 Codes (1969-1998)	ICD-10 Codes (1999-2005)
Ischemic Heart Disease (IHD)	410-414	I20-I25
Stroke	430-438	I60-I69
Congestive Heart Failure (CHF)	428	I50

Changes in Mortality Data Reporting

- ICD 9 to ICD 10
- Population standard was used for age standardization (age adjustment) of death rates. The standard is based on the year 2000 population

MAPS

- Data maps are available for selected chronic disease death rates for the state as a whole and at the county level.
- Maps allow the reader to identify areas in the state with high rates and areas with low rates.
- Although county rates provide a high degree of specificity, rates in counties with small populations and few deaths for a specific condition can be unstable.

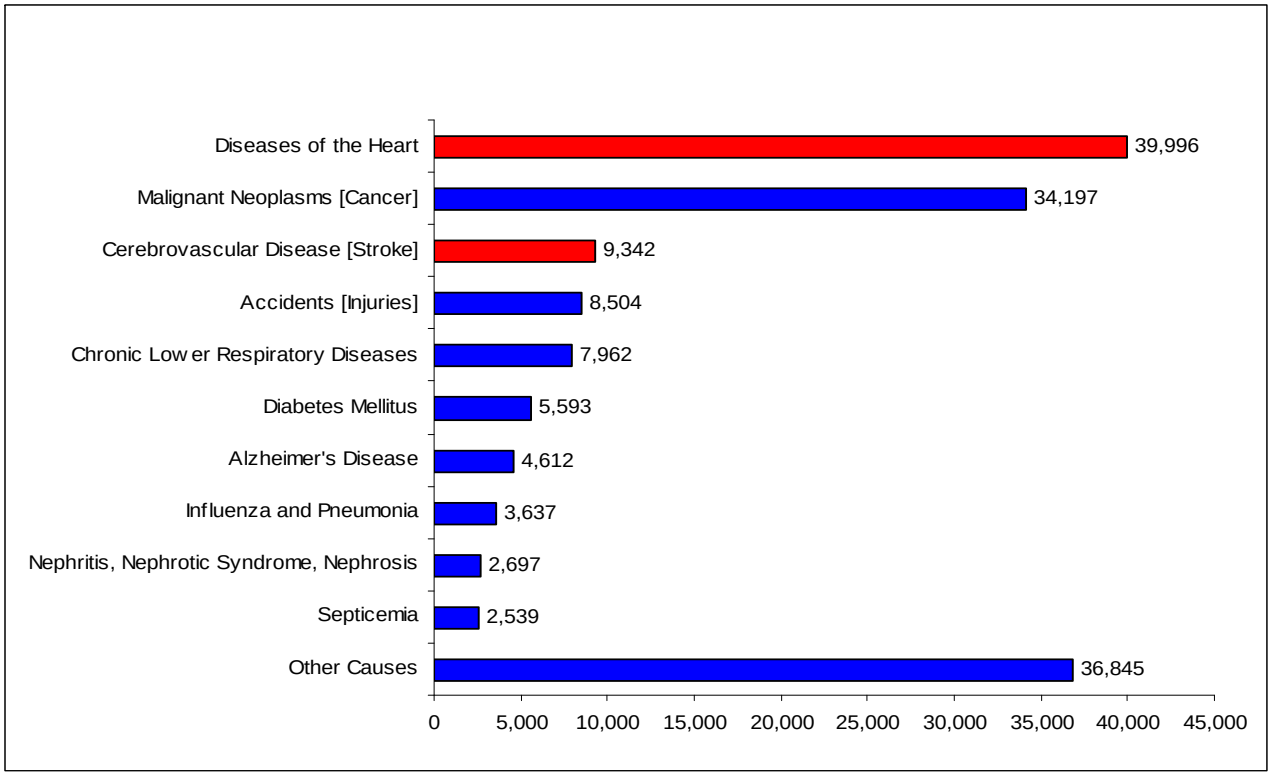
MAPS

- For each map, county specific rates are ranked from highest to lowest and then categorized into quartiles
- The maps also use a graded color scheme to differentiate each quartile, with the darkest color representing counties with the highest rates and the lightest color representing areas with the lowest rates

Leading Causes of Death

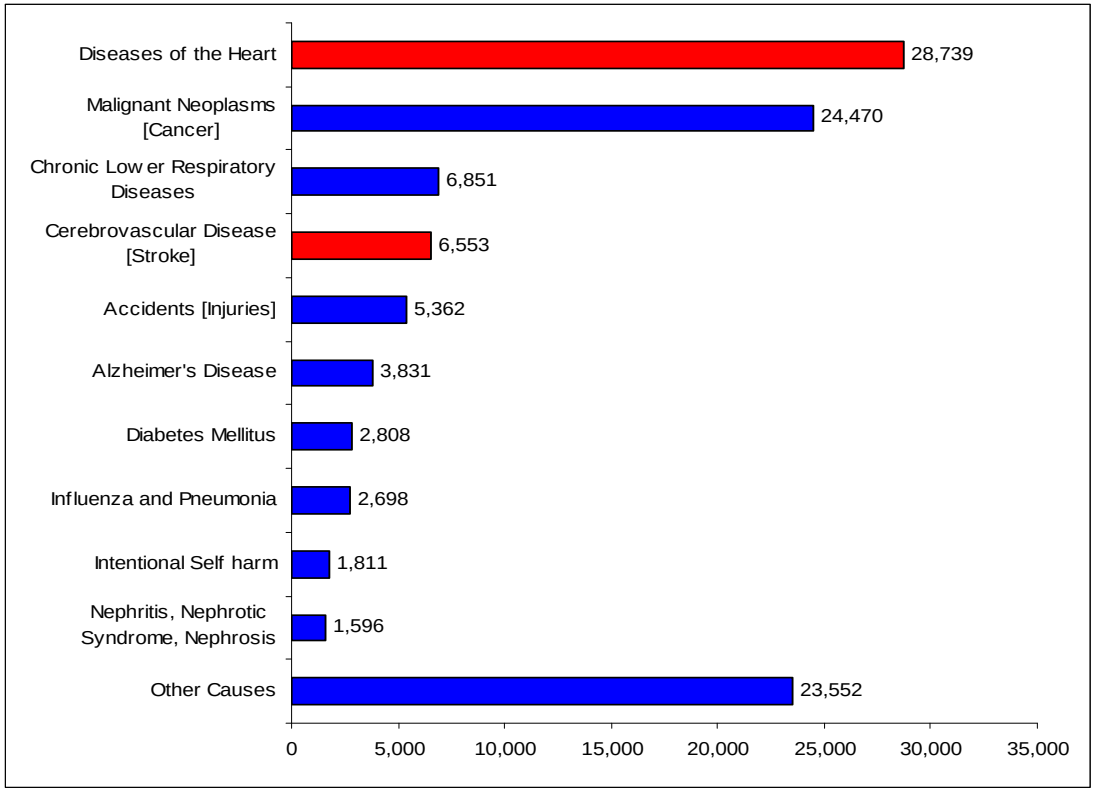
Texas Race/Ethnic Groups

Leading Causes of Death Texas-2005



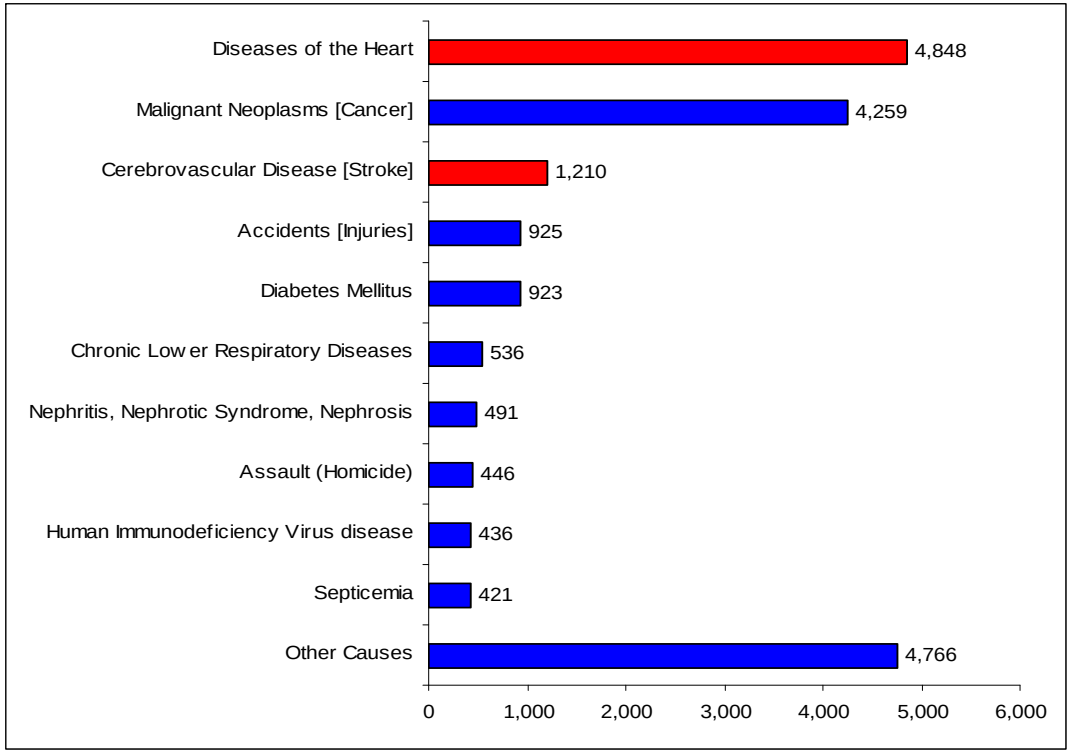
Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 2004

Leading Causes of Death Texas Whites, 2005



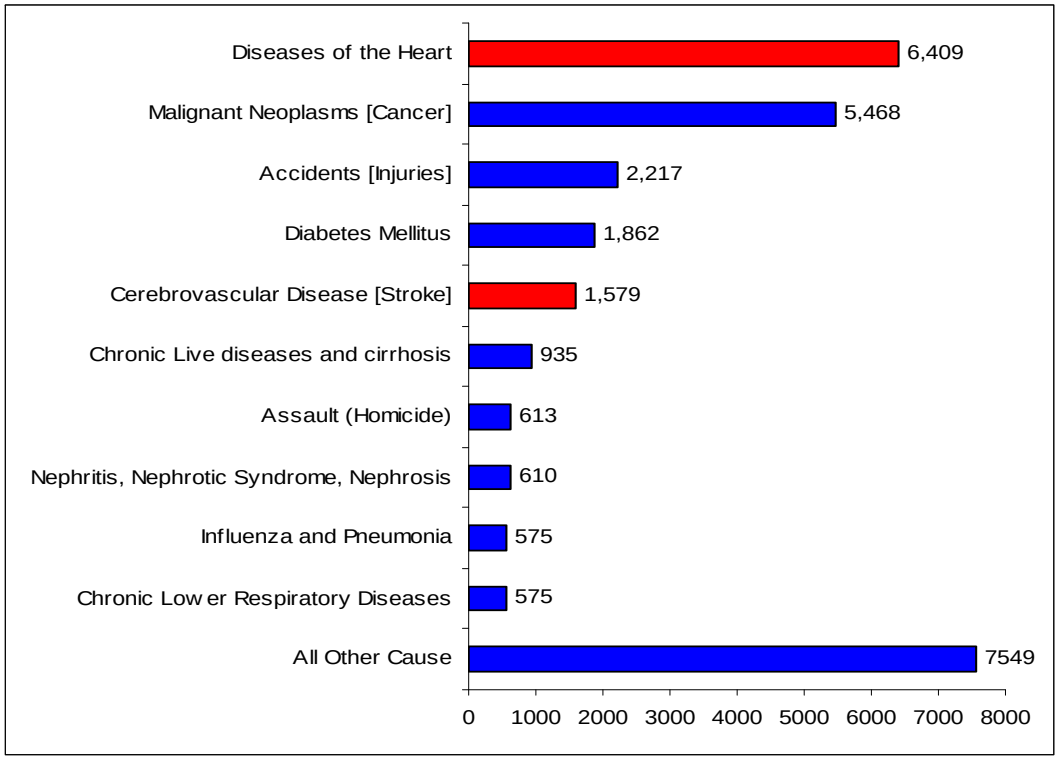
Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 2005

Leading Causes of Death Texas African Americans,2005



Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 2005

Leading Causes of Death Texas Hispanics,2005



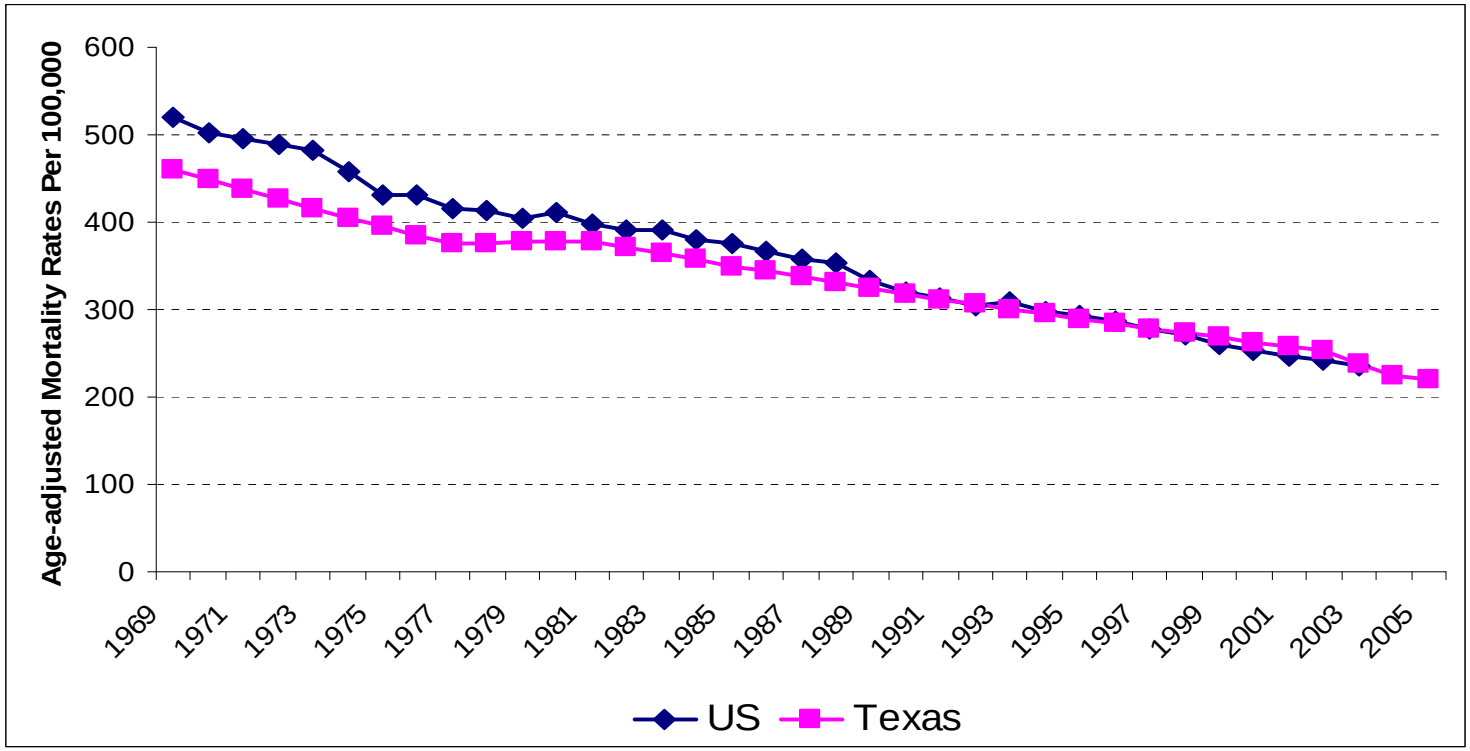
Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 2005

Leading Causes of Death

- In 2005, around 32% of all deaths in Texas were attributed to heart disease and stroke.
- Heart disease and stroke were the first and third leading causes of death, respectively among all racial/Ethnic groups

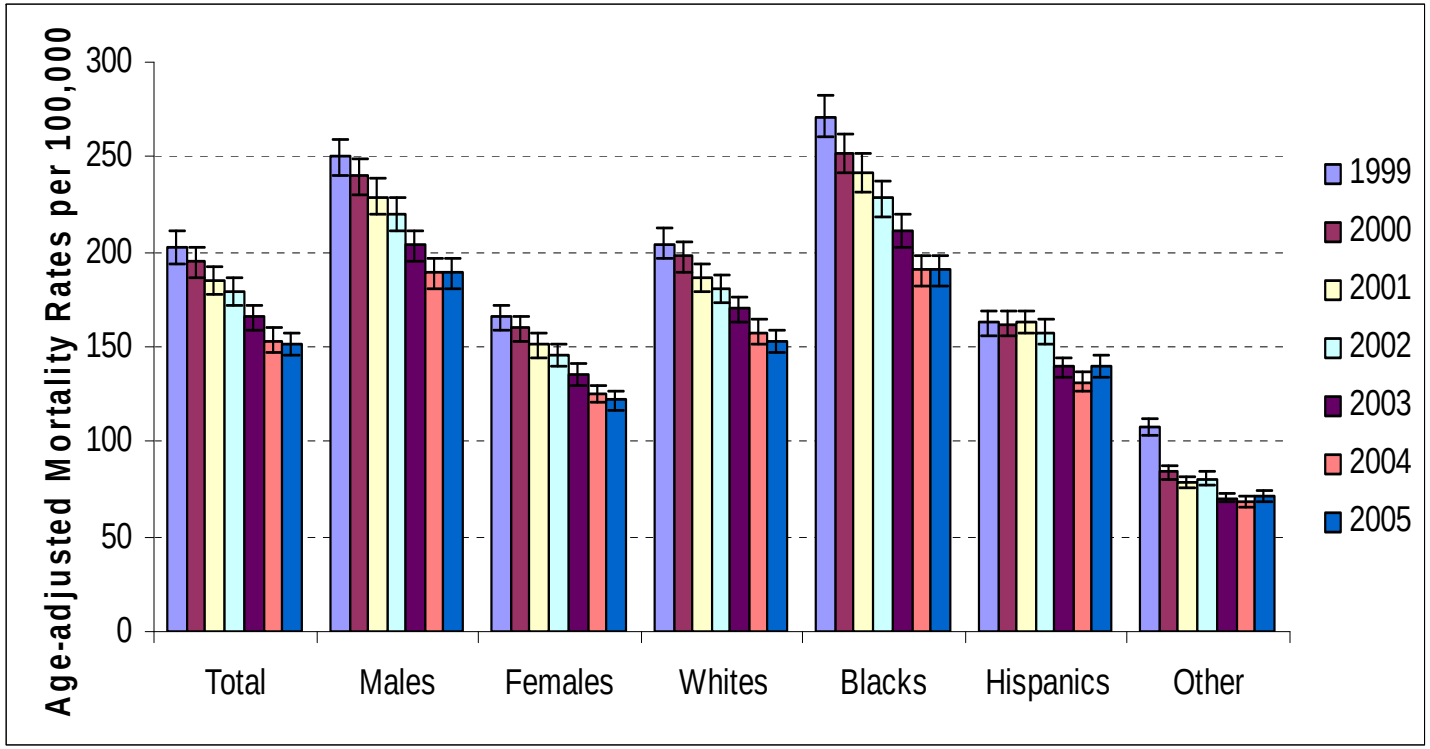
Ischemic Heart Disease

Heart Disease Mortality Trends, US and Texas, 1969-2005



Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 1969-2005

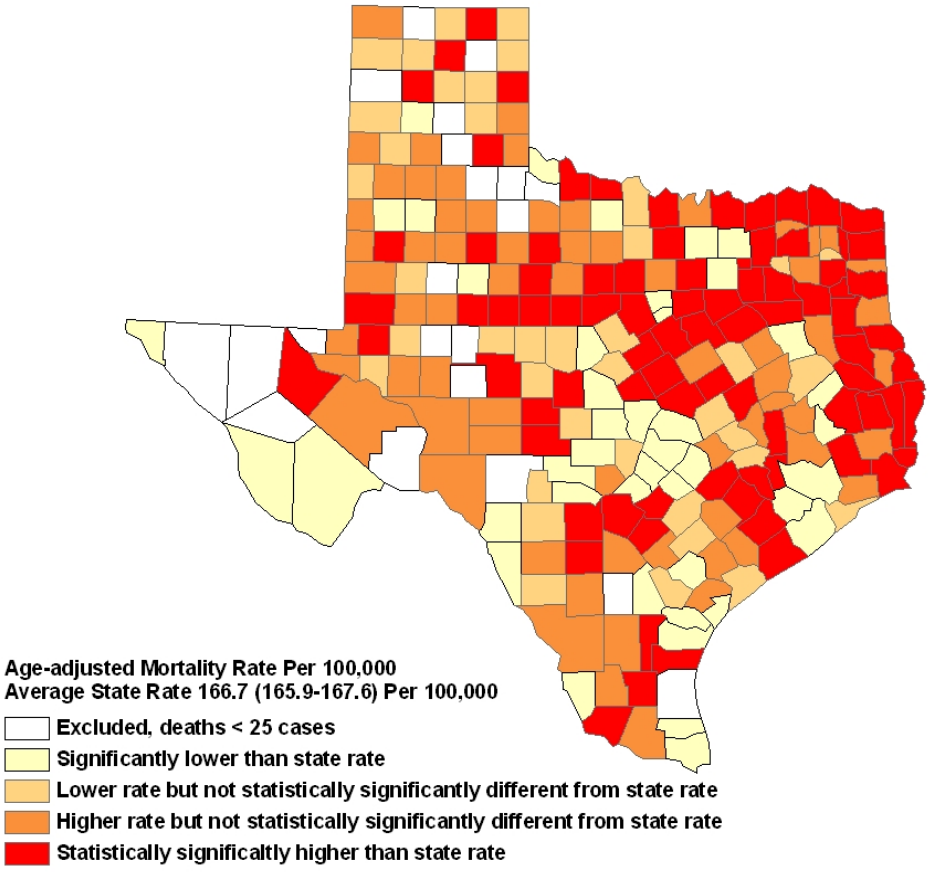
Mortality Rates for Ischemic Heart Disease, Texas 1999-2005



Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 1999-2005

Ischemic Heart Disease (ICD 10 I20-I25)

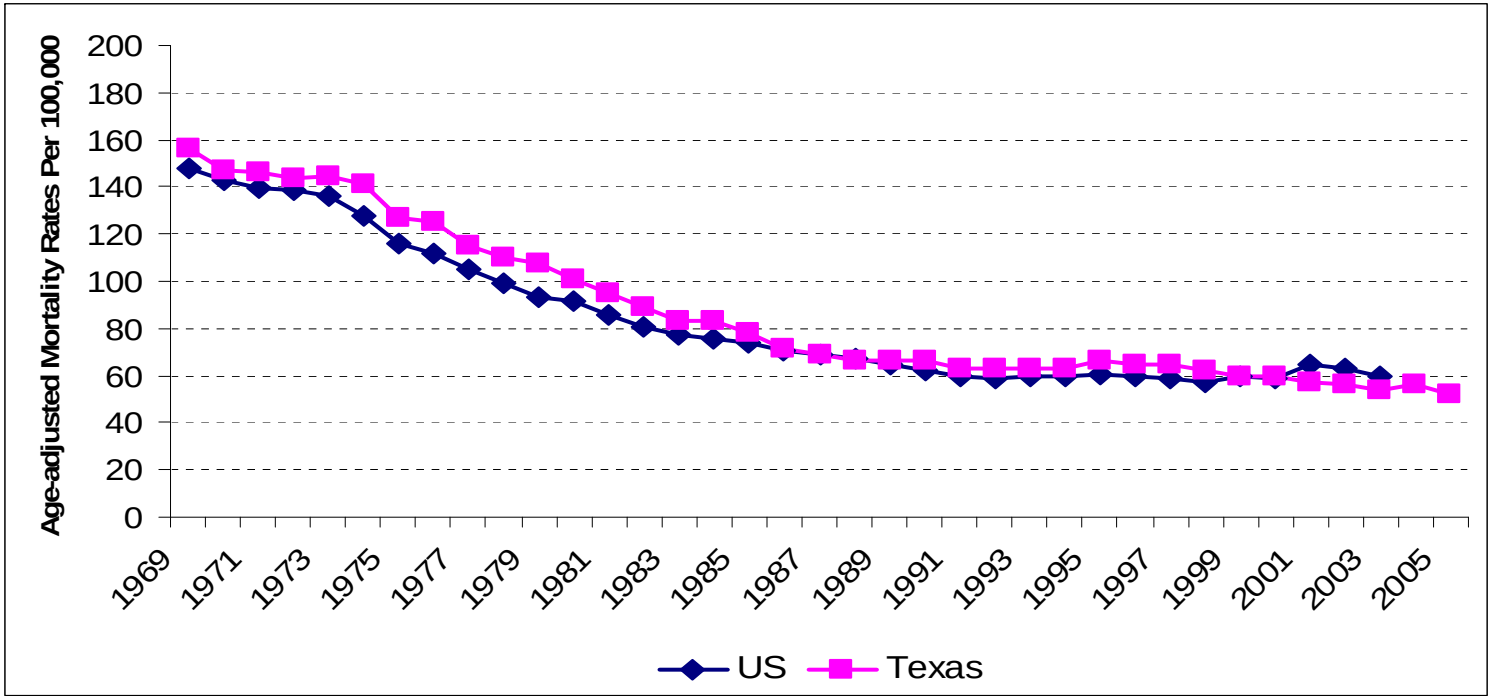
5-year Average Age-Adjusted Mortality Rates Per 100,000, Texas 2001-2005



Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 2001-2005

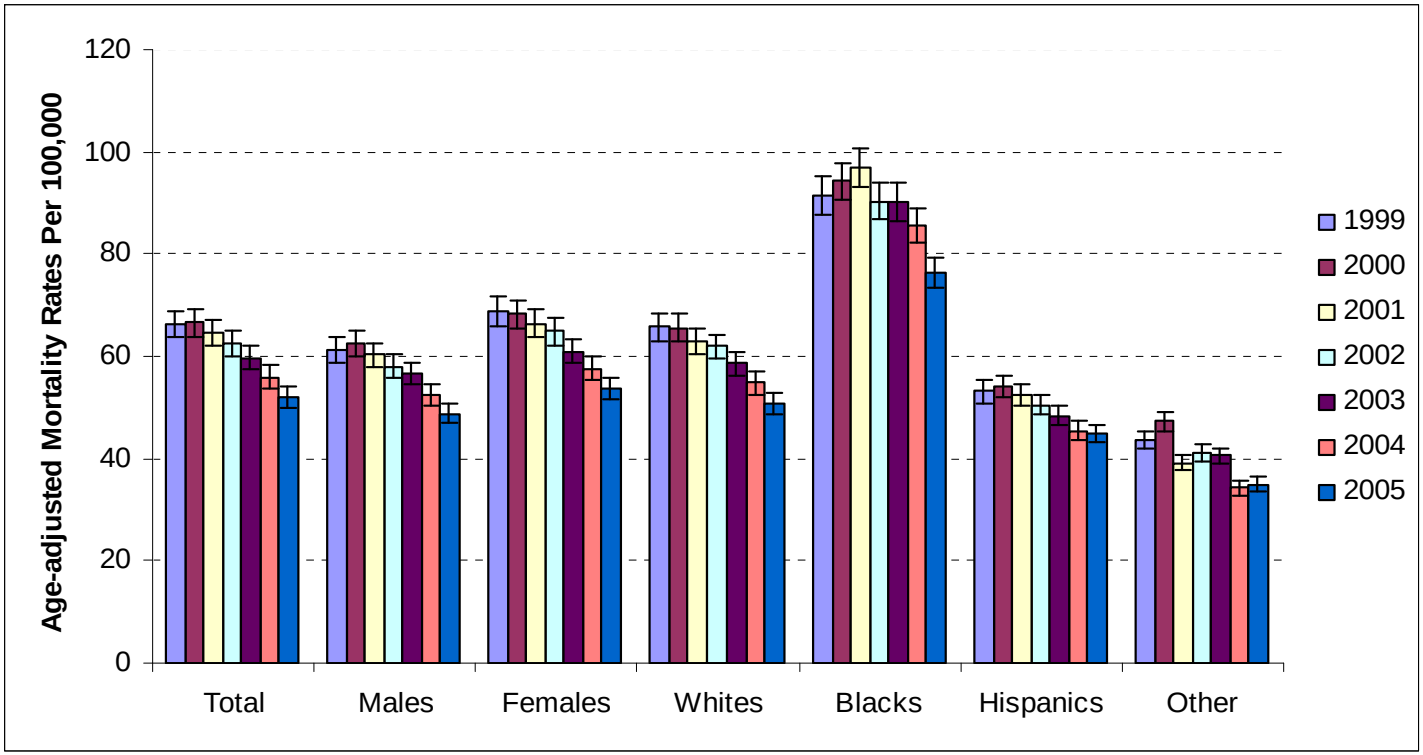
Stroke

Stroke Mortality Trends, US and Texas, 1969-2005



Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 1969-2005

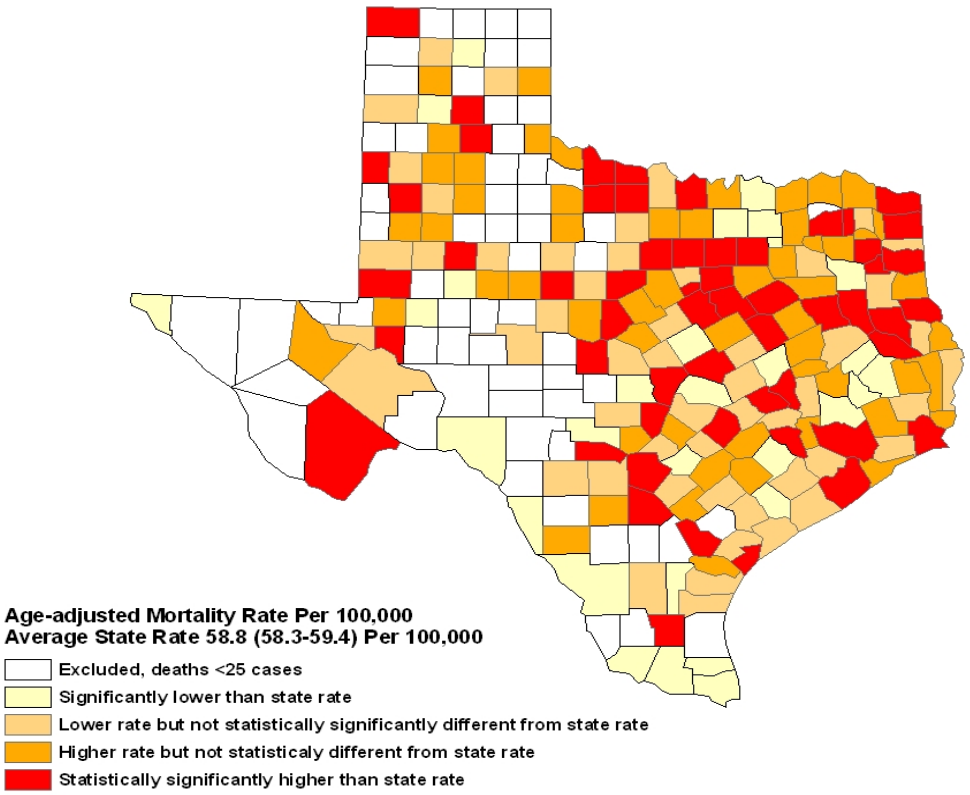
Mortality Rates for Stroke, Texas 1999-2005



Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 1999-2005

Stroke (ICD 10 I60-I69)

5-year Average Age-Adjusted Mortality Rates Per 100,000, Texas 2001-2005



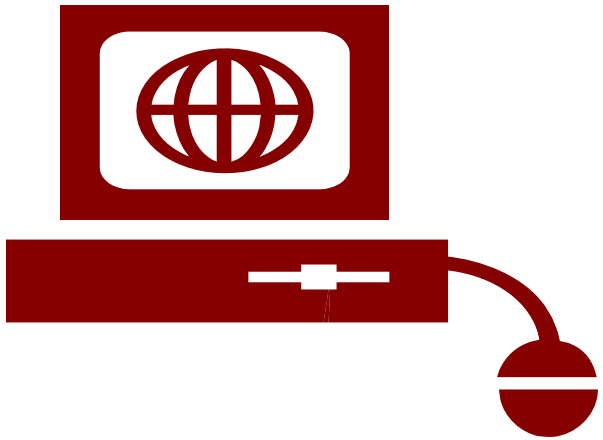
Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 2001-2005

Disparities in Heart Disease and Stroke Mortality in Texas

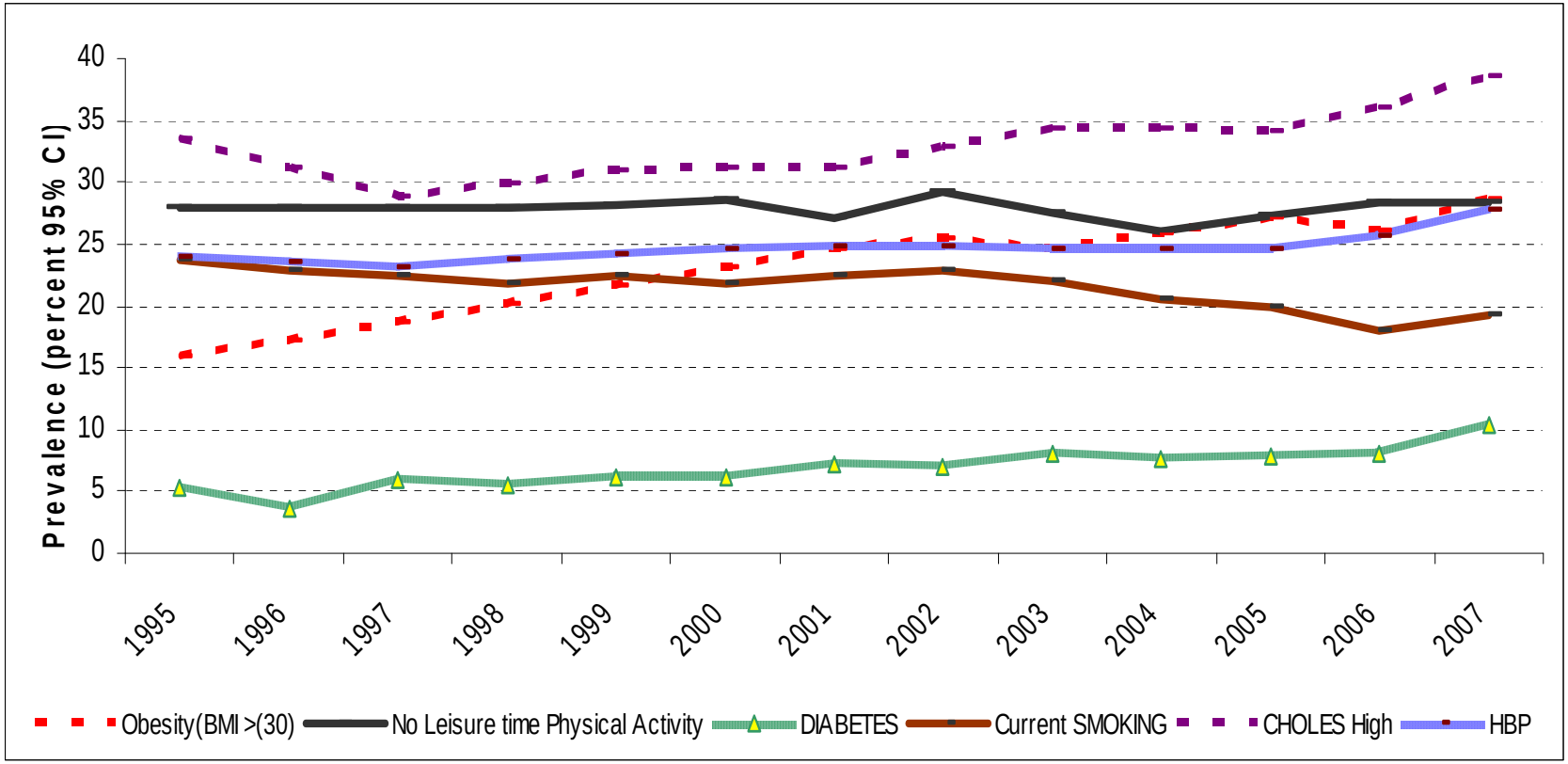
- The overall age-adjusted mortality rates (AAMR) for ischemic heart disease (IHD) and stroke have steadily declined since 1970.
- Texas males had a higher risk of dying from IHD than females.
- Texas females had a higher risk of dying from stroke than males.
- African Americans had a higher risk of dying from IHD and stroke than Whites, Hispanics and Others.

More Information on Mortality Data

- http://www.dshs.state.tx.us/vs/default.shtm

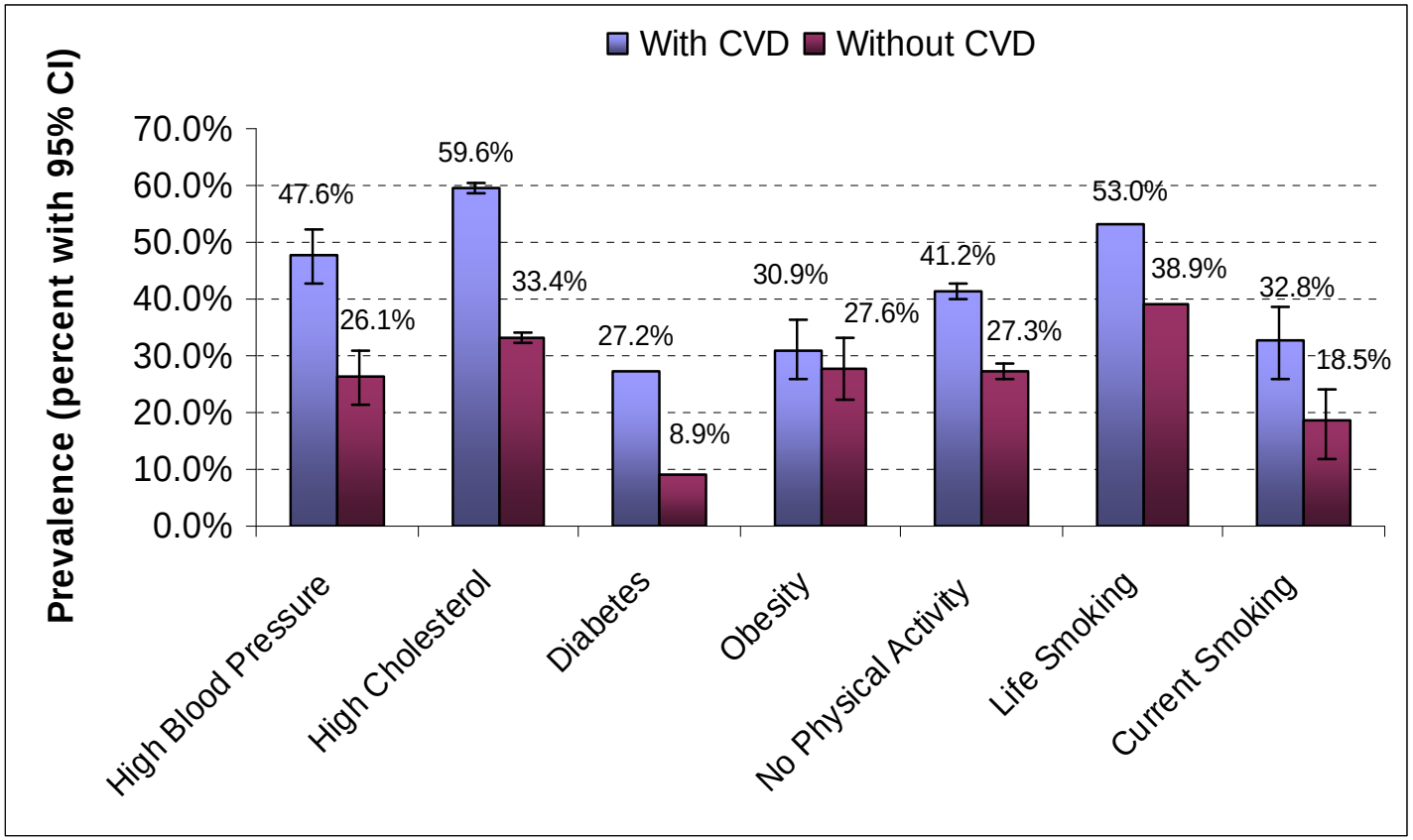


Prevalence of Risk Factors for CVD and Stroke, Texas, 1995-2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2007

Prevalence of Risk Factors With and Without CVD, Texas 2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Behavioral Risk Factors

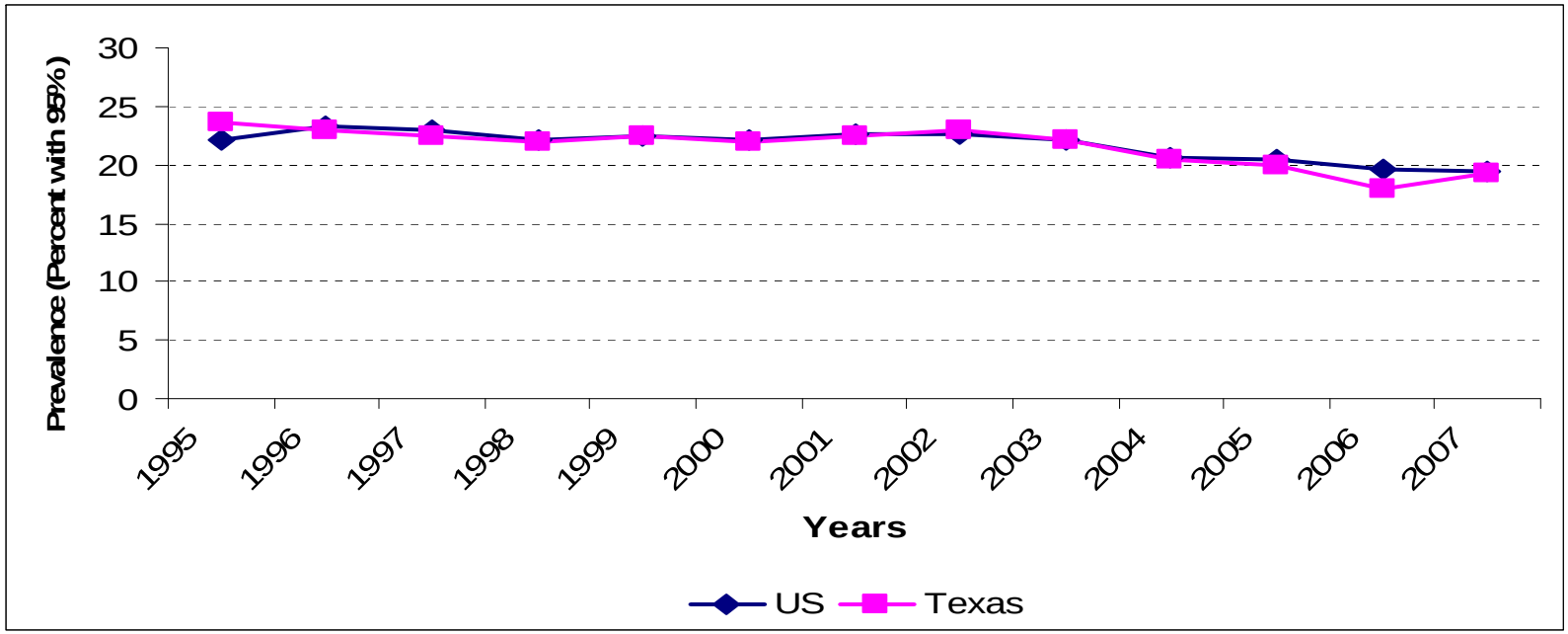
Cigarette Smoking

Overweight/Obesity

Lack of Physical Activity

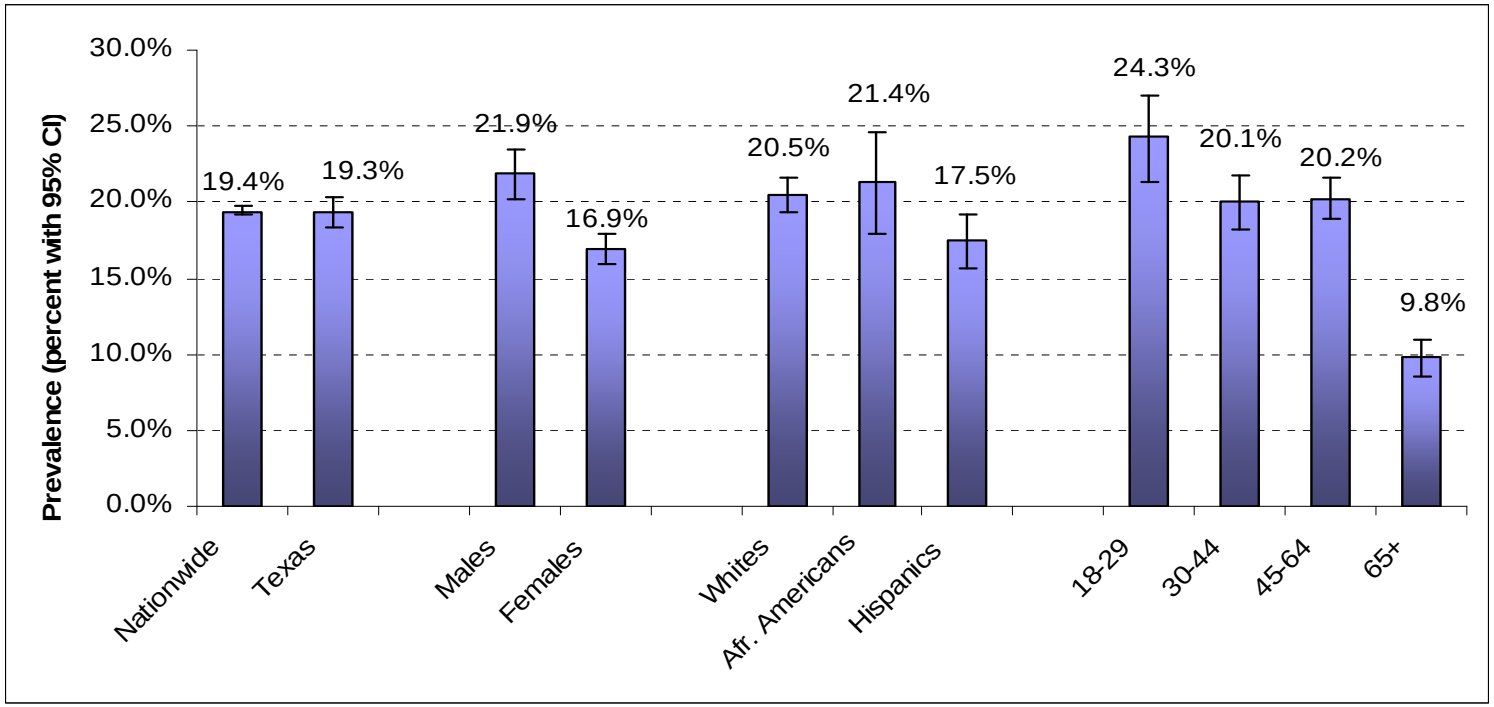
Poor Nutrition

Prevalence of Current Cigarette Smoking
Texas and US Adults, 1995-2007



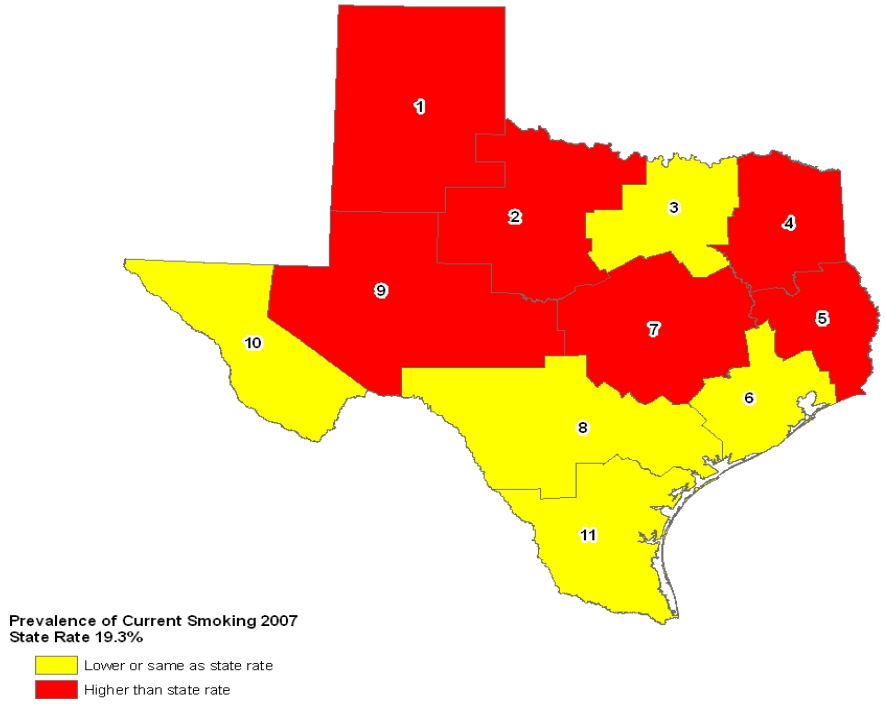
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2007

Prevalence of Current Smoking
by Demographic, Texas, 2007



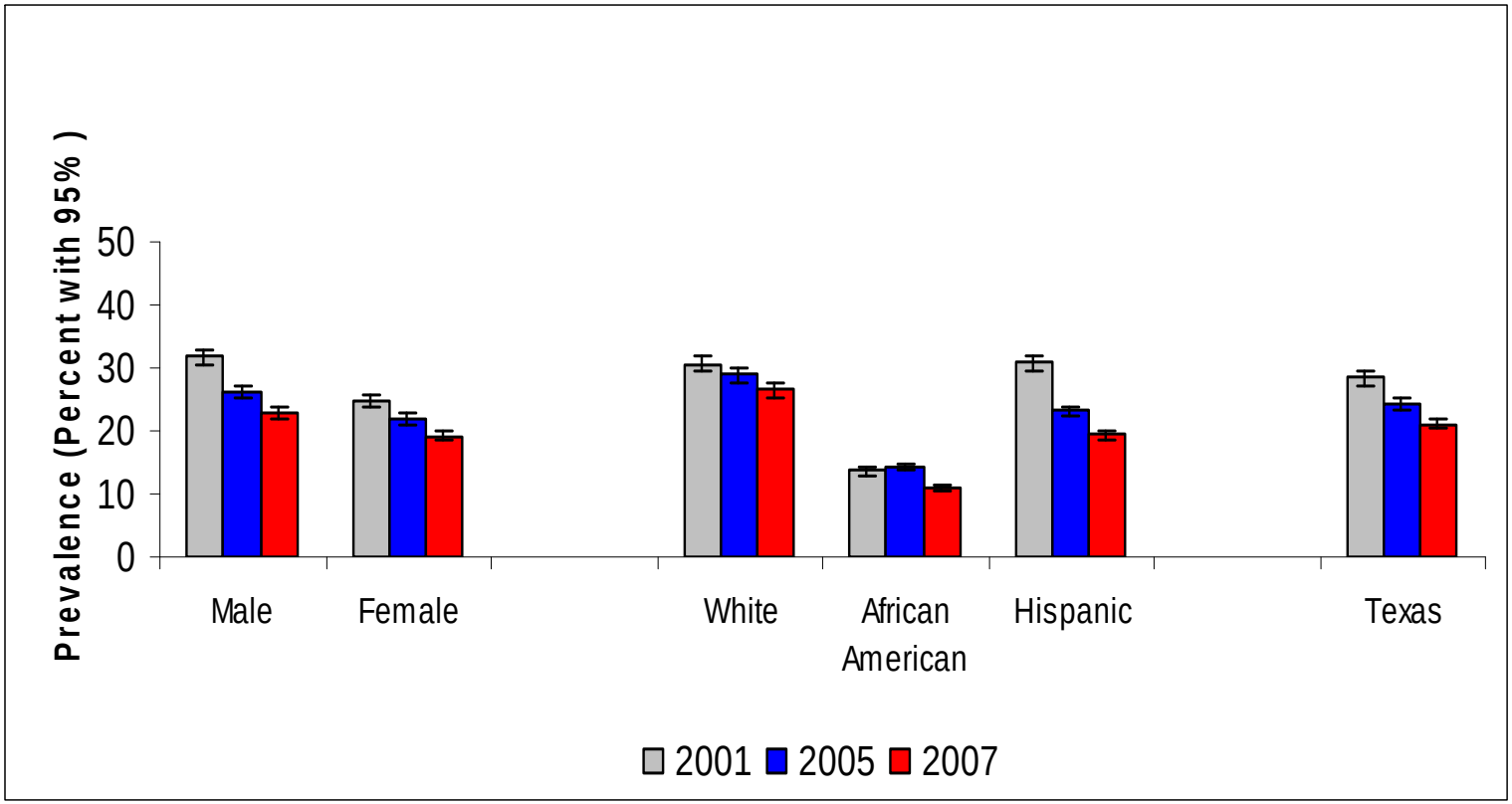
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Adult Cigarette Smoking
by Health Service Region, 2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Prevalence of Cigarette Smoking* Among Youth Texas, 2001, 2005, & 2007



Data Source: Texas Youth Risk Behavior Surveys (YRBS), Texas Department of State Health Services, 2001, 2005, 2007 High School Survey

*Percentage of Students who smoked cigarettes on one or more of the past 30 days

Overweight/Obesity

- Adults

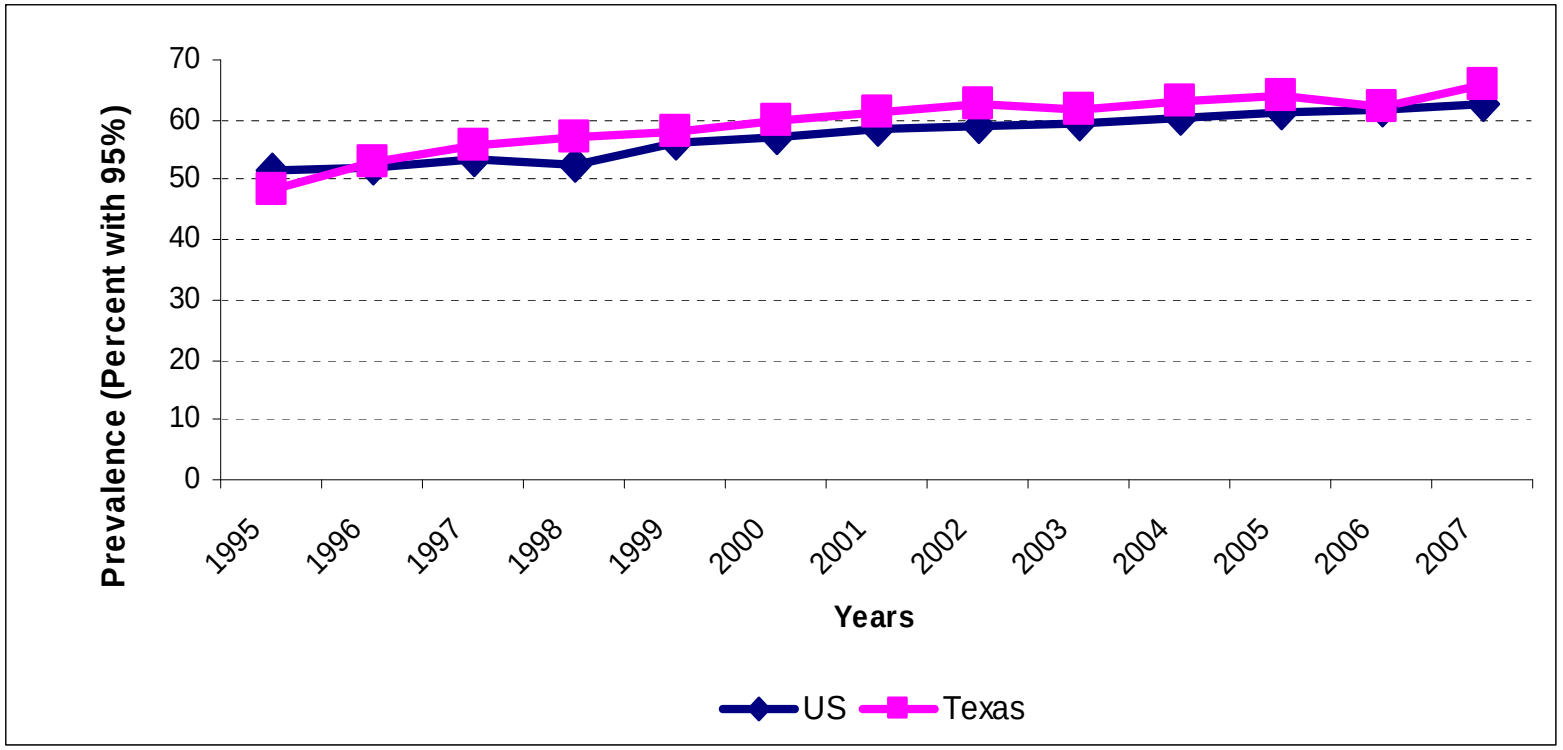
  Overweight: (BMI 25 or greater)

  Obesity: (BMI 30 or greater)

- Youth

  Overweight: (at or above the 95th percentile for BMI by age and sex)

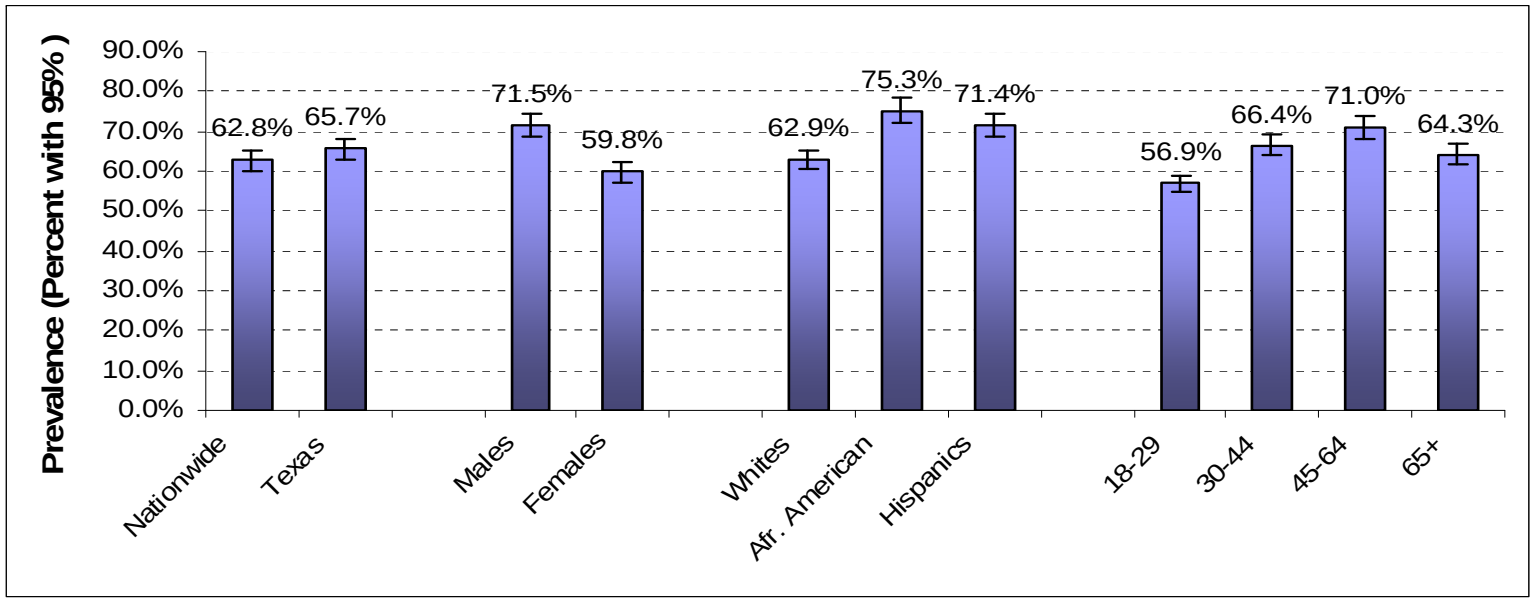
Prevalence of Overweight or Obesity Texas and US Adults, 1995-2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2007

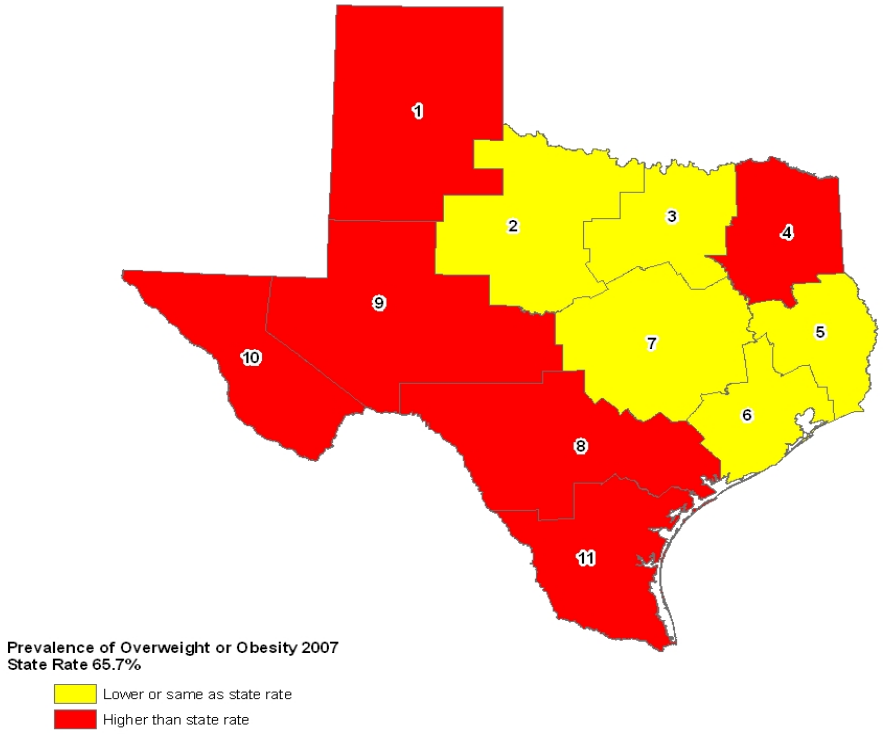
Prevalence of Overweight or Obesity

by Demographic, Texas, 2007



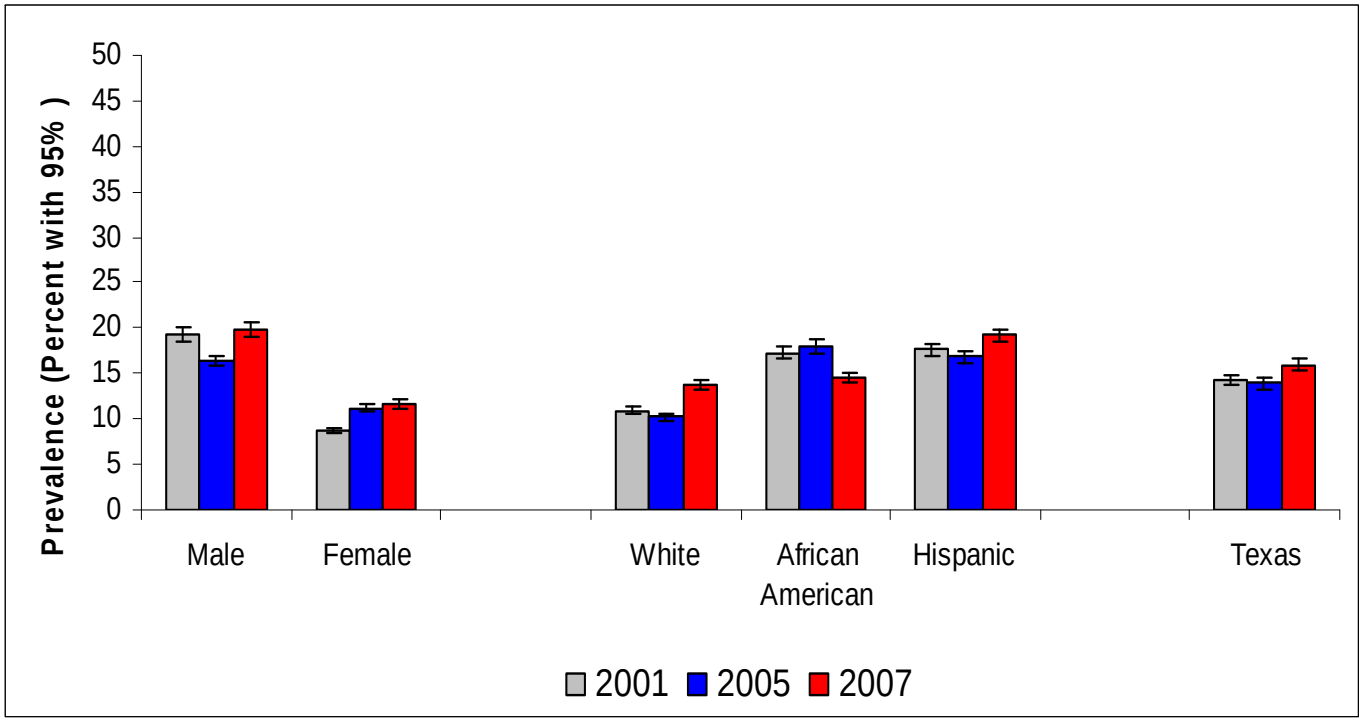
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Prevalence of Overweight or Obesity
by Health Service Region, 2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Prevalence of Overweight among Youth
Texas, 2001, 2005, & 2007



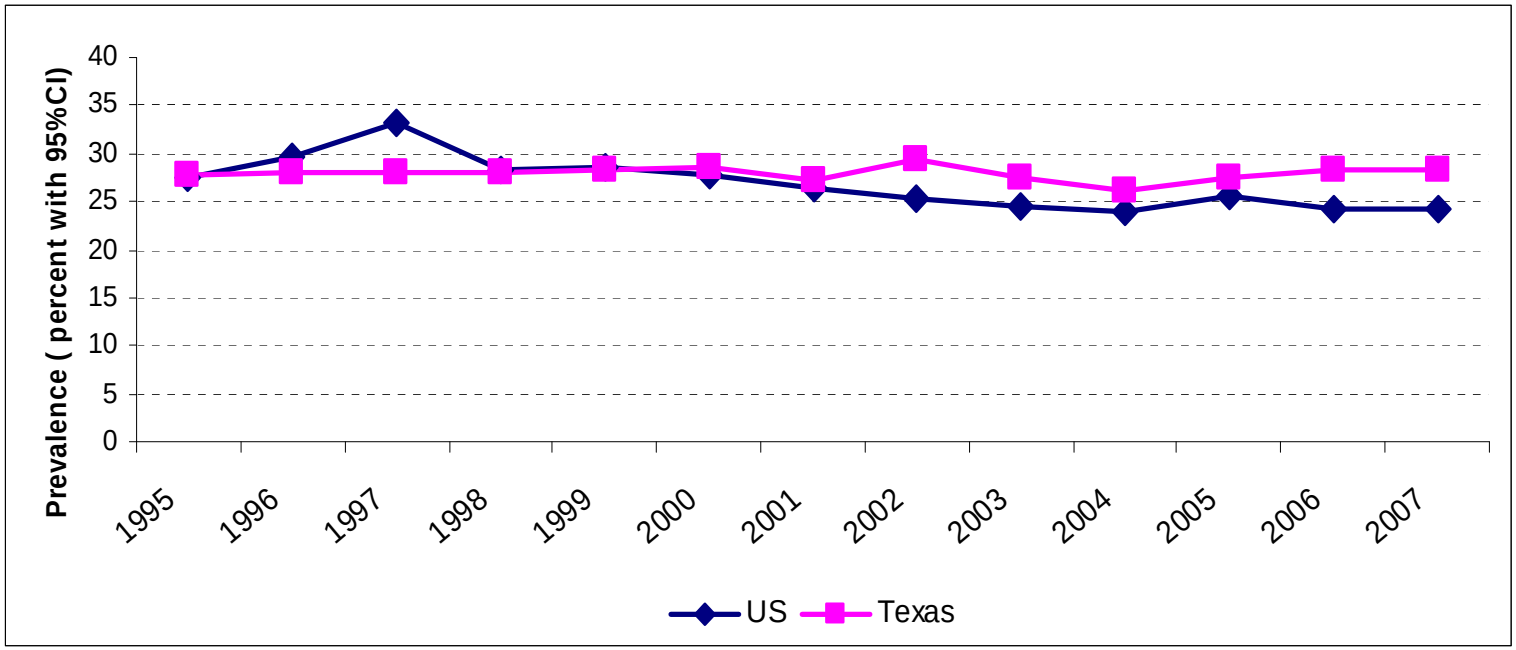
Data Source: Texas Youth Risk Behavior Surveys (YRBS), Texas Department of State Health Services, 2001, 2005, 2007 High School Survey

Lack of Physical Activity

- Regular physical activity greatly reduces a person's risk of dying from heart disease and decreases the risk for colon cancer, diabetes and high blood pressure
- Defined as No Leisure Time Physical Activity within the past 30 Days

Prevalence of No Leisure Time Physical Activity,

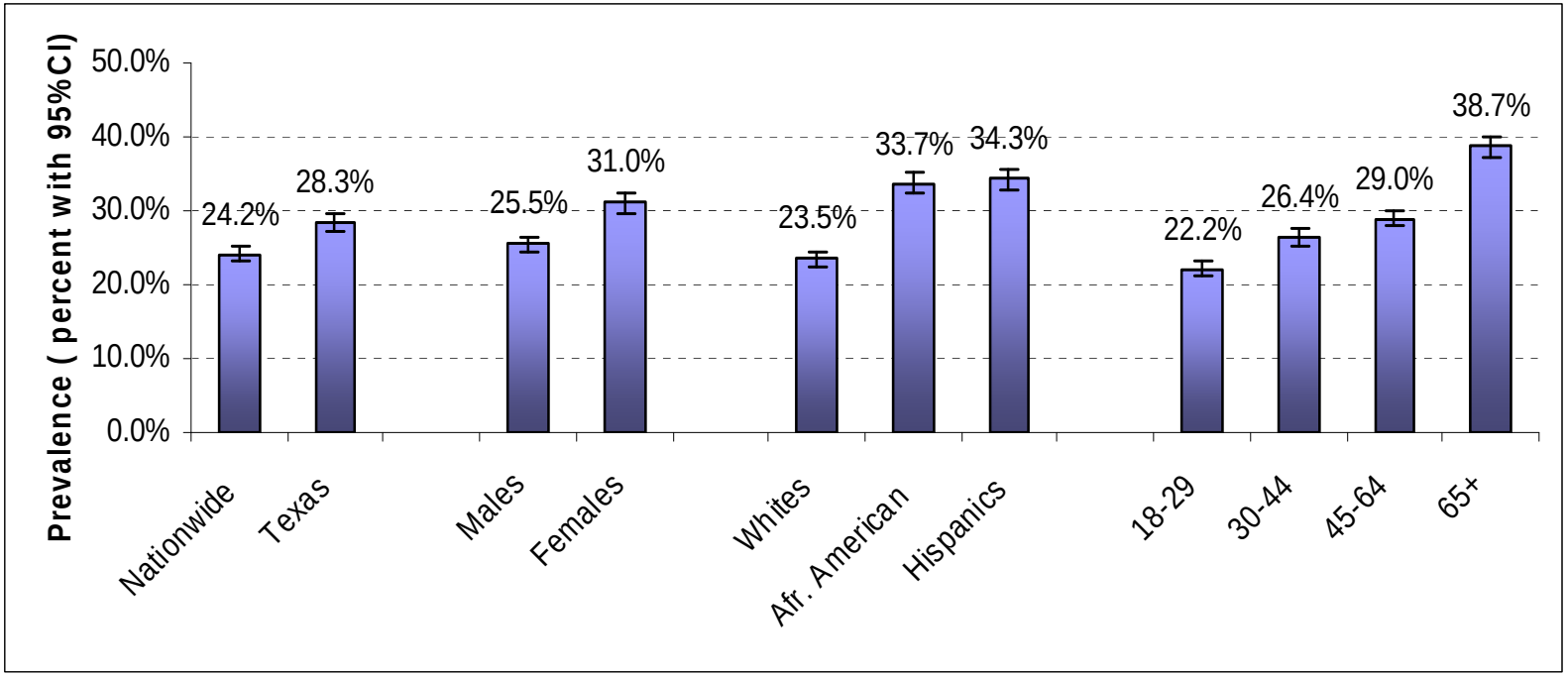
Texas and US Adults, 1995-2007



* During the past 30 days, did you participate in any physical activities or exercise?
% of adults who did not participate in any physical activities during the past 30 days

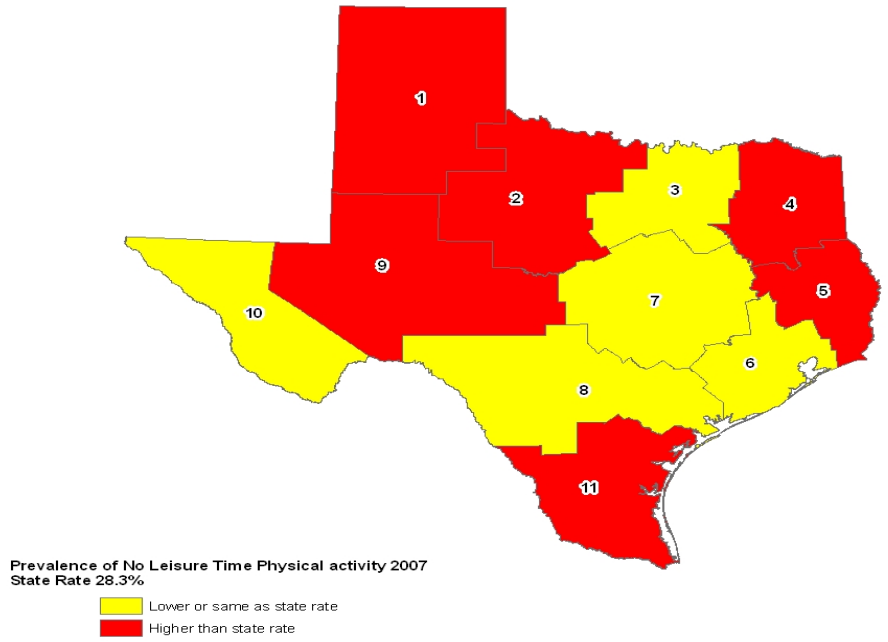
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2007

Prevalence of No Leisure Time Physical Activity, by Demographic, Texas, 2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Prevalence of No Leisure Time Physical Activity, by Health Service Region, Texas, 2007



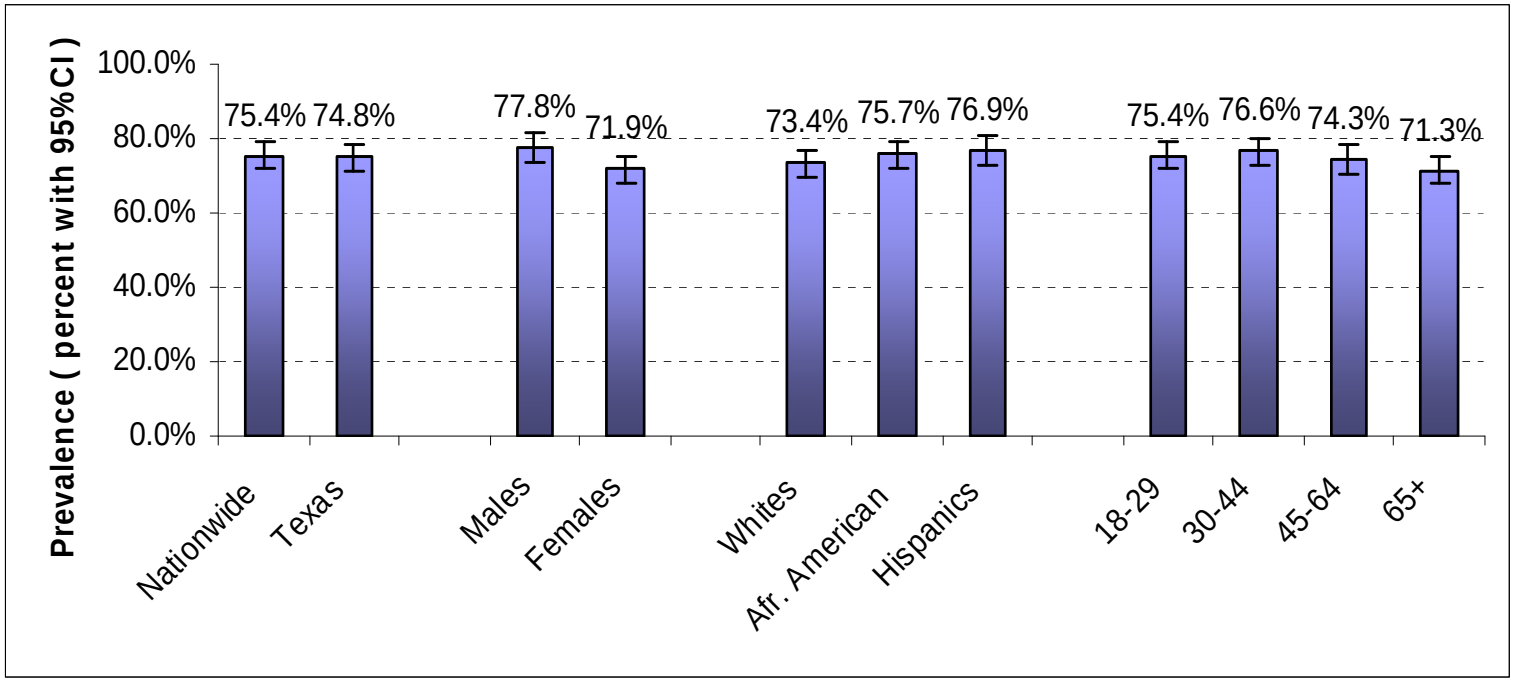
* During the past 30 days, did you participate in any physical activities or exercise?
% of adults who did not participate in any physical activities during the past 30 days

Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Intake of Fruit & Vegetables < 5 times a day

- Good nutrition, including a diet that is low in saturated fats and high in fruits and vegetables, plays a key role in maintaining good health.
- Improving the American diet could extend the productive life span of Americans and reduce the occurrence of chronic diseases.

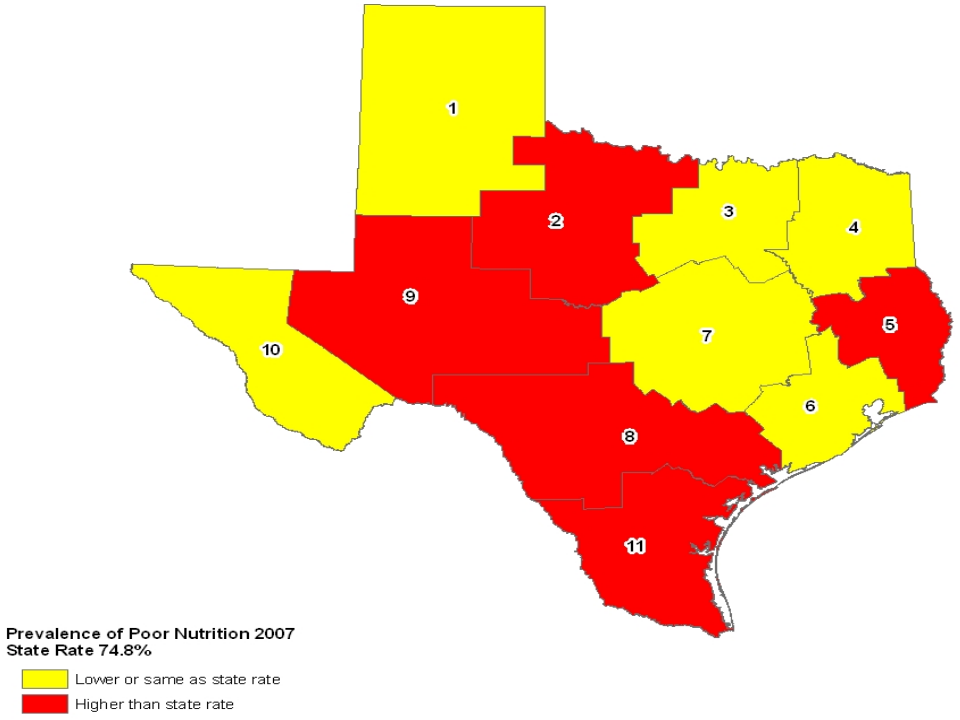
Prevalence of Fruit & Vegetable Intake < 5 Times a day, by Demographic, Texas, 2007



* % of adults who reported eating fewer than 5 servings of fruits and vegetables per day

Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Prevalence of Fruit & Vegetable Intake < 5 Times a day by Health Service Region, Texas, 2007

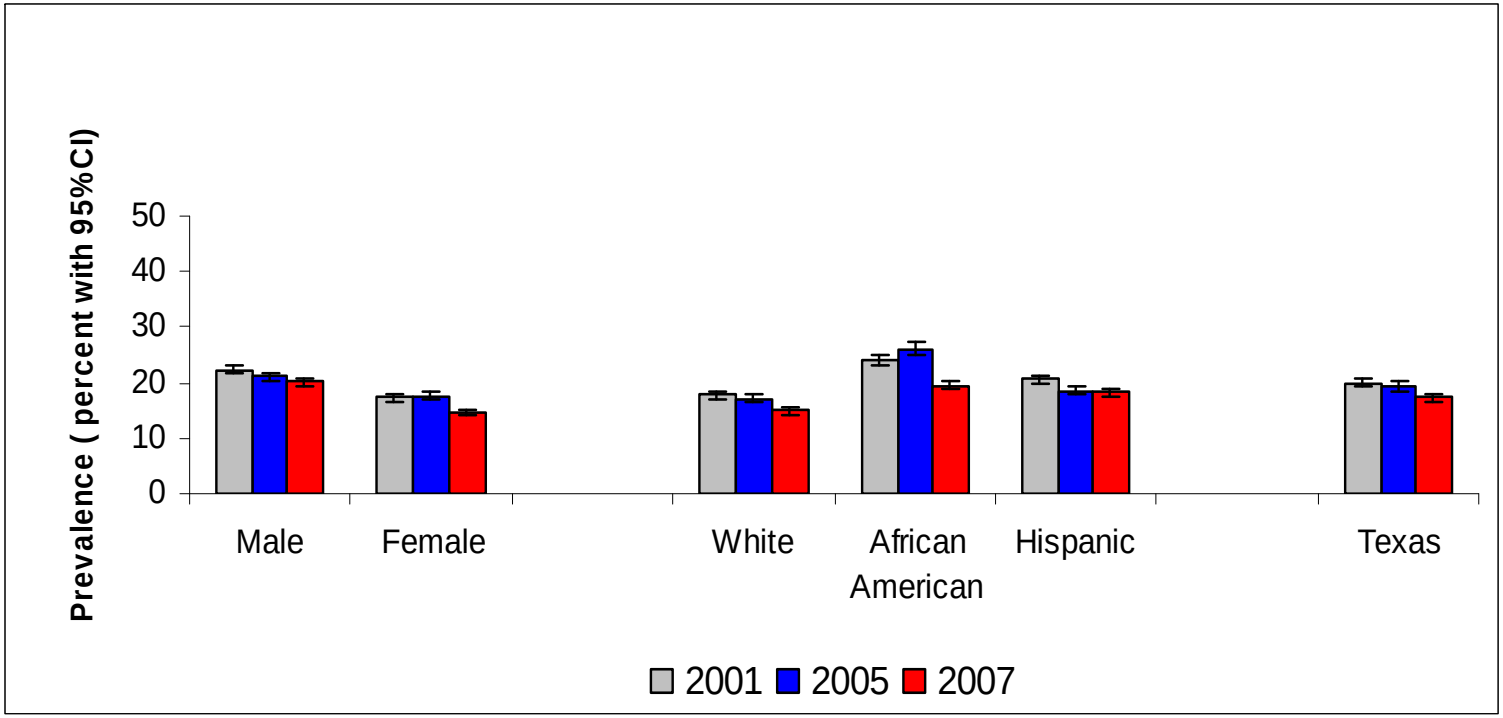


* % of adults who reported eating fewer than 5 servings of fruits and vegetables per day

Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

Prevalence of Fruit & Vegetable Intake < 5 Times a day Among

Texas Public High School Students, 2001,2005, & 2007



Data Source: Texas Youth Risk Behavior Surveys (YRBS), Texas Department of State Health Services, 2001, 2005, 2007 High School Survey

Behavioral Risk Factors

- The prevalence of current smoking in Texas was similar to the national average, around 19%, in 2007.
- Texas prevalence of overweight or obesity was higher than the national average in 2007.
- Texas prevalence of no leisure time physical activity was significantly higher than the national average (29% vs 24%) in 2007.
- Around 75% of adults consumed fruits & vegetables less than 5 times per day in 2007.

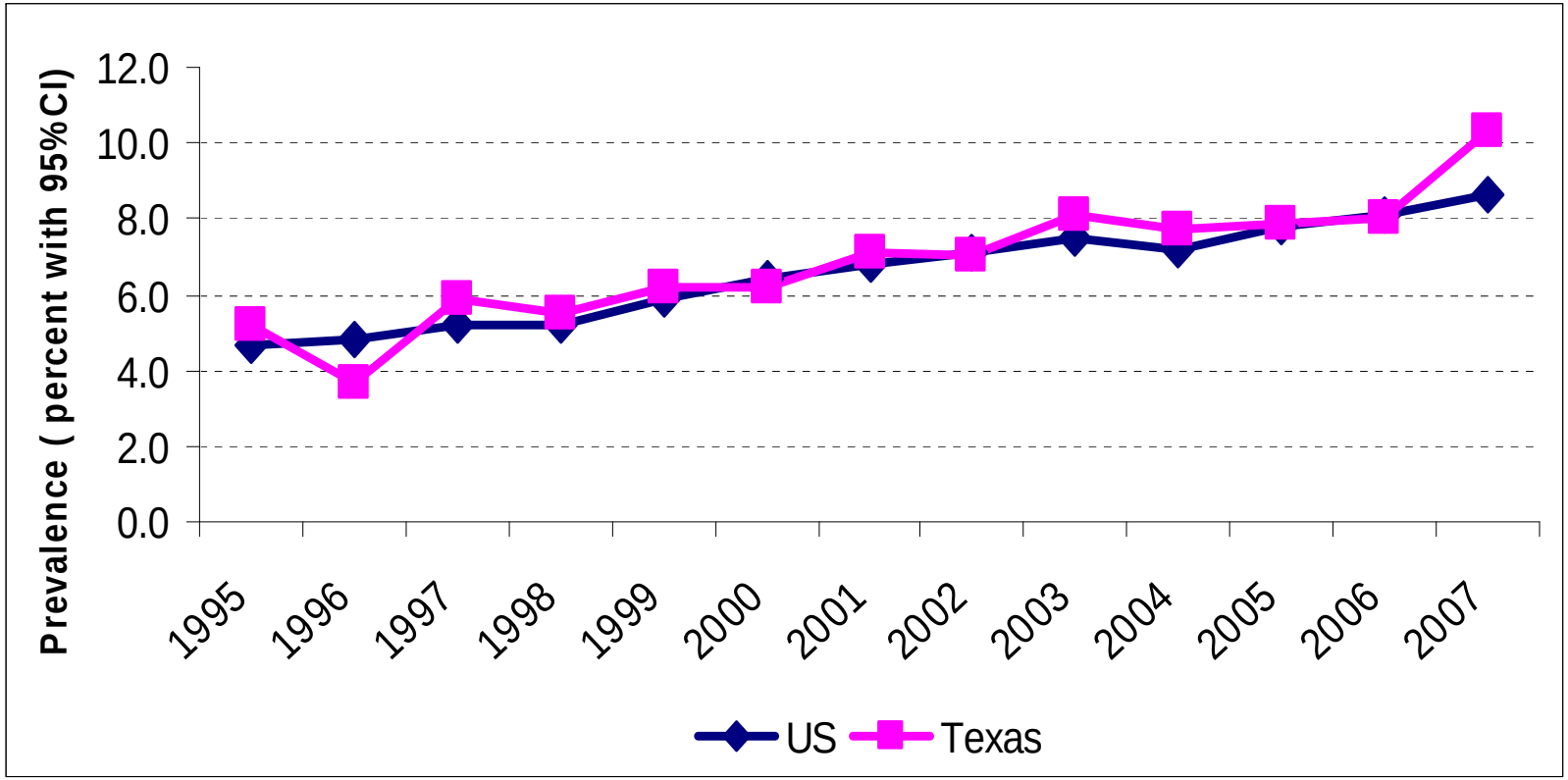
Medical Risk Factors

Diabetes

High Cholesterol

High Blood Pressure

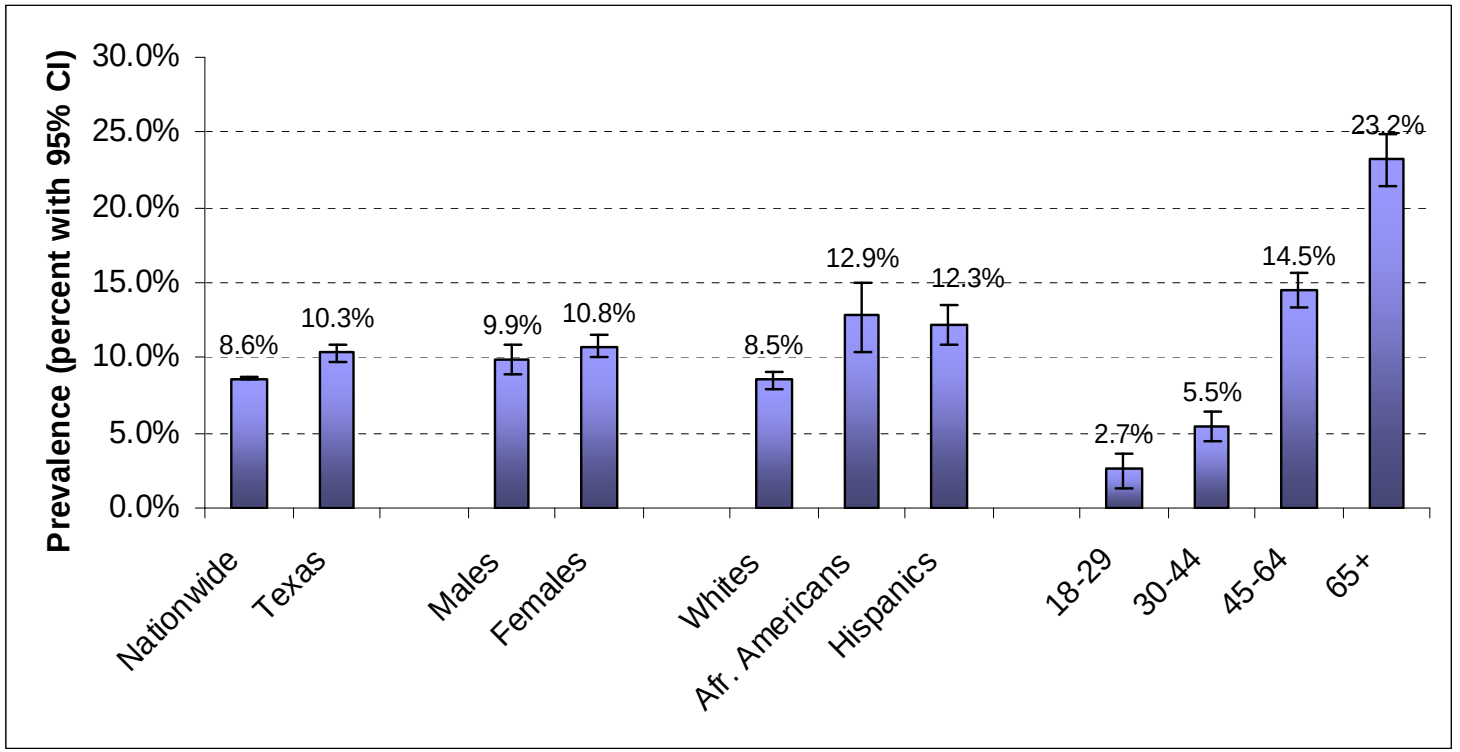
Prevalence of Diabetes,
Texas and US Adults, 1995-2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2007

Prevalence of Diabetes,

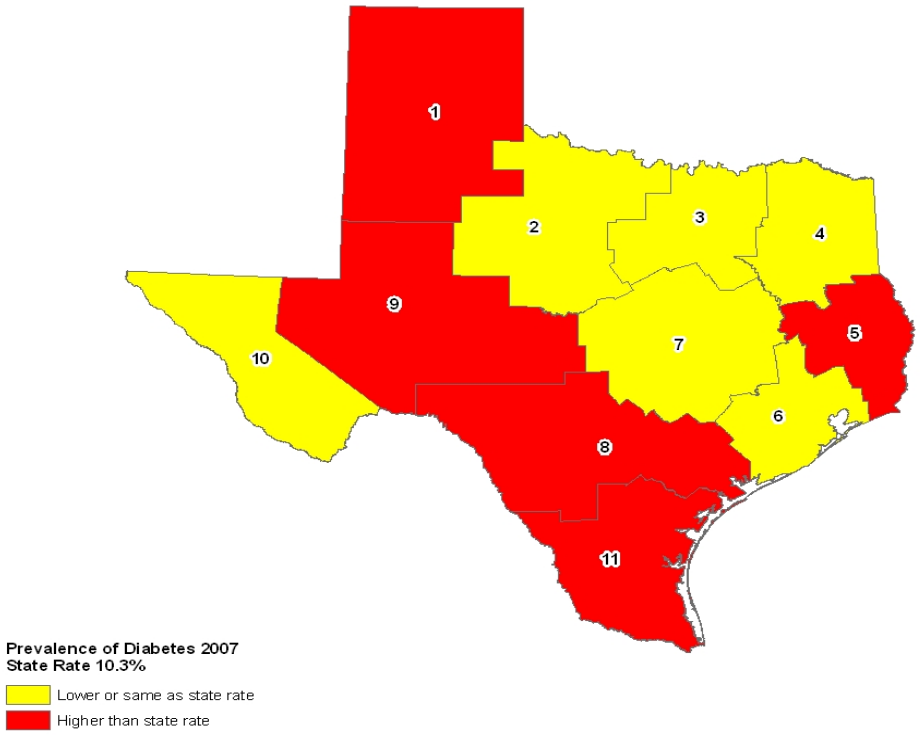
by Demographic, Texas, 2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

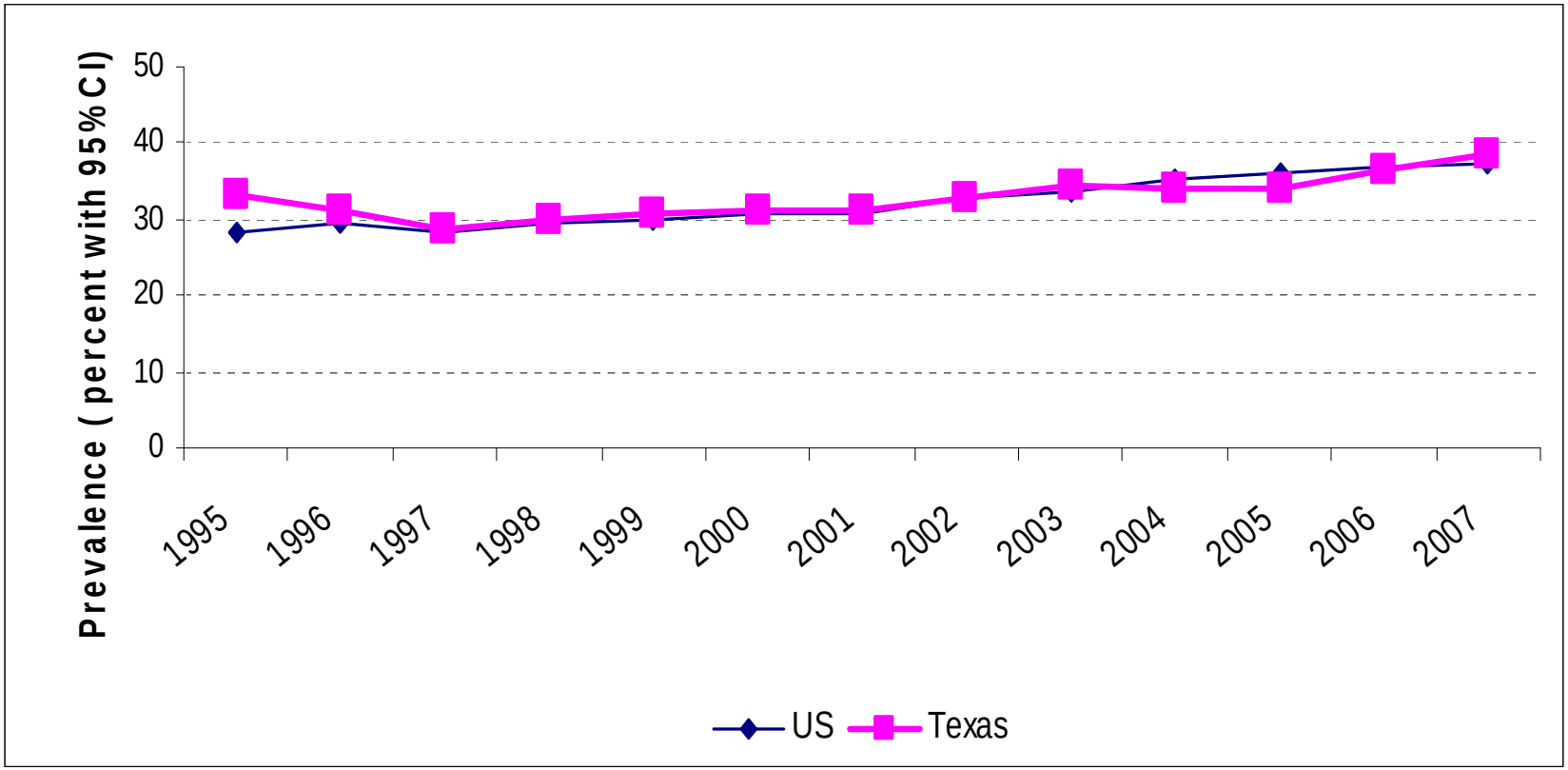
Prevalence of Diabetes,

by Health Service Region, 2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

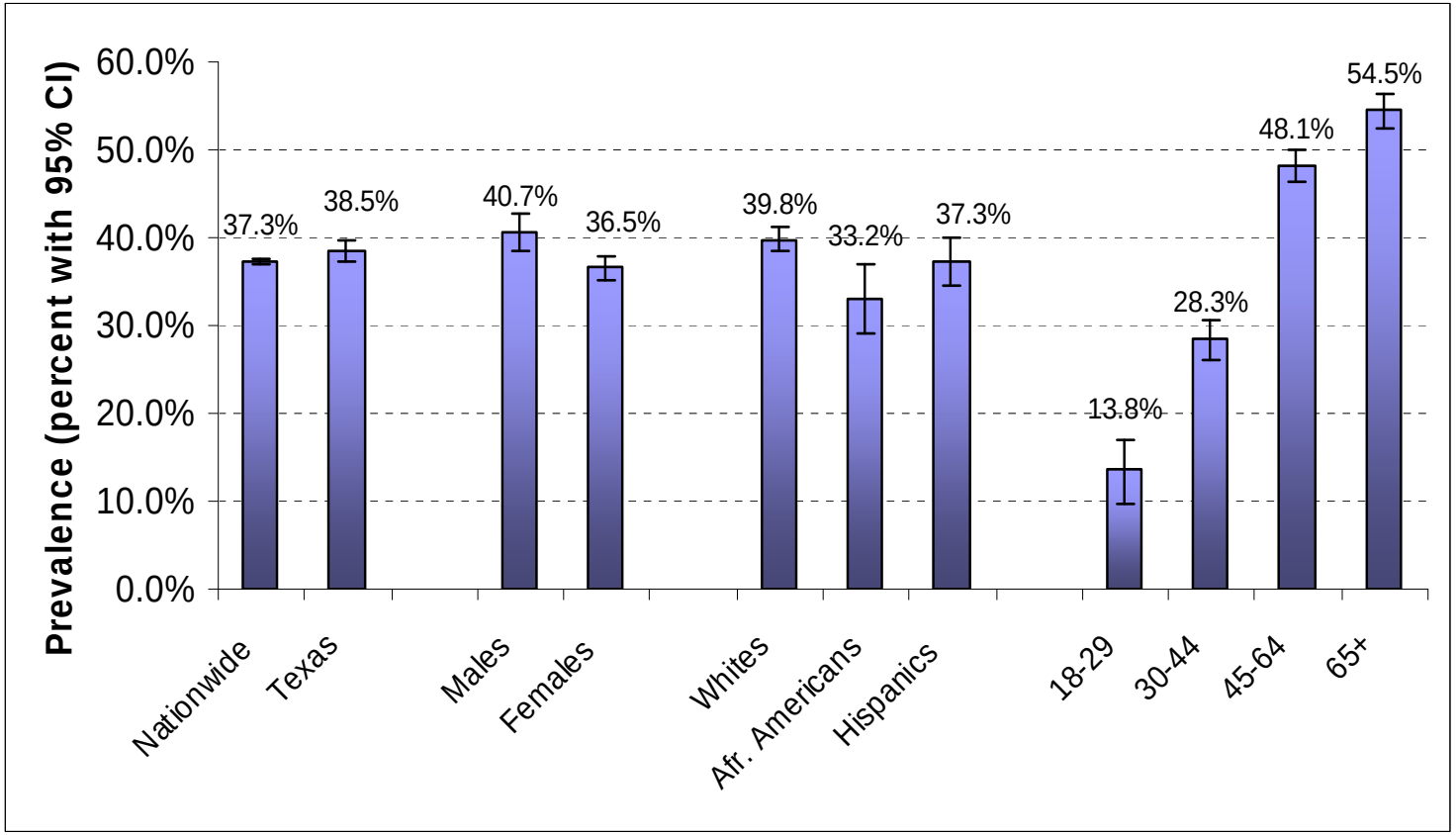
Prevalence of High Cholesterol, Texas and US Adults, 1995-2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2007

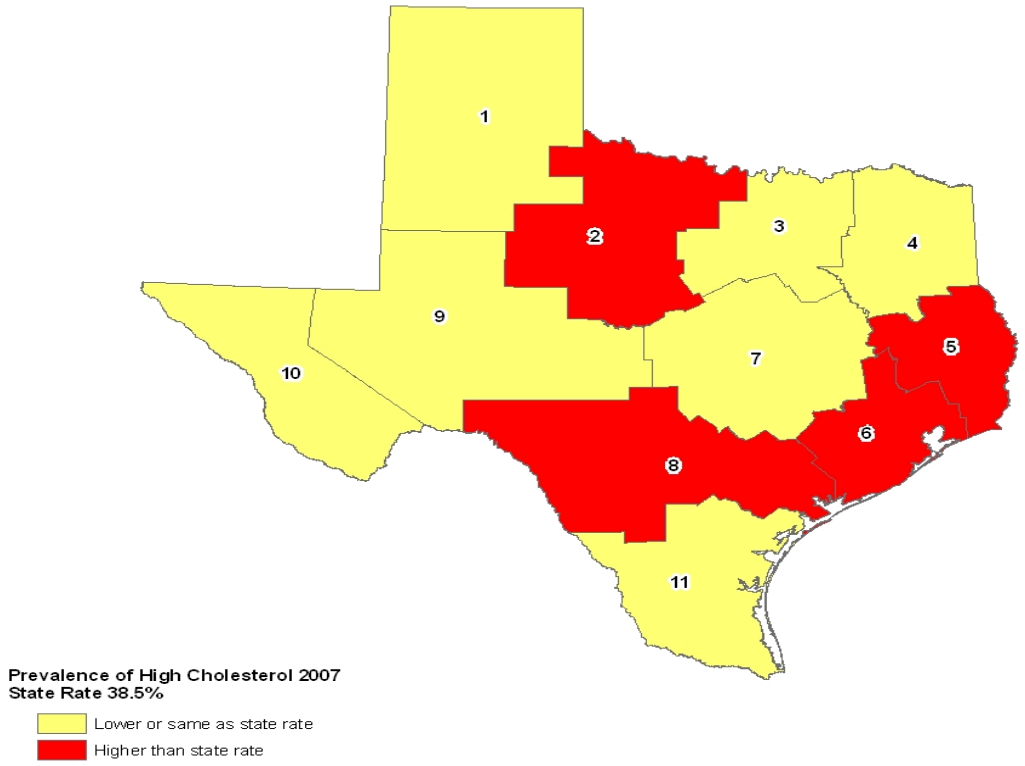
Prevalence of High Cholesterol,

by Demographic, Texas, 2007



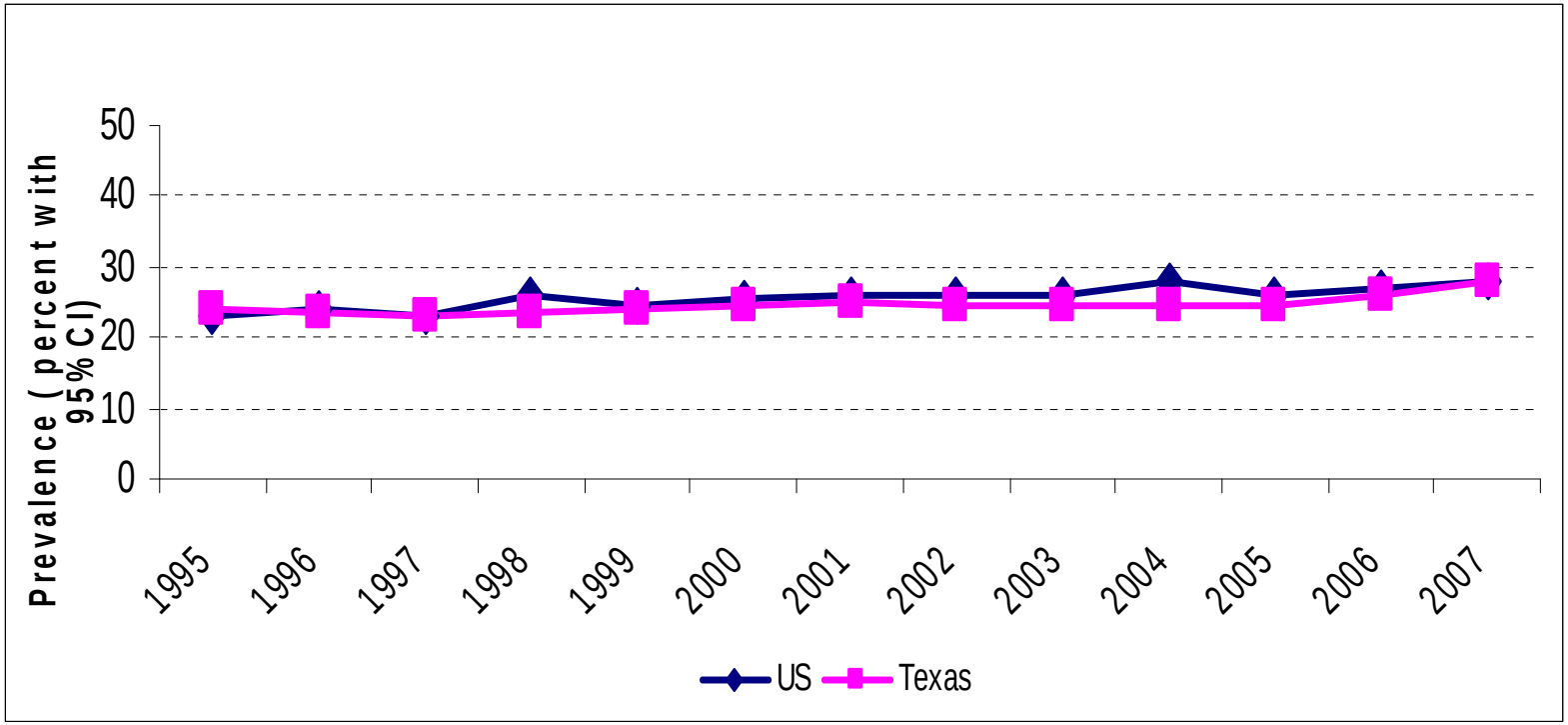
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Prevalence of High Cholesterol
by Health Service Region, 2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

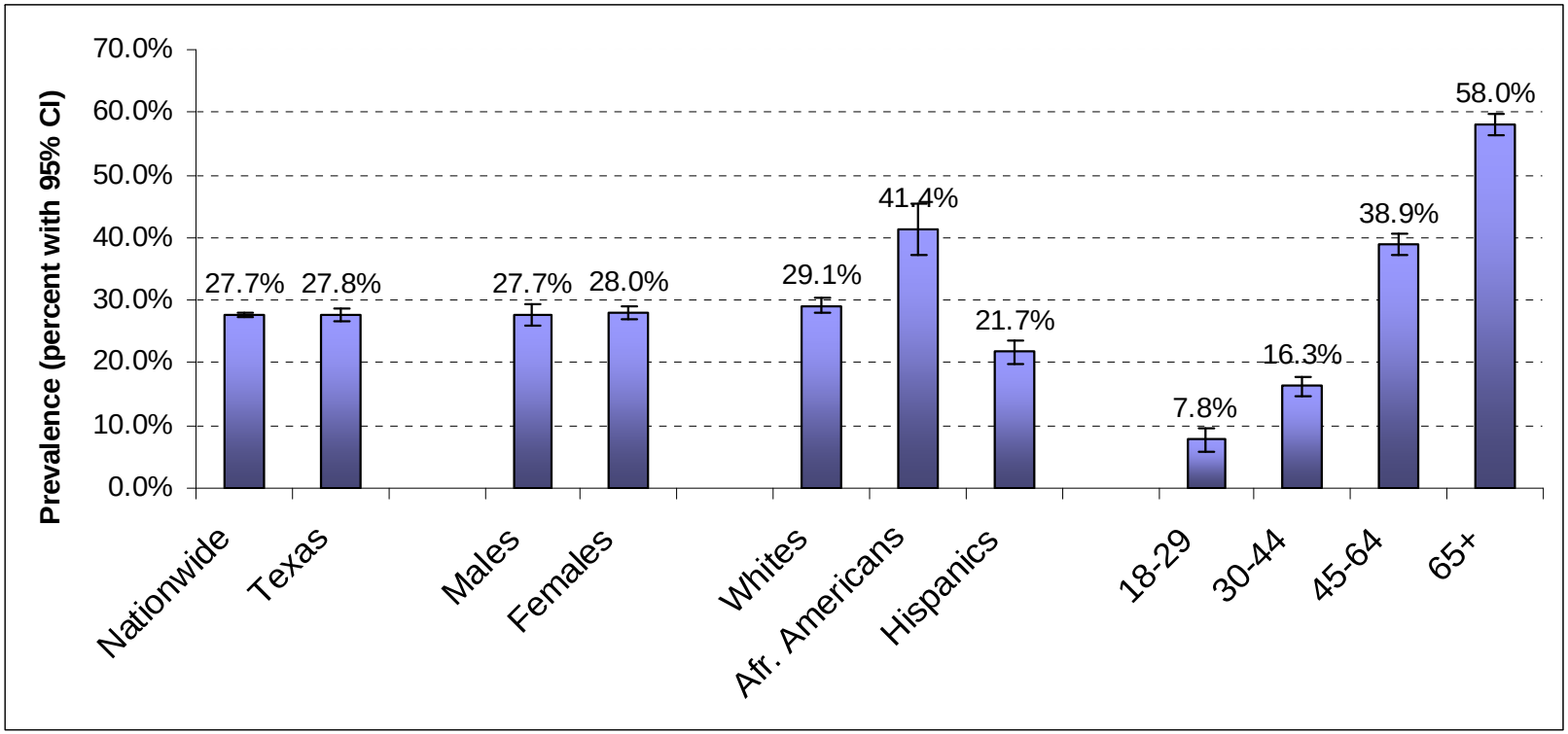
Prevalence of High Blood Pressure, Texas and US Adults, 1995-2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2007

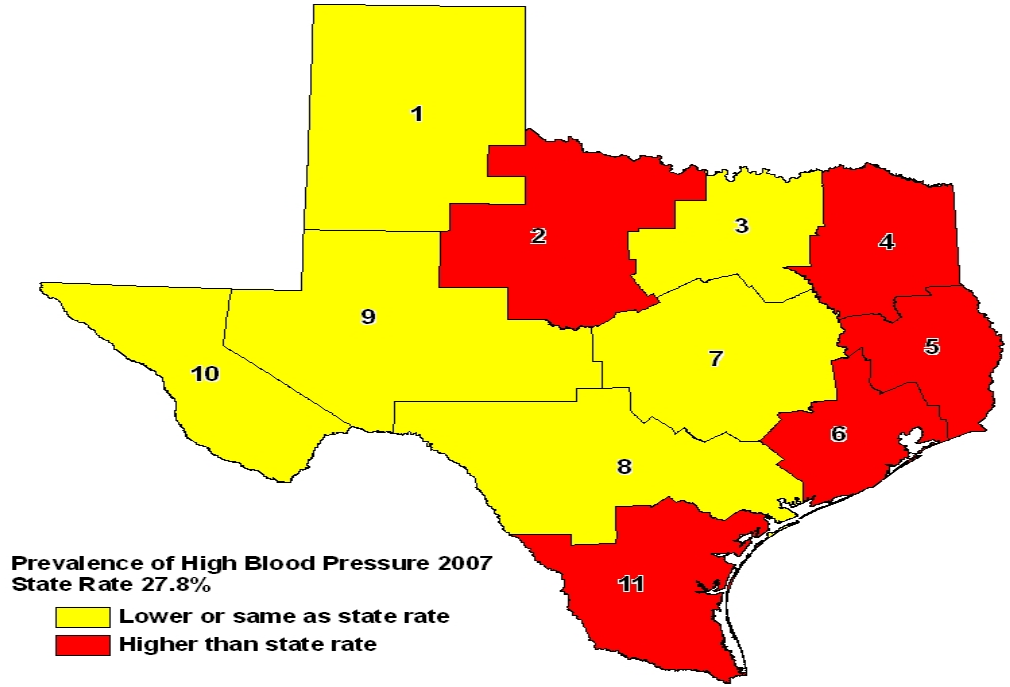
Prevalence of High Blood Pressure,

by Demographic, Texas, 2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Prevalence of High Blood Pressure
by Health Service Region, 2007



Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2007

Medical Risk Factors

- The prevalence of diabetes among adult Texans has been rising since 1995.
- Texas prevalence of diabetes was significantly higher than the national average (10.3% vs 8.8%) in 2007.
- Texas prevalence of high blood cholesterol was similar to the national average in 2007.
- More than 27% of adult Texans reported being diagnosed with high blood pressure in 2007.

Financial Burden

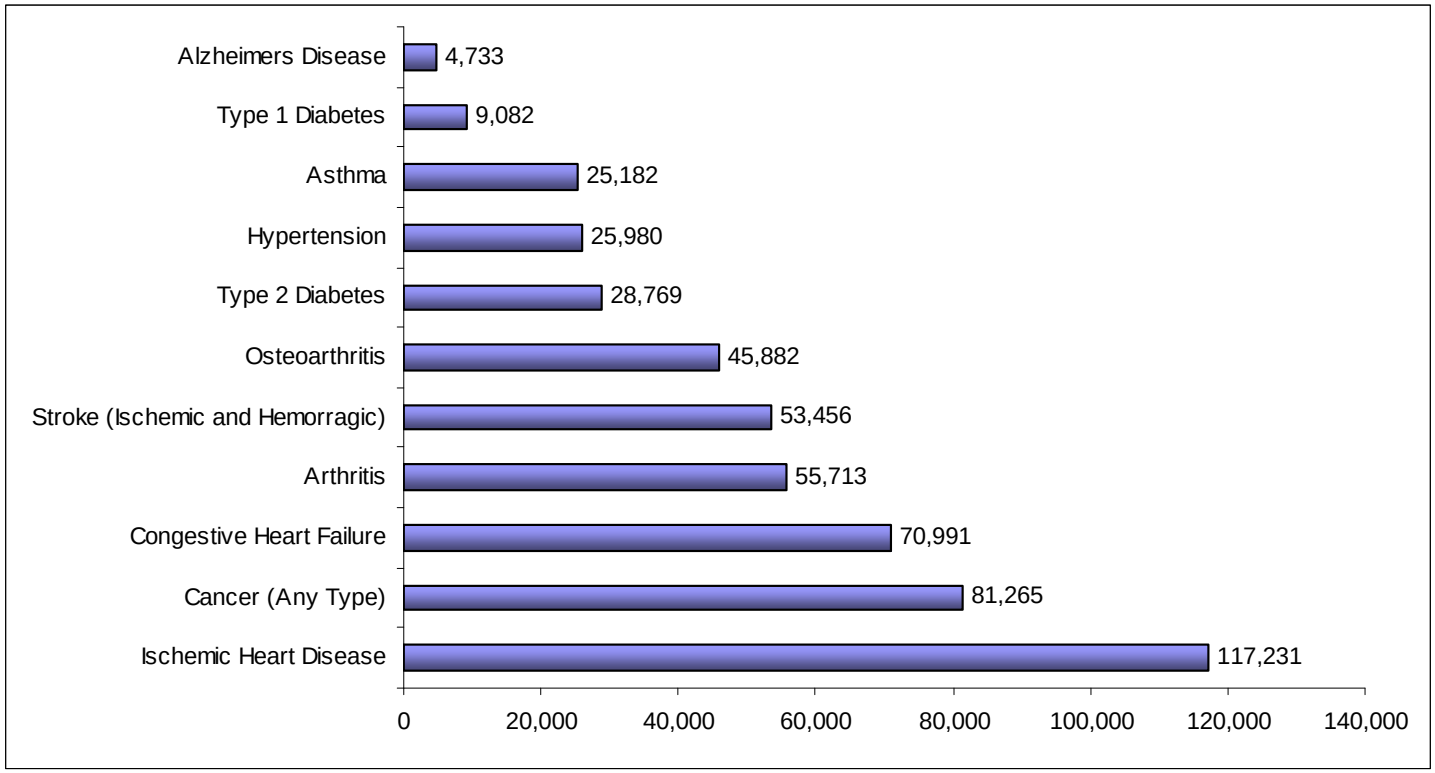
Hospital Discharge Data

- Hospital discharge data has been compiled and tabulated by the Texas Health Care Information Collection (THCIC) since 1999.
- THCIC is required to provide a public use data file (PUDF) for computer-to-computer access.
- The PUDF contains patient level information for inpatient hospital stays.

Classes of Diagnoses (ICD-9 codes):

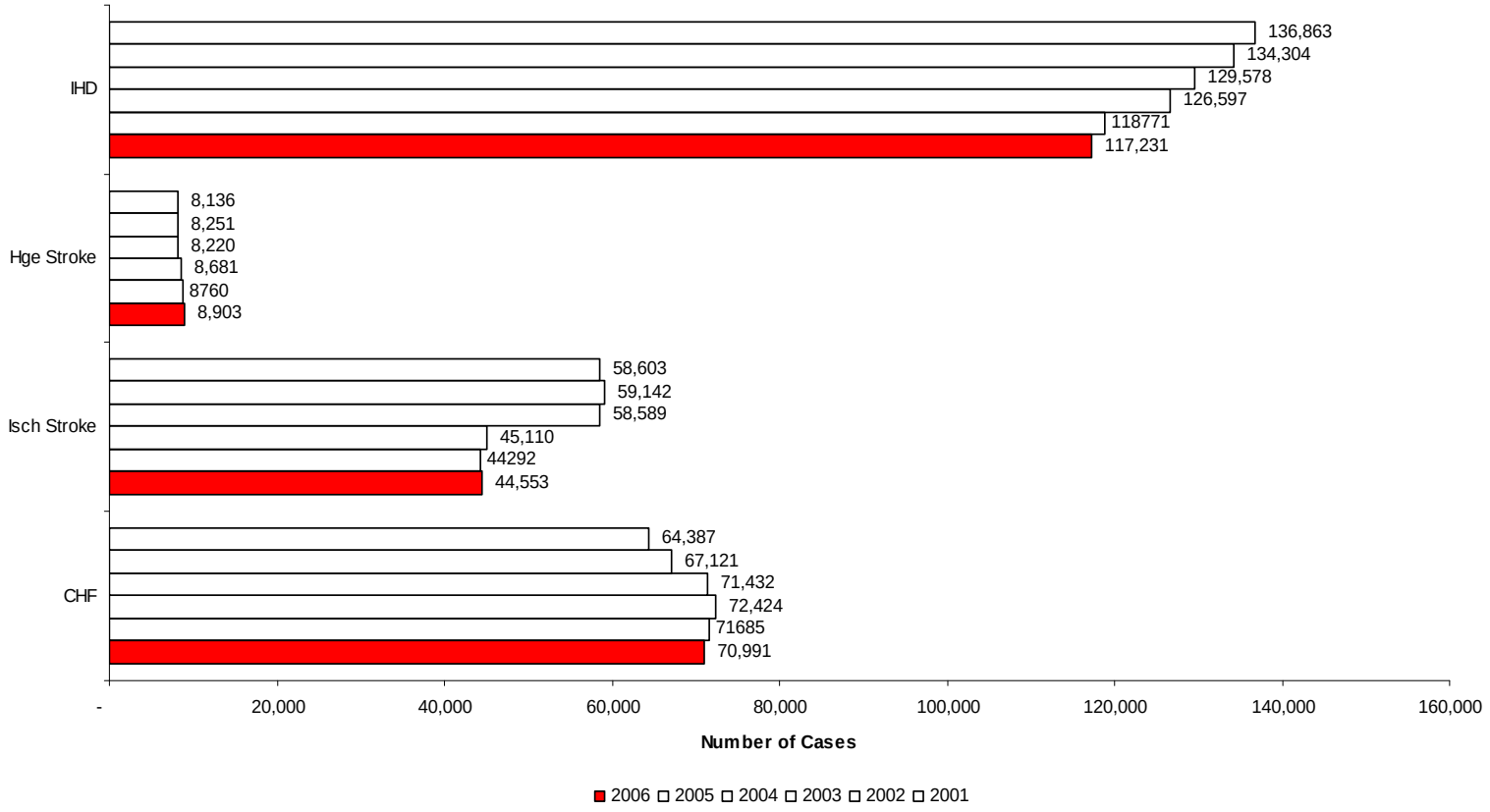
- **Ischemic Heart Disease (ICD-9 codes 410-414)**
- **Ischemic Stroke (ICD-9 codes 430-432)**
- **Hemorrhagic Stroke (ICD-9 codes 433- 438)**
- **Congestive Heart Failure (ICD-9 code 428)**

Number of First-listed Hospital Discharge for Select Diagnoses, Texas, 2006,



Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2006

Number of Hospital Discharges, CVD Diagnoses , Texas 2001-2006

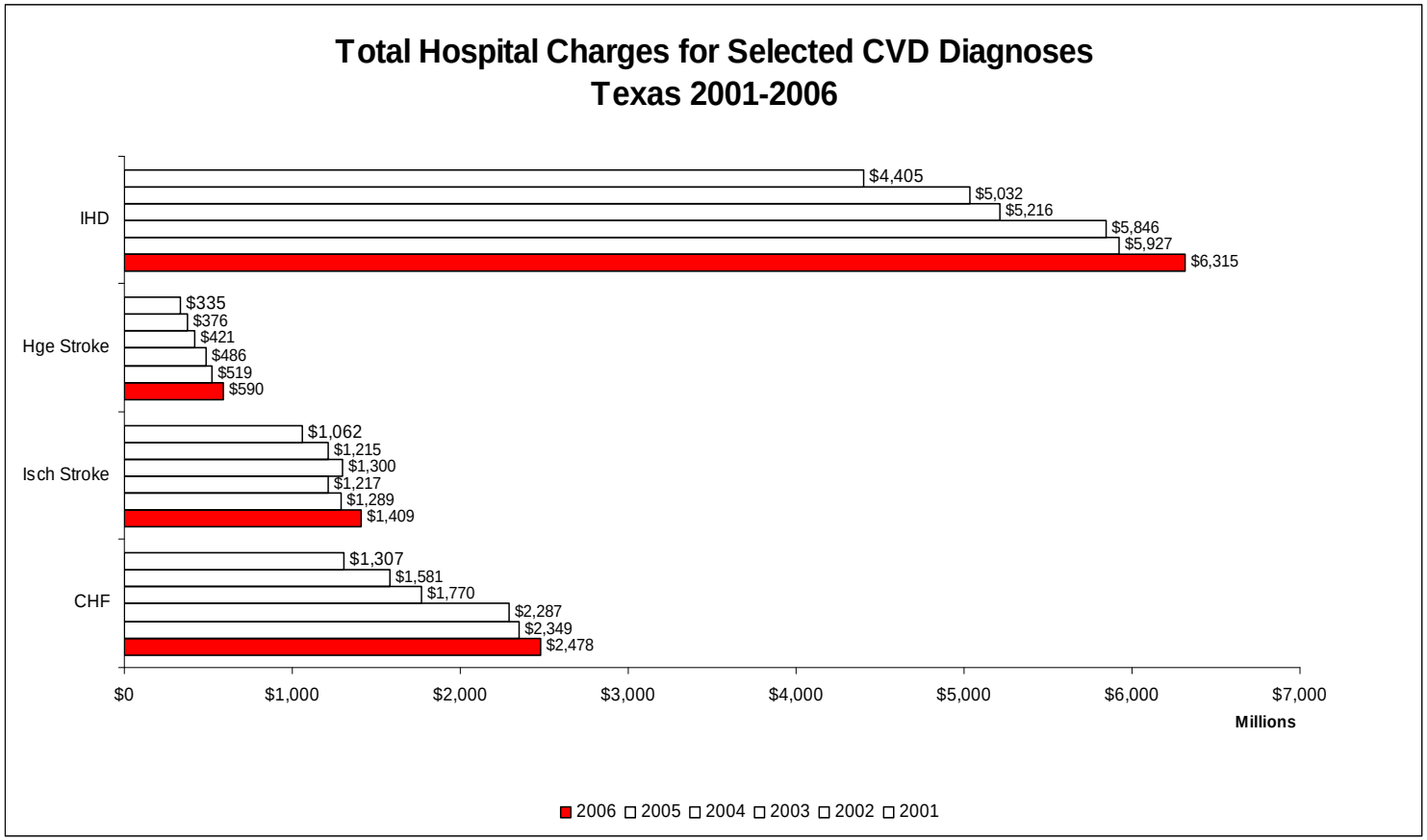


Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2001-2006

Texas Hospital Charge Data

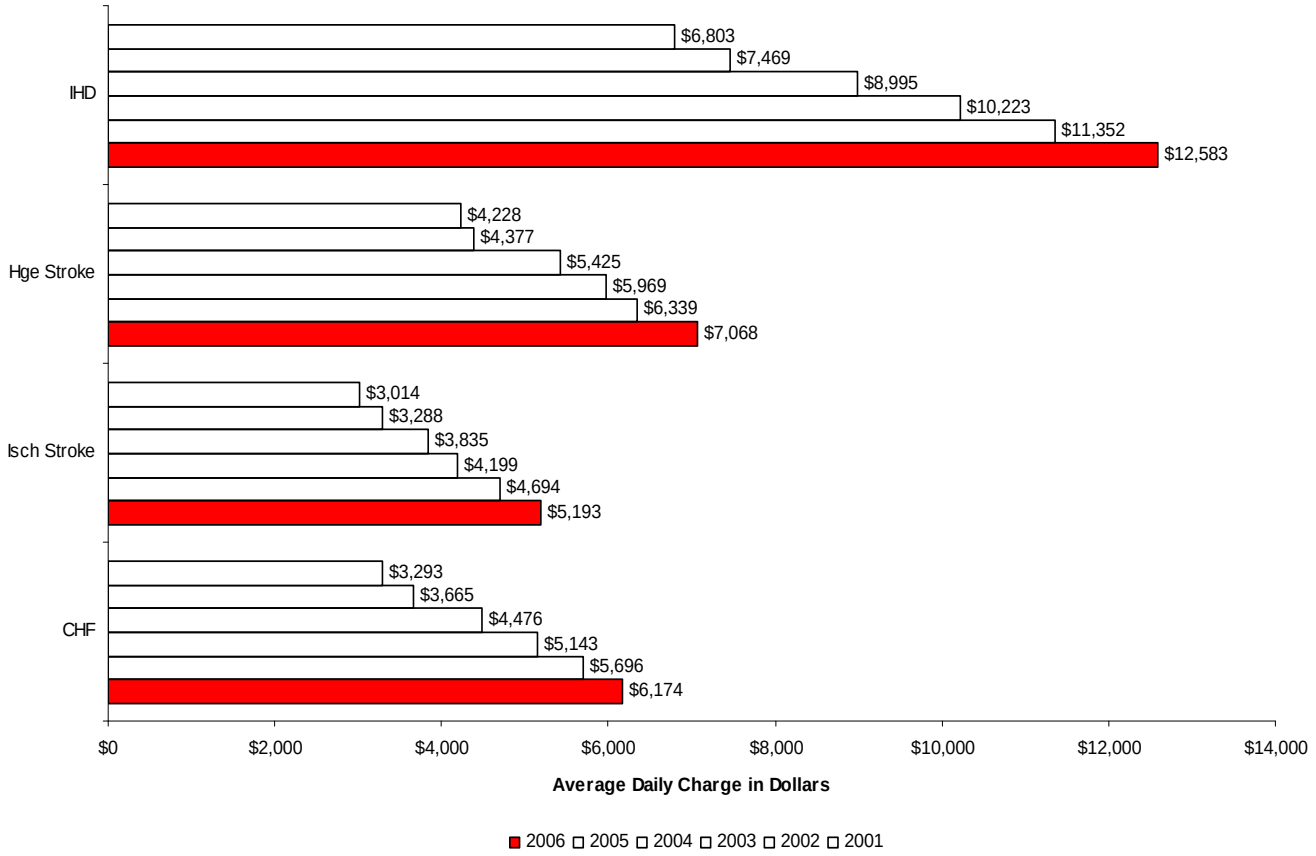
- Estimated potential cost to payers
- Does not represent actual reimbursements

Total Hospital Charges for Selected CVD Diagnoses, Texas 2001-2006



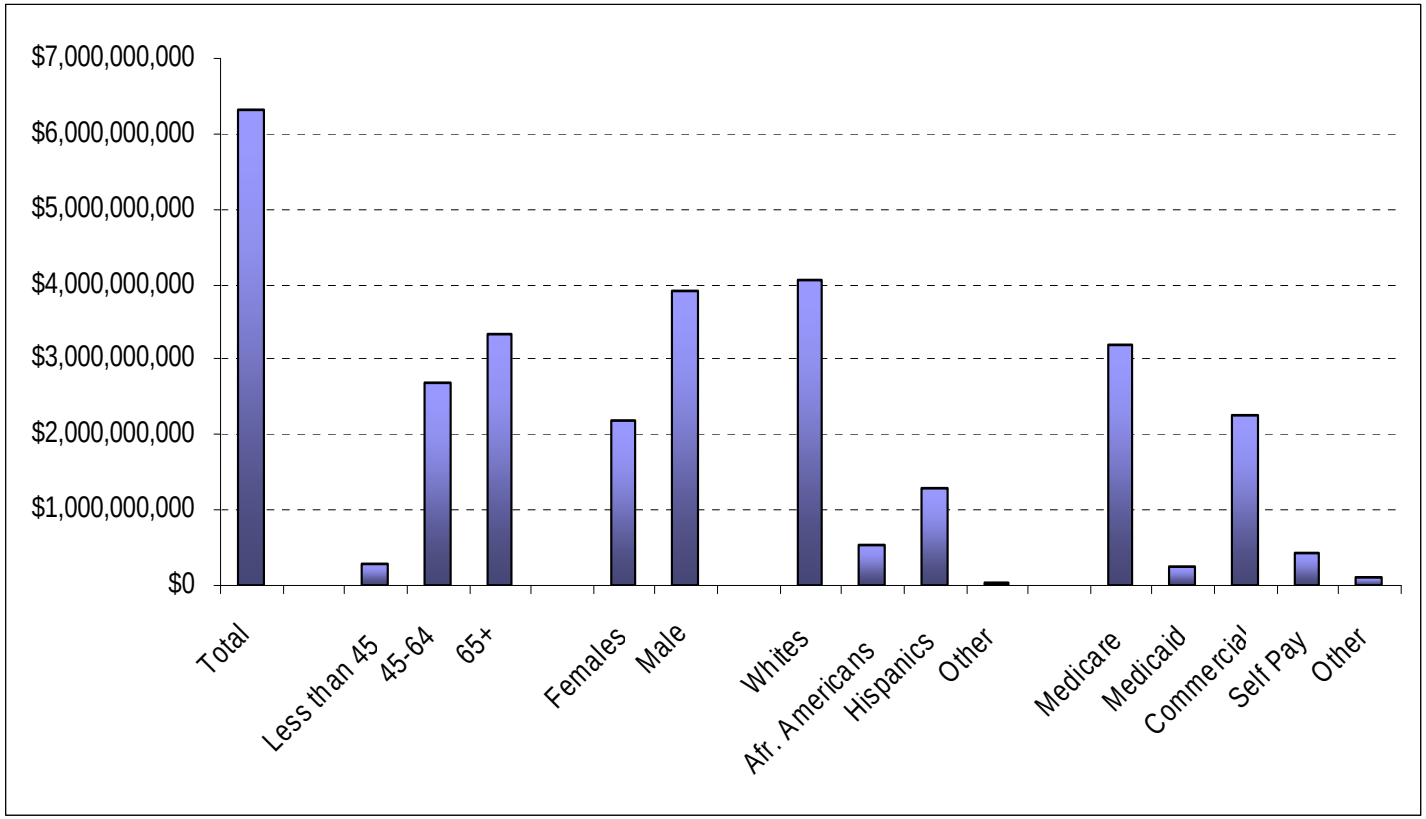
Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2001-2006

Estimated Average Hospital Charge Per Day for Selected CVD Diagnoses, Texas 2001-2006



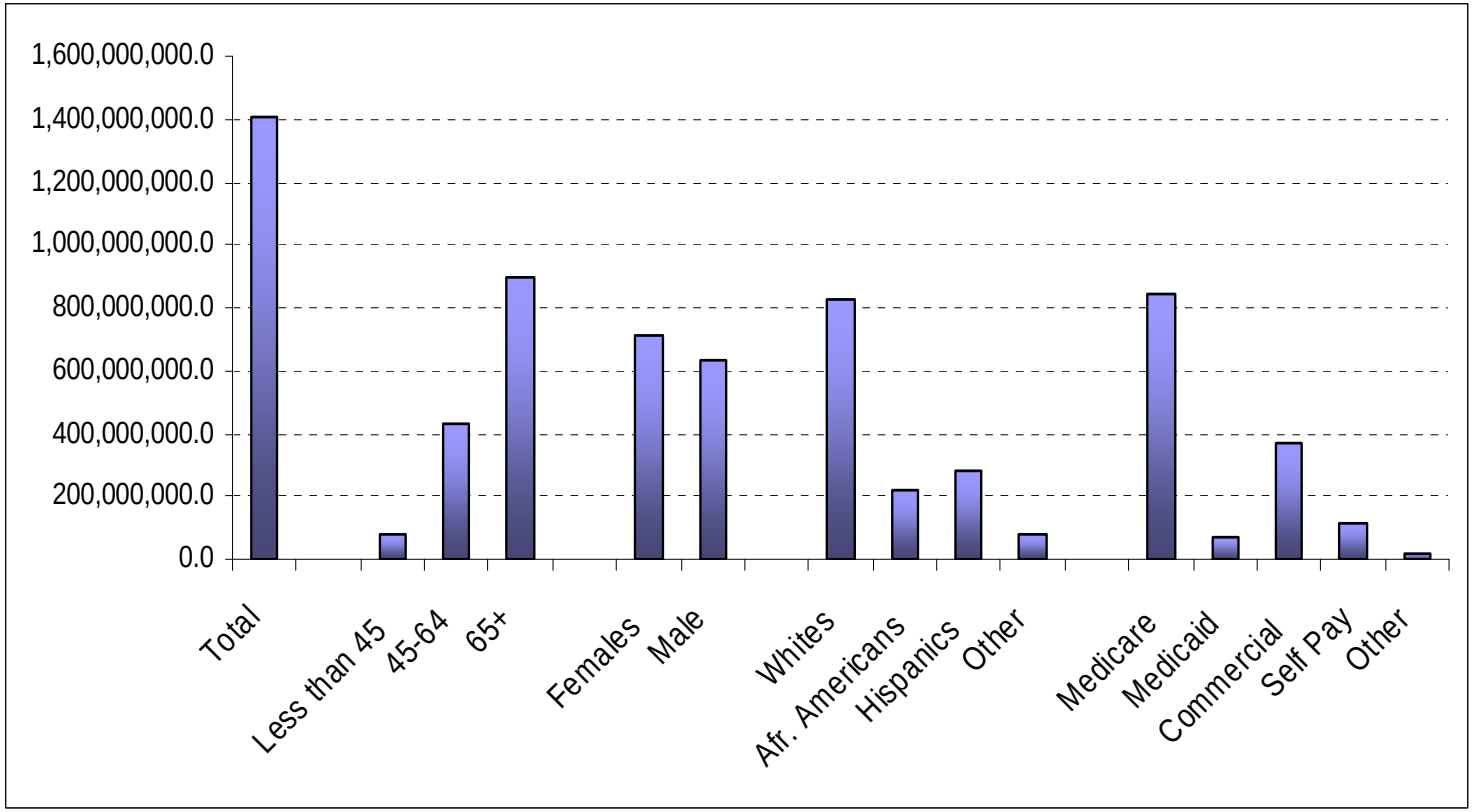
Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2001-2006

Total Hospital Charges for Ischemic Heart Disease, by Demographic, Texas, 2006



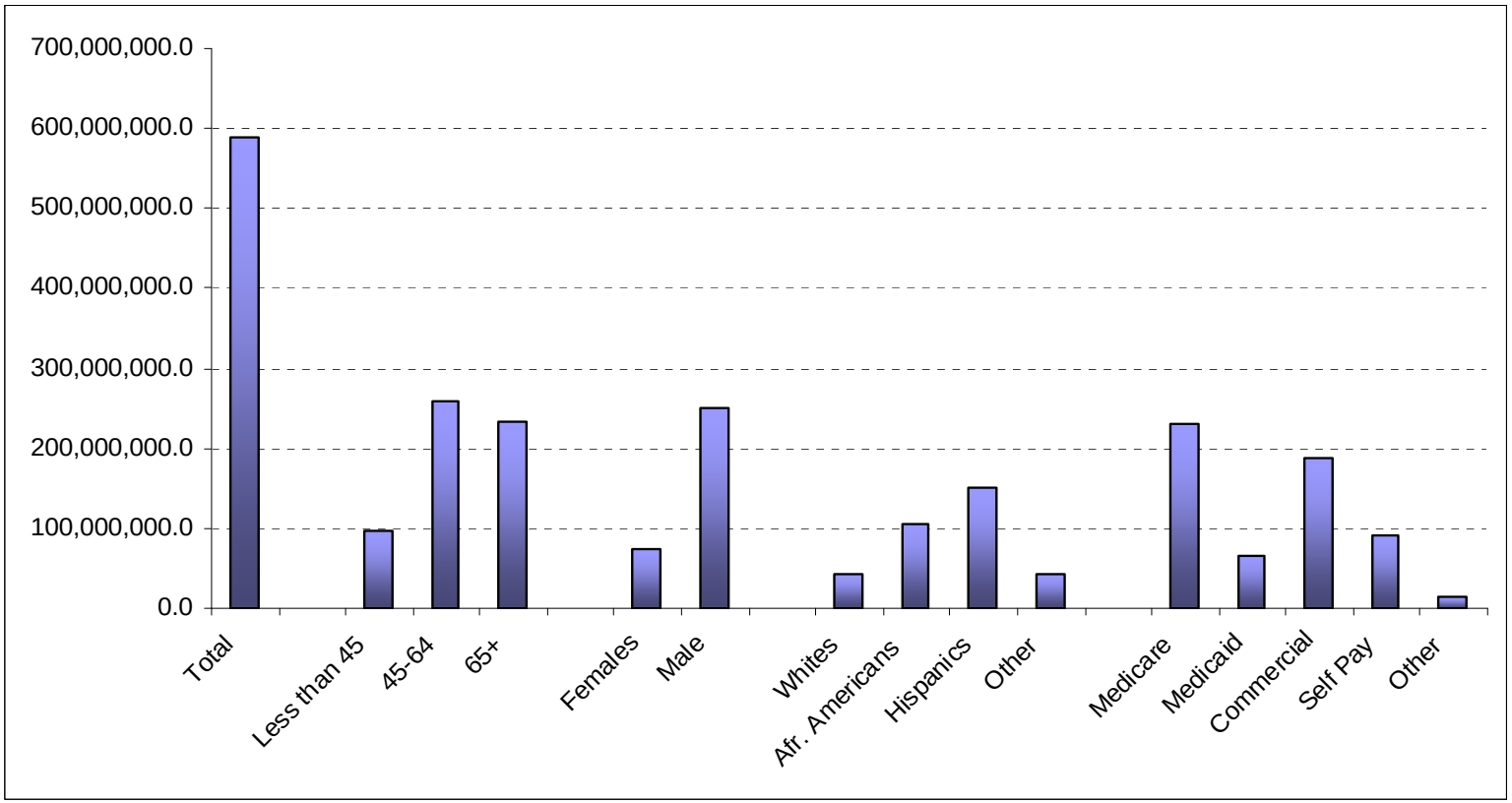
Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2006

Total Hospital Charges for Ischemic Stroke by Demographic, Texas, 2006



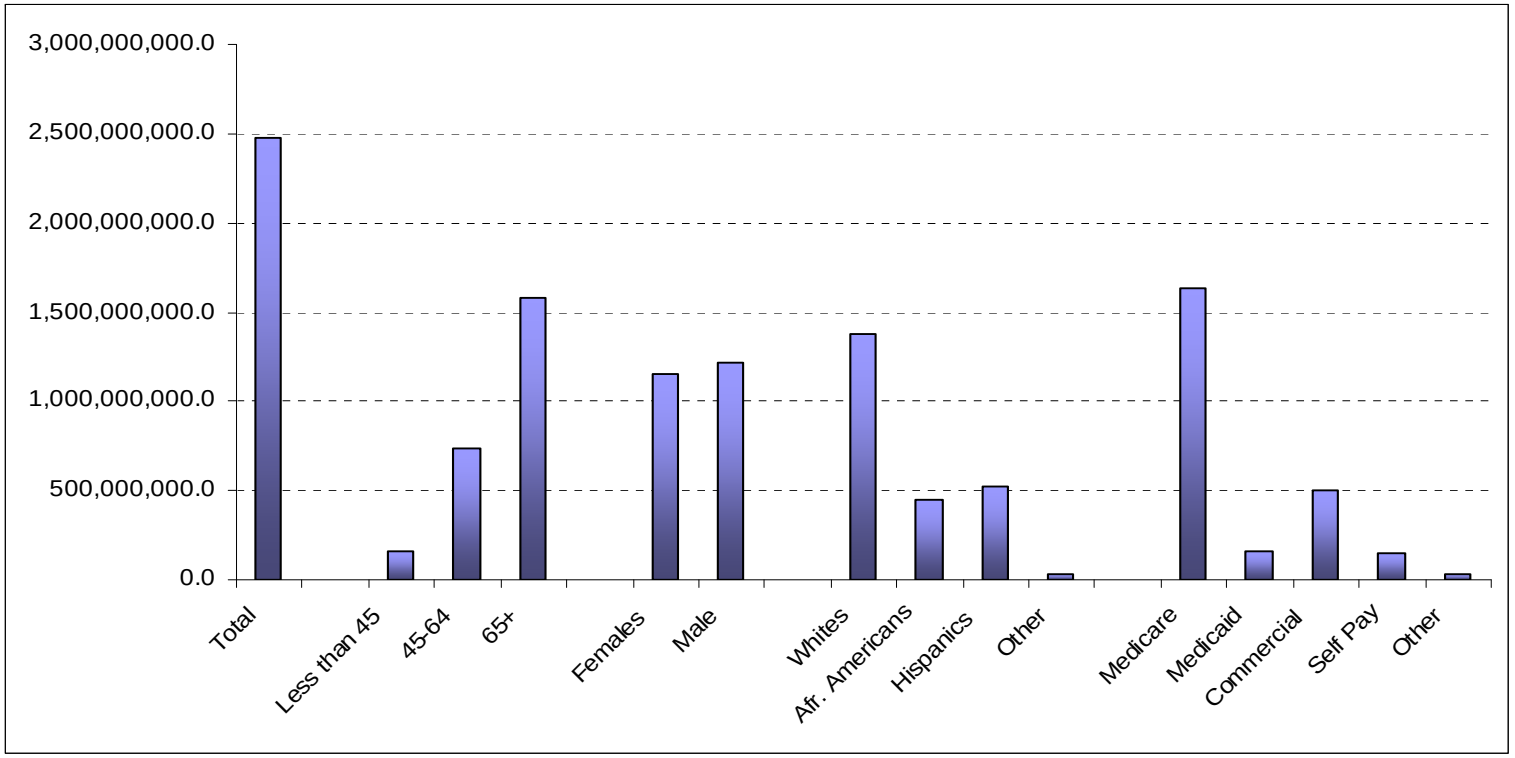
Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2006

Total Hospital Charges for Hemorrhagic Stroke, by Demographic, Texas, 2006



Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2006

Total Hospital Charges for Congestive Heart Failure, by Demographic, Texas, 2006



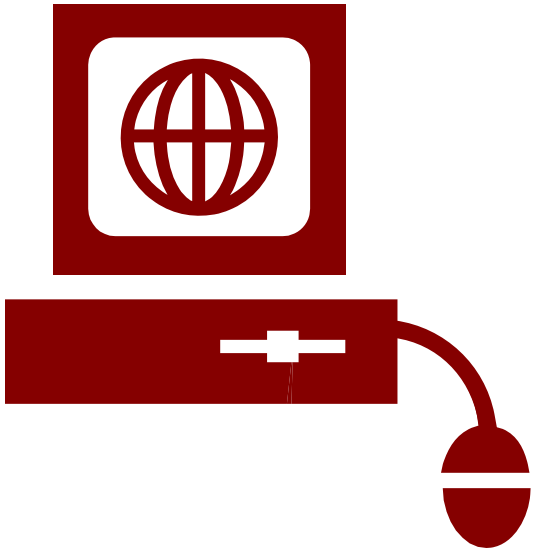
Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2006

Hospital Discharge Data

- In 2006, the highest number of discharges for chronic disease hospitalizations was for IHD, followed by cancer, congestive heart failure and stroke.
- Estimated average hospital charges per day and total charge for selected CVD diagnoses have increased each year from 2001 to 2006.
- The number of discharges for CVD steadily declined since 2001.

More Information on THCIC

- http://www.dshs.state.tx.us/thcic/



Texas Medicaid Reimbursement Data

- Represents cost to Texas/US.
- Population is low income and generally has less access to primary prevention.
- Data cannot be generalized to rest of population

Medicaid Reimbursement Data for CVD

- Data are based on paid Medicaid claims for Fee-For-Service (FFS) and Patient Care Case Management (PCCM) clients.
- Data excludes information on individuals served by Medicaid HMOs or those served by STAR+PLUS.
- Data does not include denied or pending claims
- Data excludes the portion paid by the Medicare program and other insurance providers.
- Data is available by type of claim: physician, emergency dept., or inpatient hospital.

ICD-9 Codes for Medicaid Reimbursement Data

Ischemic Heart Disease (ICD-9 codes 410-414)

Stroke (ICD-9 codes 430-438)

Congestive Heart Failure (ICD-9 code 428)

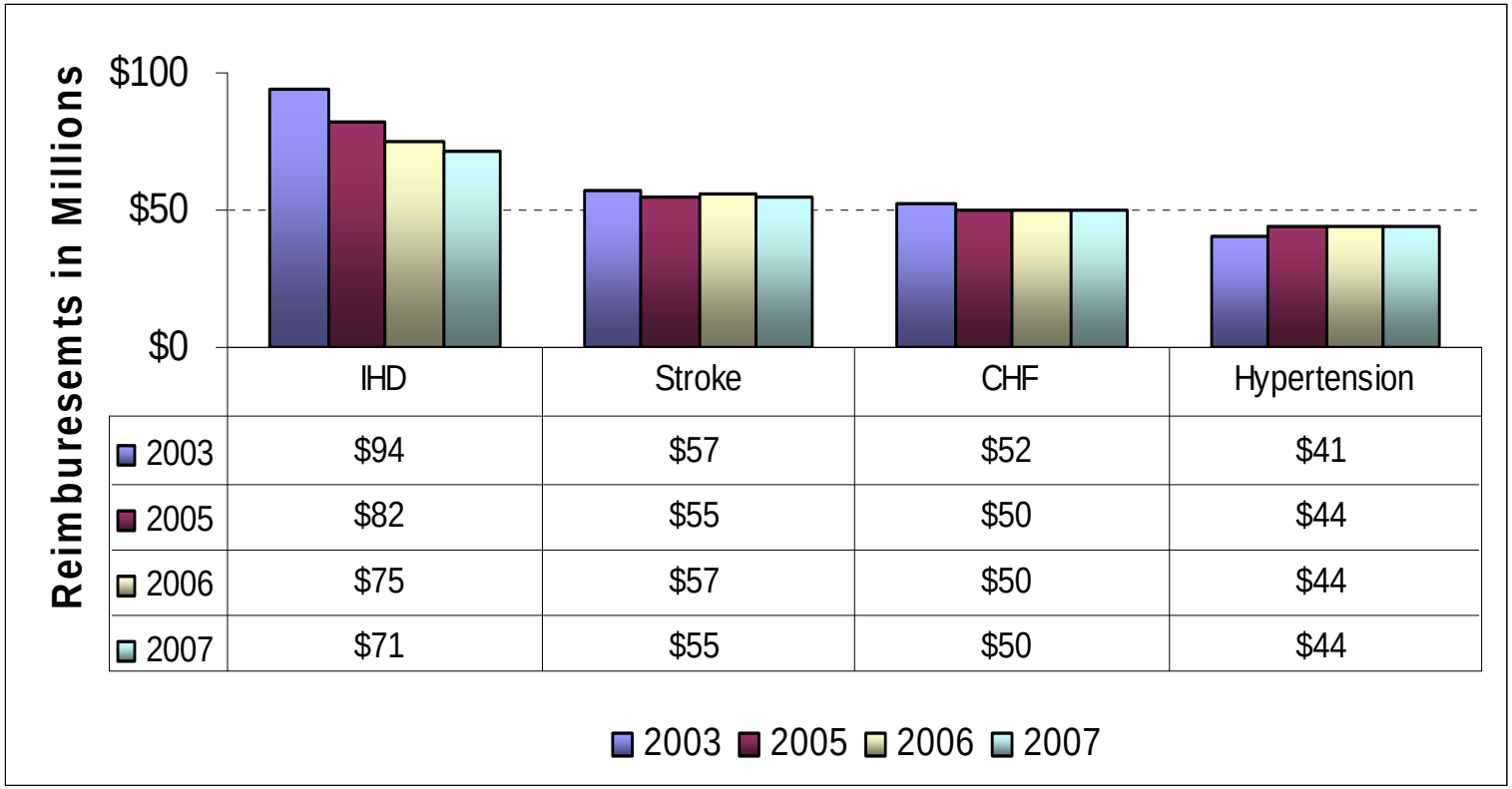
Hypertension (ICD-9 codes 401-405)

Texas Medicaid Reimbursement Amounts for CVD Diagnoses In Millions, 2007

	Inpatient Hospital Claims	Emergency Claims	Physician Claims
IHD	**$41**	**$8**	**$22**
Stroke	**$34**	**$6**	**$16**
CHF	**$34**	**$4**	**$13**
Hypertension	**$15**	**$9**	**$20**
Total	**$124**	**$27**	**$71**

Data Source: Fee for Service (FFS) and Patient Care Management (PCCM) clients, Texas Health and Human Services Commission, 2007.

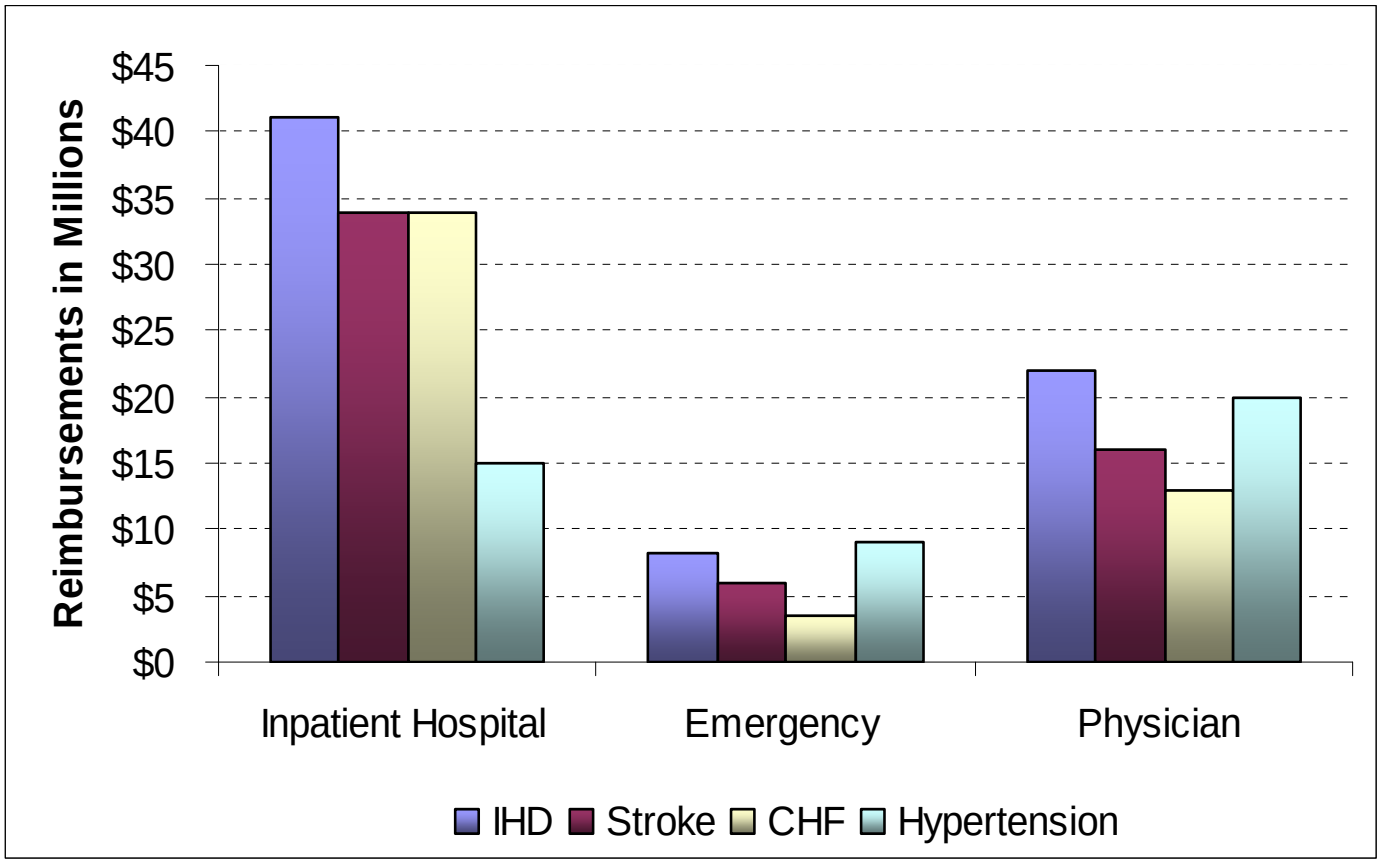
Trends in Texas Medicaid Reimbursement Amounts for CVD, 2003,2005, 2006, 2007



	IHD	Stroke	CHF	Hypertension
2003	$94	$57	$52	$41
2005	$82	$55	$50	$44
2006	$75	$57	$50	$44
2007	$71	$55	$50	$44

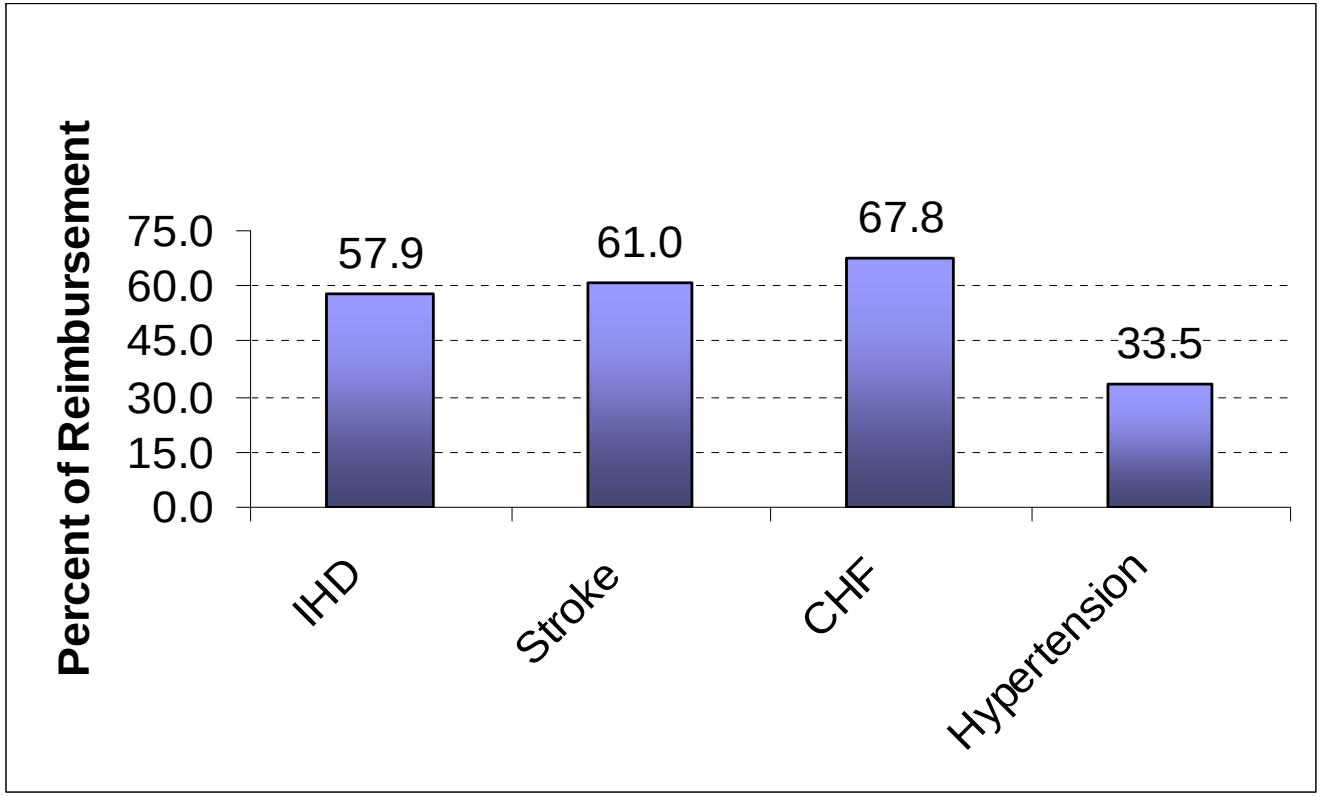
Data Source: Fee for Service (FFS) and Patient Care Management (PCCM) clients, Texas Health and Human Services Commission, 2003, 2005, 2006, 2007.

Medicaid Reimbursement Amounts for CVD, Texas , 2007



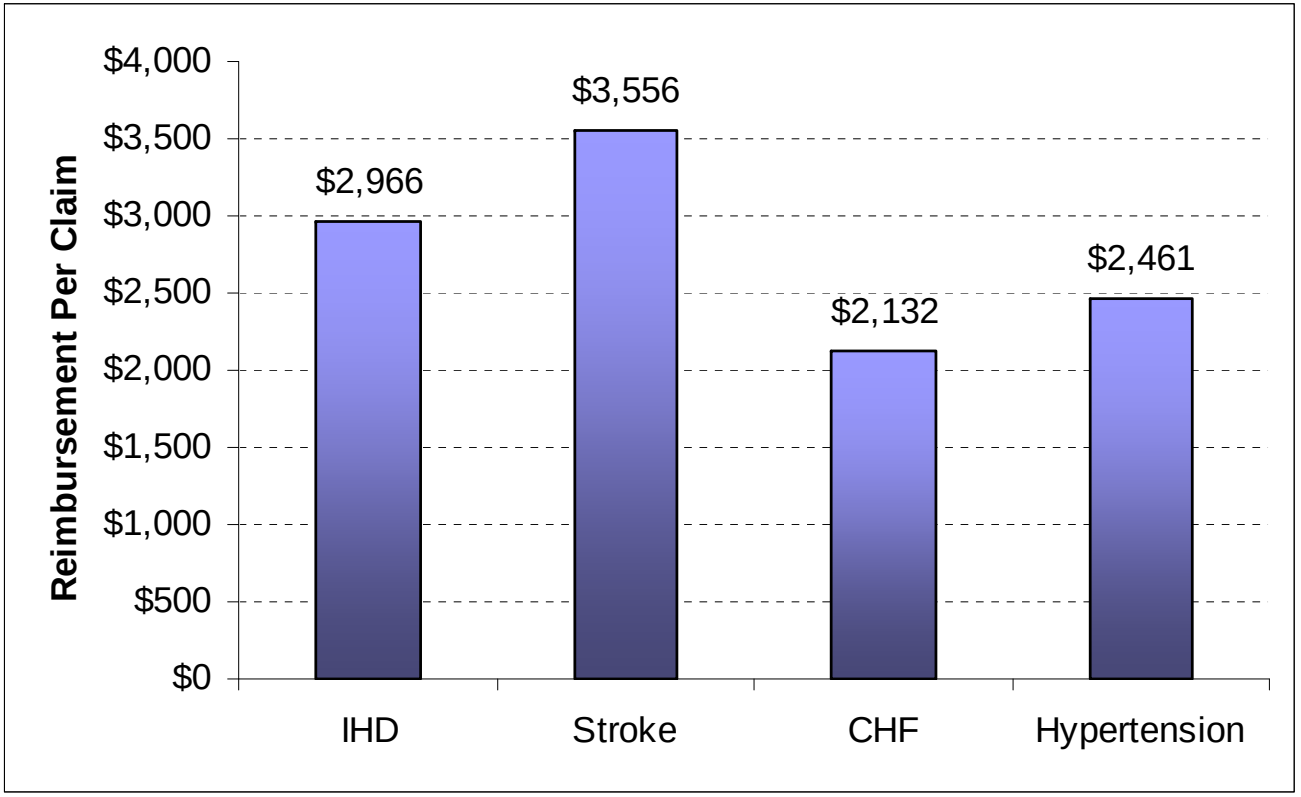
Data Source: Fee for Service (FFS) and Patient Care Management (PCCM) clients, Texas Health and Human Services Commission, 2007.

Percent of Total Medicaid Reimbursements for Inpatient Hospital, 2007



Data Source: Fee for Service (FFS) and Patient Care Management (PCCM) clients, Texas Health and Human Services Commission, 2007.

Average Medicaid Reimbursement per Claim for Inpatient Hospital, Texas, 2007



Data Source: Fee for Service (FFS) and Patient Care Management (PCCM) clients, Texas Health and Human Services Commission, 2007.

Medicaid Reimbursement Data

- Texas Medicaid Program paid over $220 million dollars in Medicaid claims for CVD in 2007.
- Among CVD diagnose, Medicaid reimbursement was highest for ischemic heart disease followed by stroke, congestive heart failure and hypertension in 2003-2007.
- Average Medicaid reimbursement per claims for inpatient hospital was highest for stroke followed by heart disease, hypertension, and congestive heart failure in 2007.

Health Plan Employer Data and Information Set

HEDIS

- Standardized performance measures designed for comparing the quality of care of managed care organizations

Trends in Selected Measures for CVD

by Percentage of Members, Texas, 2001-2007

Measures	2001	2002	2003	2004	2005	2006	2007
A. Controlling High BP 1	47.8	50.9	57.9	59.2	64.5	64.5	57.7
B. Beta Blocker Treatment After a Heart Attack	NA	90.3	86.9	85.2	83.3	84.3	86.0
C. LDL-C Screening after acute CV event3	72.4	76.2	77.1	77.9	79.4	75.6	82.3
D. LDL-C Level < 130 mg/dL4		42.6	57.7	56.3	55.8	46.8	NA

Data Source: http://www.opic.state.tx.us/page.php?p_sub_page_id=582001-2007

HEDIS

Patient Population Measured:

A: Age 18 through 85 years diagnosed with high blood pressure, whose blood pressure was controlled below 140 mmHg systolic and 90 mm Hg diastolic.

B: Age 35 years and older of diagnosed with acute myocardial infarction (AMI) and who received an ambulatory prescription.

C: The percentage of members 18 through 75 years of age who had an LDL-C screening during the measurement year and the year prior, after discharge for an acute cardiovascular event.

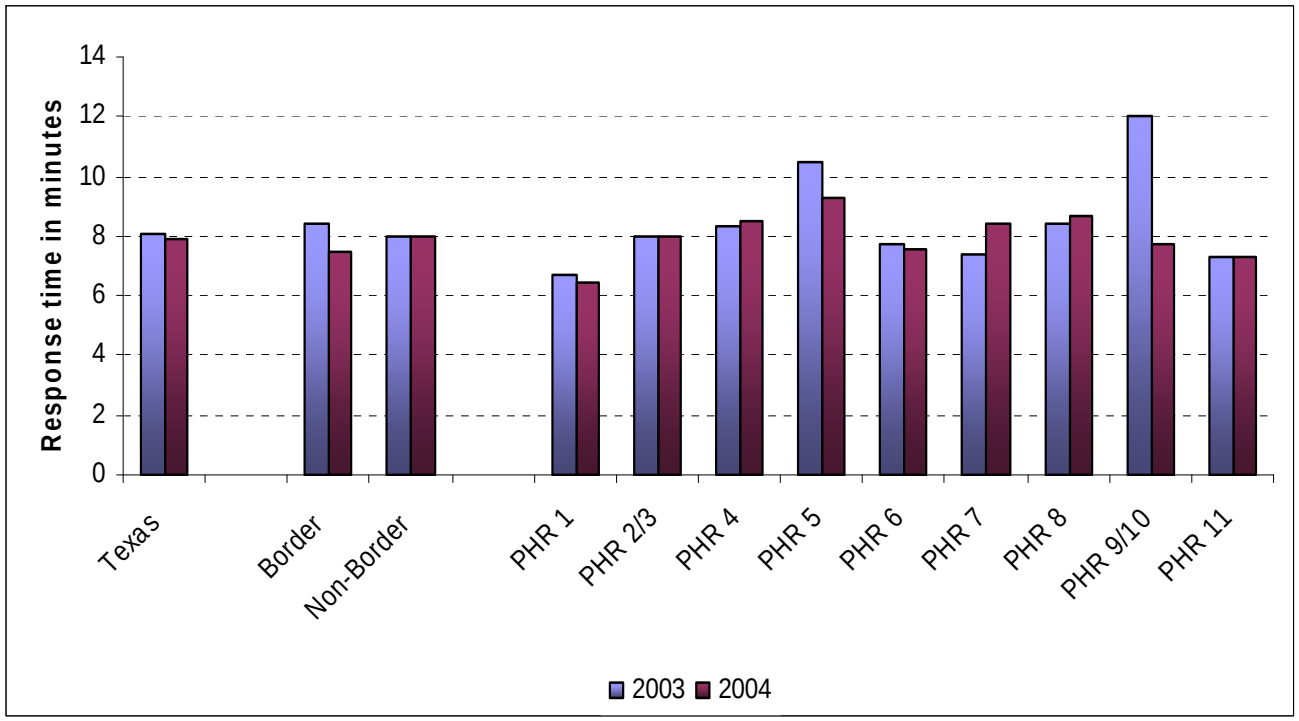
D: The percentage of members 18 through 75 years of age who had an LDL-C level of less than 130 mg/dL during the measurement year, after discharge for an acute cardiovascular event.

Emergency Medical Services (EMS)

EMS Data

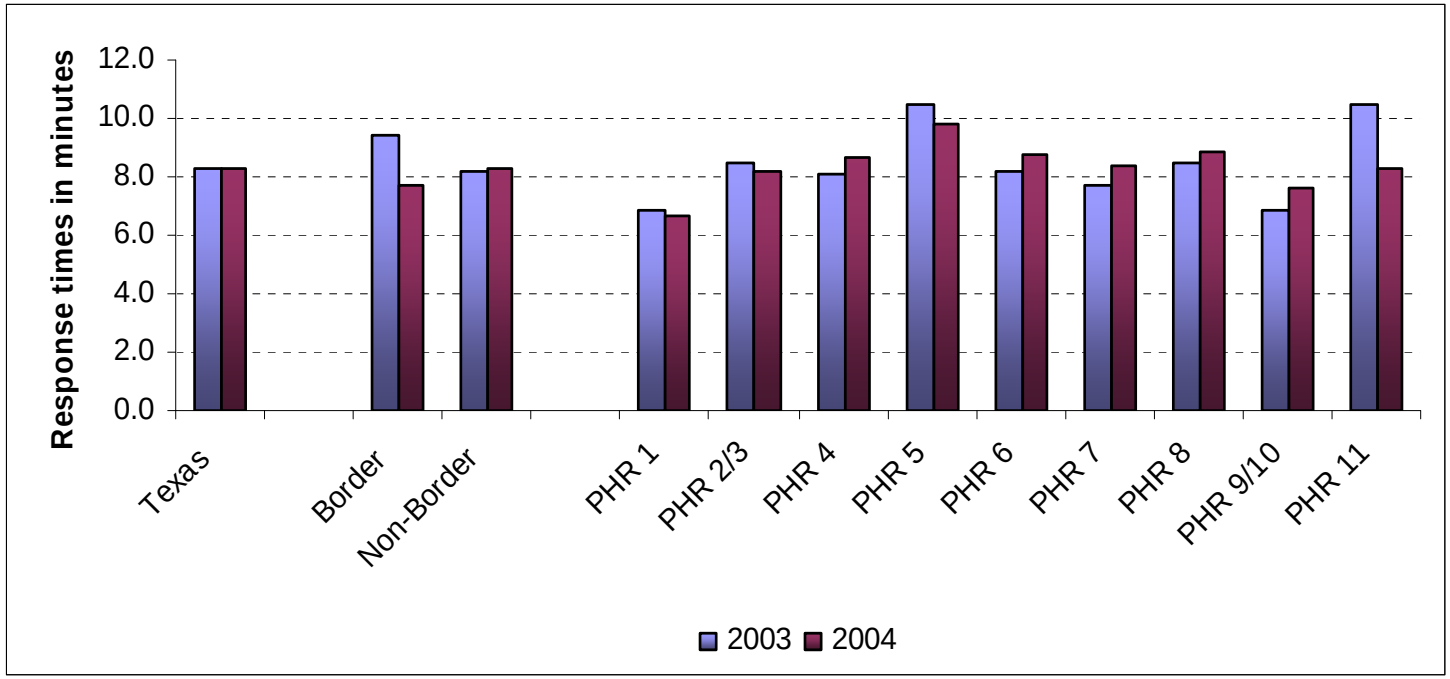
- Suspected CVD illness types include cardiac arrest, cardiac rhythm disturbance, chest pain/discomfort, and stroke.
- Medical-related 911calls only (no inter-facility transfers)
- Texas residents only
- Data provide by Texas Trauma Registry

EMS Response Time for CVD, Texas Health Service Regions, 2003, 2004



Data Source: Texas EMS/Trauma Registry, 2003, 2004.

EMS Response Time for Stroke, Texas Health Service Regions, 2003, 2004



Data Source: Texas EMS/Trauma Registry, 2003, 2004.

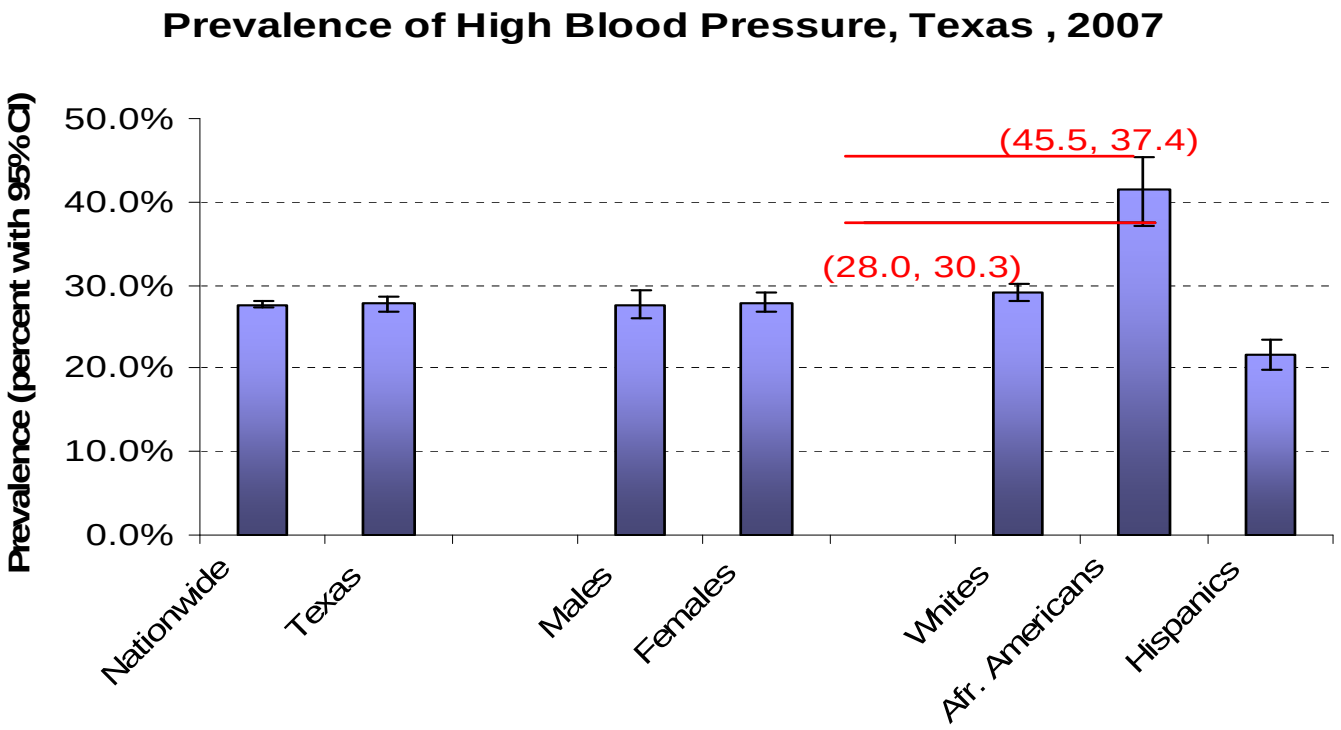
Interpreting Confidence Interval (CI)

Interpreting CIs

- If the confidence intervals do **not** overlap, the test is statistically significant
- There is a statistically significant difference between prevalence of high blood pressure among Whites and African Americans in Texas

Interpreting CIs

- Do the CIs Overlap?



Interpreting CIs

- If the confidence intervals overlap, the test is **not** statistically significant
- There is not a statistically significant difference between prevalence of heart disease among Health Service Region 4 and Health Service Region 5

Interpreting CIs

- Do the CIs Overlap?