The Burden Report:
Cardiovascular Disease & Stroke in Texas

**Texas Cardiovascular Health
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www.dshs.state.tx.us/wellness**

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Cardiovascular Disease in Texas
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Executive Summary

<div align="center">Highlights</div>

- Cardiovascular disease (CVD) and stroke is a serious and costly disease.
- Heart disease is the leading cause of death in Texas.
- Stroke is the 3rd leading cause of death in Texas.
- Thirty-four percent of all deaths in Texas in 2003 were due to heart disease and stroke, more than any other cause.
- In Texas and the US during the period from 1999-2003, age-adjusted mortality rates have steadily declined.
- Age-adjusted mortality rates for ischemic heart disease declined from 202.4 per 100,000 in 1999 to 165.8 per 100,000 in 2003.
- Age-adjusted mortality rates for stroke declined from 66.3 per 100,000 in 1999 to 59.7 per 100,000 in 2003.
- In 2005, about 1.4 million Texas adults aged 18 years and older reported that they have CVD or stroke.
- Overall, hospitalizations for CVD and stroke cost Texas over $9.8 billion dollars in 2004. Ischemic heart disease alone accounted for 59.4% of this cost.
- Among Texans aged 18 years and older with CVD or stroke, 19% stated they did not have any type of health care coverage, 24% cannot see a doctor due to the cost, and 21% did not have a routine checkup within the past year in 2005.
- In 2005, only 13.5% of Texas adults could correctly identify all heart attack signs and symptoms, 21% could correctly identify all stroke signs and symptoms, and 85% could recognize 911 as the first emergency response option for heart attack and stroke.
- High blood pressure and cholesterol are important health concerns for people in Texas. More than 24% of Texas adults have been diagnosed with high blood pressure and 34% with high blood cholesterol.
- People in Texas are increasingly overweight and obese. From 1995 to 2005, the percentage of Texans who are overweight or obese increased from 51.4% to 61.3%.
- The prevalence of diabetes, a major risk factor for CVD, has increased over the past decade in Texas (from 5.2% in 1995 to 7.9% in 2005).
- Significant disparities exist among Texans with CVD or stroke and their risk factors.
- Generally, persons who are older, poorer, have a lower education and are African American have a higher CVD prevalence, more risk factors, and are at higher risk of death from cardiovascular disease in Texas.
- The average EMS response time for a suspected cardiac event was approximately 8 minutes from the time the call was received to the time EMS arrived on the scene and nearly 40 minutes from the time the call was received to the time EMS arrived at destination (Hospital).

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of death in Texas and has been since 1940. CVD accounts for 2 out of every 5 deaths. In Texas in 2005 over 1,422,000 adults reported that they have had a diagnosed heart attack, a stroke, angina or coronary heart disease. Through the auspices of the Texas Council on Cardiovascular Disease (CVD) and Stroke, the Cardiovascular Health and Wellness Program at the Texas Department of State Health Services has continually collected and provided CVD and stroke health data and information and made data resources available to state partners. These data serve as a benchmark and determinant of progress toward stated goals and objectives as outlined in the State Plan to Reduce Cardiovascular Disease and Stroke, May 2002 (updated May 2005). In 2002, the Texas Cardiovascular Disease Surveillance System and Report was created to better monitor specific trends and risk factors related to CVD and stroke (see www.texascvdcouncil.org).

To better meet the needs of our state partners in reducing the excessive burden of the Number 1 cause of death in Texas, we have compiled the most relevant and useful data pieces collected thus far into this first edition of the "The Burden Report: Cardiovascular Disease and Stroke in Texas."

Highlights of significant finding from this report include:
1) Cardiovascular disease accounted for 35% of all deaths in Texas for the five-year period from 1999 to 2003.
2) Total hospitalization charges for CVD and stroke in 2004 were over $9.8 billion.
3) Total hospitalization charges for CVD and stroke have risen 62% from 1999 to 2004.

The Cardiovascular Health and Wellness Program of the Texas Department of State Health Services hopes this report will serve as a conclusive resource to guide current and future partners as they expand from a state vision to actual implementation of programs and activities proven effective in reducing the fiscal and physical costs of CVD and stroke in worksites, healthcare sites, schools, and communities across the state.

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DEMOGRAPHIC Information

Population Distribution By Race/Ethnicity

DEMOGRAPHICS: Race Group – Whites

Percent of Total County Population
Whites
2004 Population Estimate

Percent of Total
- Under 25%
- 25 - 50%
- 50 - 75%
- Above 75%
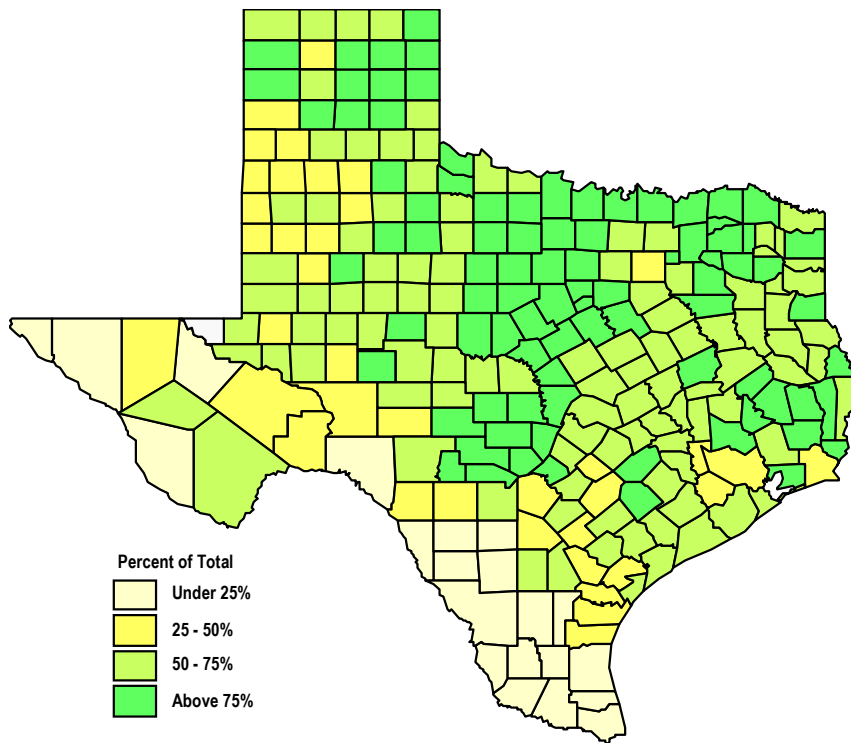
- Shaded areas in the map show the proportion of county population that are White.
- Ninety-nine of the 254 Texas counties have more than 75 percent of its county population who are White. Most of these counties are concentrated in the north and central parts of Texas.

DEMOGRAPHICS: Race Group – African Americans

Percent of Total County Population
African Americans
2004 Population Estimate
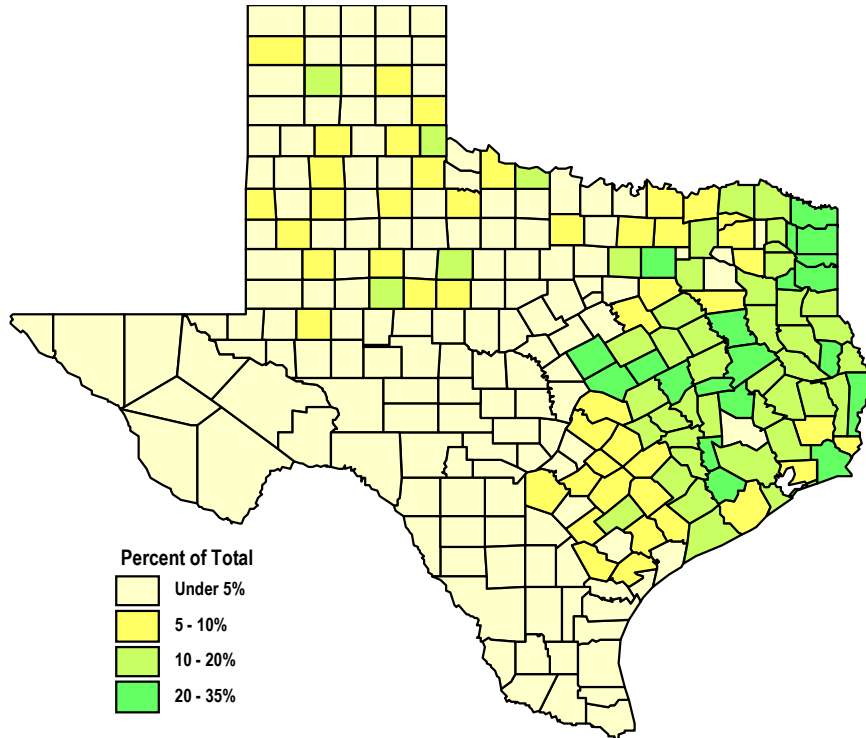
Percent of Total
- Under 5%
- 5 - 10%
- 10 - 20%
- 20 - 35%

- Shaded areas in the map show the proportion of county population who are African Americans.
- Twenty counties have more than 20 percent of its county population who are African Americans. Most of these counties are concentrated in the north and central parts of Texas.

DEMOGRAPHICS: Race Group – Hispanics

Percent of Total County Population
Hispanics
2004 Population Estimate

Percent of Total
- Under 25%
- 25 - 50%
- 50 - 75%
- Above 75%
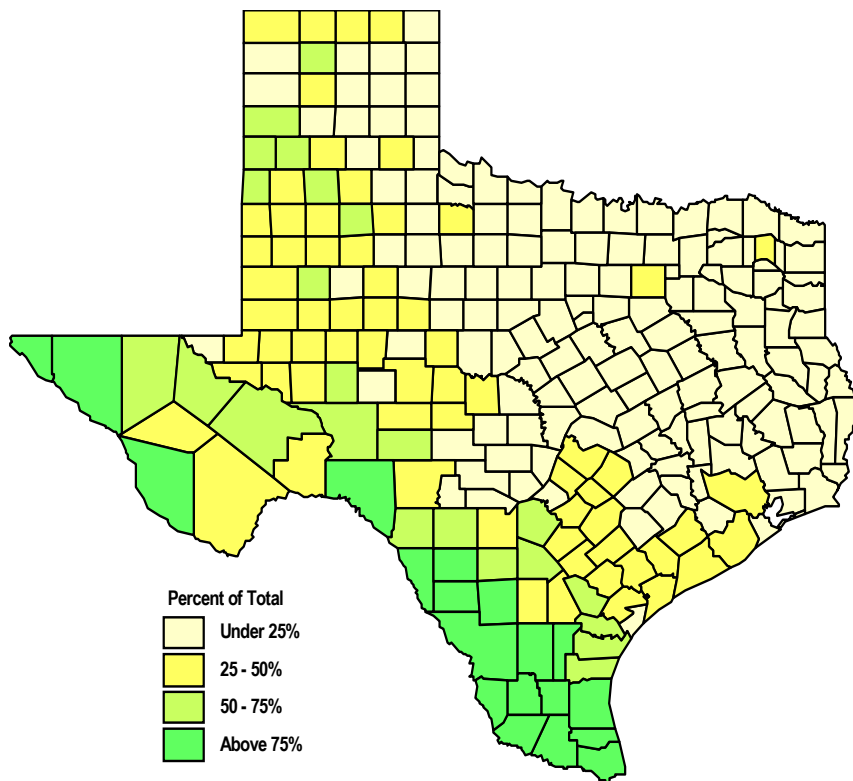
- Shaded areas in the map show the proportion of county population who are Hispanic.
- Nineteen counties have more than 75 percent of its county population who are Hispanic. Most of these counties are concentrated in the north and central parts of Texas.

DEMOGRAPHICS: Race Group – Others

Percent of Total County Population
Others
2004 Population Estimate

Percent of Total
- Under 1%
- 1 - 2%
- 2 - 4%
- 4 - 15%
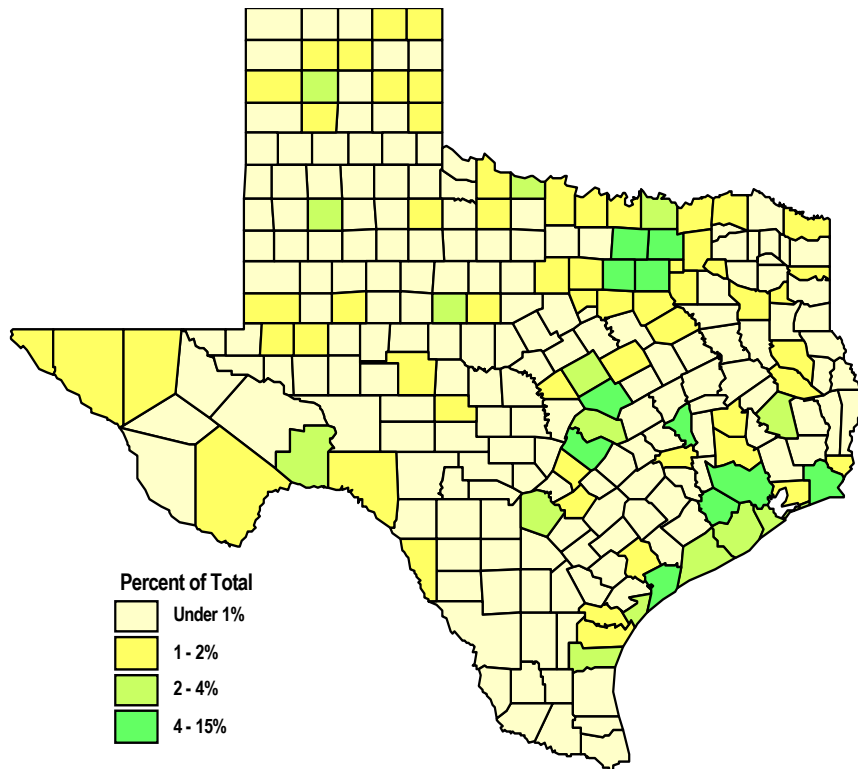
■ Shaded areas in the map show the proportion of county population who are "Other".

■ There are a total of 11 counties that have more than 4 percent of its county population who classified as **American Indian or Alaska Native** , **Asian, Native Hawaiian or Pacific Islander** , **Multi-Racial and Some Other Race, Multi-Racial, Some Other Race**   are "Other" race group. Most of these counties are concentrated in the north and central parts of Texas.

Mortality

Mortality Data

Methods

Texas death certificate data were compiled and tabulated by the Statistical Services Division of the Texas Department of State Health Services' (DSHS) Vital Statistics Unit. Cause of death was coded according to the International Classification of Diseases, both Ninth and Tenth Editions (ICD-9 and ICD-10). The US 2000 population was used for age standardization (age adjustment) of death rates replacing the previous 1940 population standard. ICD-10 codes of I00-I99 were used to define major cardiovascular disease, I20-I25 for ischemic heart disease, I60-I69 for stroke, and I50 for congestive heart failure. Death trends by sex-, race-, and age-specific mortality data were computed for 1999 through 2003.

This publication also includes maps of selected chronic disease death rates for the state as a whole and at the county level. The maps allow the reader to identify areas in the state with significantly high or low rates of disease deaths. Although county rates provide a high degree of specificity, rates in counties with small populations and few deaths for a specific condition can be unreliable. 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 counties with the lowest rates.

Statewide Mortality

Cardiovascular diseases accounted for 35 percent of all deaths in Texas for the five year period of 1999-2003. Among the 51,940 total deaths from major CVD in 2003, 80 % were due to ischemic heart disease (IHD) and 20% were due to stroke.

Leading Causes of Death

Heart disease was ranked as the first leading cause of death in Texas for all races (Table 1). For the purpose of ranking mortality statistics, underlying cause of death is used, even though other conditions may contribute to that death. (The underlying cause of death is defined as the disease or injury that initiated the chain of morbid events leading directly to death). Multiple contributing causes can also be listed on the death certificate. Analyses based on a single underlying cause exclude a considerable amount of pertinent data, and may under report the actual number of CVD related death. In 2003, 51,940 deaths were listed as having heart disease and stroke as the leading cause of death (see table 1).

Table 1. Leading Causes of Death*: Texas, 2003

Rank	Cause	Number of Deaths	Crude Death Rate*	% Of Deaths
	All Causes	154,501	698.5	100.0
1	**Diseases of the Heart**	41,654	188.3	27.0
2	**Malignant Neoplasms**	33,782	152.7	21.9
3	**Cerebrovascular Diseases**	10,286	46.5	6.7
4	**Accidents**	8,341	37.7	5.4
5	**Chronic Lower Respiratory Disease**	7,548	34.1	4.9
6	**Diabetes Mellitus**	5,663	25.6	3.7
7	**Alzheimer's Disease**	4,012	18.1	2.6
8	**Influenza and Pneumonia**	3,603	16.3	2.3
9	**Nephritis, Nephrotic Syndrome and Nephrosis**	2,671	12.1	1.7
10	**Intentional Self Harm (Suicide)**	2,355	10.6	1.5
	All Other Causes	34,586	156.4	22.4

* Leading Causes of Death of heart disease and stroke ICD-10 codes:I00-I09, I11, I13, I20-I51, I60-I69. Rates expressed as deaths per 100,000 population.

Leading Causes of Death

Figure 1. Leading Causes of Death in Texas - 2003

Cause	Number of Deaths
Diseases of the Heart	41,654
Malignant Neoplasms [Cancer]	33,782
Cerebrovascular Disease [Stroke]	10,286
Accidents [Injuries]	8,341
Chronic Lower Respiratory Diseases	7,548
Diabetes Mellitus	5,663
Alzheimer's Disease	4,012
Influenza and Pneumonia	3,603
Nephritis, Nephrotic Syndrome, Nephrosis	2,671
Intentional Self-Harm [Suicide]	2,355
Other Causes	34586

Number of Deaths

■ Figure 1 shows that rates for CVD deaths well exceed all other causes of death for the general population and across all race/ethnic groups.

■ A total of 154,501 Texas residents died in 2003. The leading cause of death, diseases of the heart, accounted for 27 percent of those deaths, while the second most common cause of death, malignant neoplasms, accounted for 22 percent. Cerebrovascular diseases, injuries, and chronic lower respiratory diseases ranked third, fourth and fifth respectively. Together, these five leading causes of death represented 66 percent of all deaths in 2003.

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MORTALITY DATA – LEADING CAUSES OF DEATHS AMONG WHITES, 2003

Figure 2. Leading Causes of Death in Texas Whites, 2003

Cause	Number of Deaths
Diseases of the Heart	30,360
Malignant Neoplasms [Cancer]	24,581
Cerebrovascular Disease [Stroke]	7,378
Chronic Lower Respiratory Diseases	6,507
Accidents [Injuries]	5,423
Alzheimer's Disease	3,402
Diabetes Mellitus	3,018
Influenza and Pneumonia	2,766
Intentional Self-Harm [Suicide]	1,843
Nephritis, Nephrotic Syndrome, Nephrosis	1,610
Other Causes	22617

Number of Deaths

■ A total of 109,505 White residents died in 2003. The leading cause of death, diseases of the heart, was responsible for 28 percent of these deaths while malignant neoplasms, the second most common cause of death, accounted for 22 percent. Cerebrovascular diseases ranked third and accounted for seven percent of all deaths among White residents in Texas. These top three leading causes of death accounted for over 60 percent of all death in White resident of Texas during 2003.

MORTALITY DATA – LEADING CAUSES OF DEATHS AMONG AFRICAN AMERICANS, 2003

Figure 3. Leading Causes of Death in Texas African Americans, 2003

Cause	Number of Deaths
Diseases of the Heart	5,331
Malignant Neoplasms [Cancer]	4,229
Cerebrovascular Disease [Stroke]	1,385
Diabetes Mellitus	903
Accidents [Injuries]	899
Chronic Lower Respiratory Diseases	511
Nephritis, Nephrotic Syndrome, Nephrosis	465
Human Immunodeficiency Virus Disease	415
Assault (Homicide)	412
Septicemia	366
Other Causes	4355

Number of Deaths
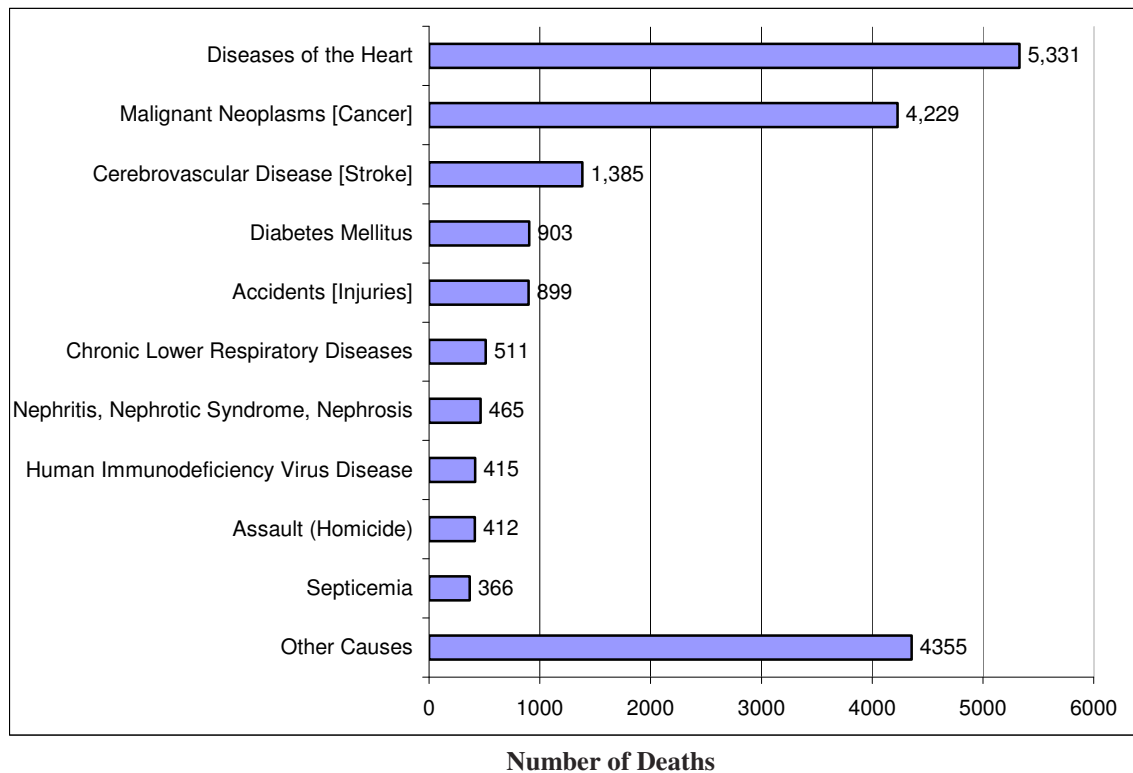
■   A total of 19,271 African American residents died in 2003.   The leading cause of death, diseases of the heart, was responsible for 28 percent of these deaths while malignant neoplasms, the second most common cause of death, accounted for 22 percent. Cerebrovascular diseases ranked third and accounted for seven percent of all deaths among Texas African American residents.   Diabetes and injury were the fourth & fifth leading causes of death accounting for five percent each of all deaths among African American residents in Texas. Together, the five leading causes of death accounted for 66 percent of deaths among African Americans in Texas in 2003.

Figure 4. Leading Causes of Death in Texas
Hispanics, 2003

Cause	Number of Deaths
Diseases of the Heart	5,963
Malignant Neoplasms [Cancer]	4,972
Accidents [Injuries]	2,019
Diabetes Mellitus	1742
Cerebrovascular Disease [Stroke]	1523
Chronic Liver Disease and Cirrhosis	811
Nephritis, Nephrotic Syndrome, Nephrosis	596
Assault (Homicide)	581
Chronic Lower Respiratory Diseases	530
Influenza and Pneumonia	493
Other Causes	6495

Number of Deaths

■ There were a total of 25,725 deaths among Hispanics in Texas in 2003. The leading cause of death, diseases of the heart, was responsible for 23 percent of all deaths while malignant neoplasms (19 percent of all deaths) was the second most common cause of death among Hispanics. The third leading cause of deaths for Hispanics was deaths due to injuries, which accounted for eight percent of all deaths. Diabetes was the fourth leading cause of death (seven percent of all deaths) and cerebrovascular diseases (six percent of all deaths) were the fifth leading cause of deaths. Together, these 5 leading causes of death represented 63 percent of all deaths among Hispanic residents in Texas in 2003.

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Total Cardiovascular Disease (CVD) Mortality

Cardiovascular Disease (CVD) includes all of the diseases of the circulatory system, which include (I00-I02) acute rheumatic fever, (I05-I09) chronic rheumatic heart diseases, (I10-I15) hypertensive diseases, (I20-I25) ischemic heart diseases, (I26-I28) pulmonary heart disease and diseases of pulmonary circulation, (I60-I69) cerebrovascular diseases, (I70-I79) diseases of arteries, arterioles and capillaries, (I80-I89) diseases of veins, lymphatic vessels and lymph nodes, not elsewhere classified, and (I95-I99) other and unspecified disorders of the circulatory system.

Texas/US Comparison

Figure 5. Age-Adjusted Mortality Rates for CVD* in Texas and US, 1999-2003
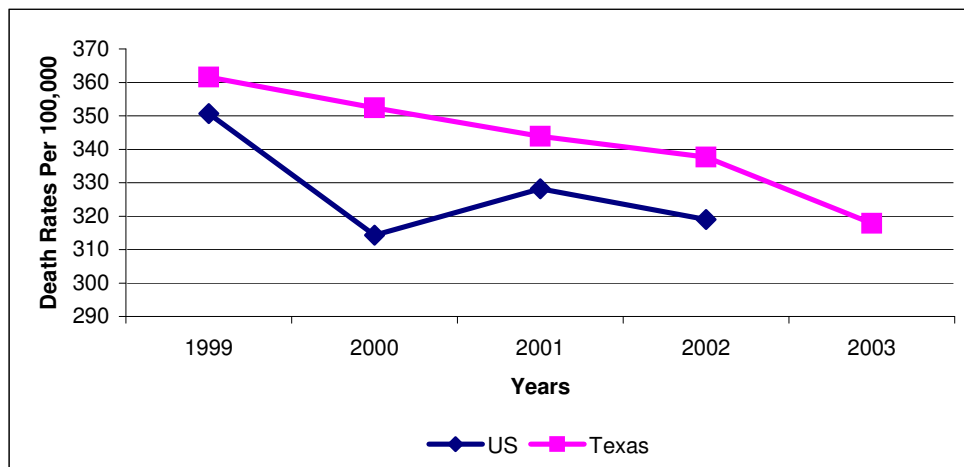
* ICD-10 Codes I00-I99 and Age Adjustment Standard Population: 2000 US
Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 1999-2003

■ Figure 5 shows that in Texas, the proportion of deaths due to CVD is steadily decreasing from 361.6 per 100,000 in 1999 to 317.8 per 100,000 in 2003. Nationally, mortality rates for CVD are also decreasing from 350.7 per 100,000 in 1999 to 319 per 100,000 in 2002.

MORTALITY DATA – ISCHEMIC HEART DISEASE

Figure 6. Age-Adjusted Mortality Rates for Ischemic Heart Disease by Gender & Race, Texas, 1999-2003
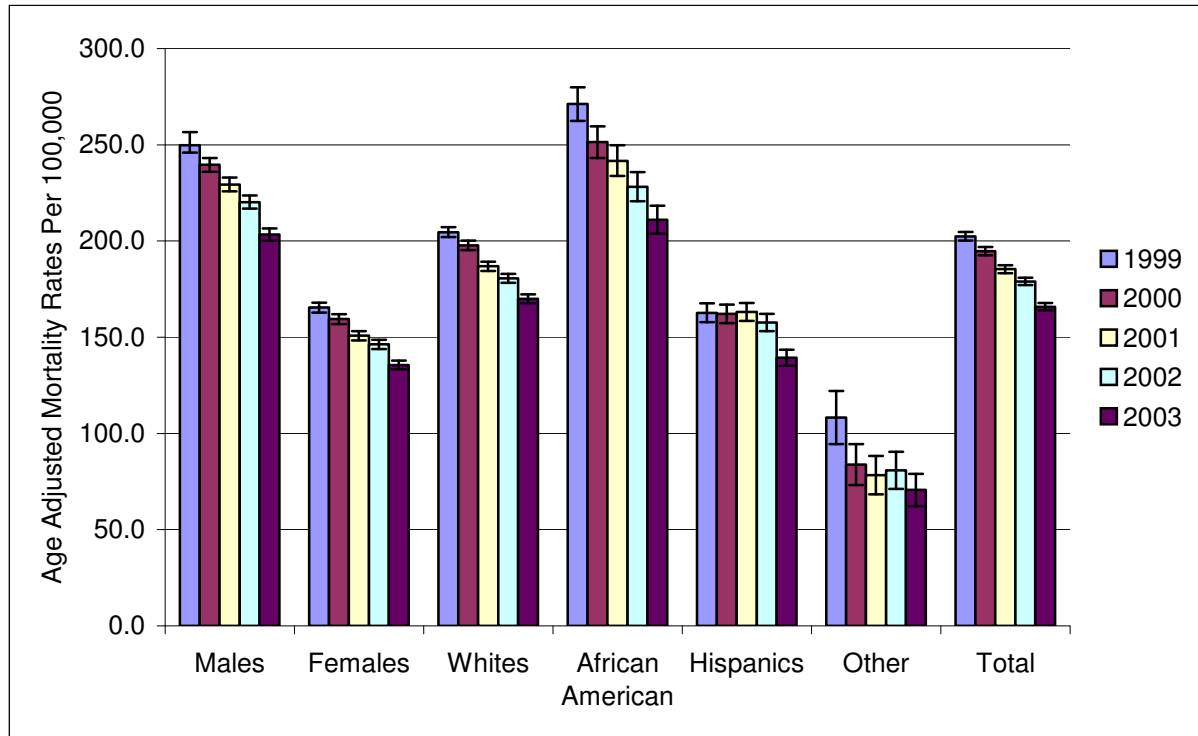
Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 1999-2003

■ The overall age-adjusted mortality rate (AAMR) for ischemic heart disease (IHD) declined from 202.4 per 100,000 in 1999 to 165.8 per 100,000 in 2003. The decrease was statistically significant. AAMR for males and females and for Whites and African Americans also showed significant decline during the same period. AAMR for Hispanics, however, stayed relatively level through 2002, and then showed a significant decline in 2003.

■ While mortality rates due to IHD are declining, patterns of disease still show that Texas males have a significantly higher risk of dying from IHD than females.

In addition, among the race/ethnicity groups, African Americans have a higher risk of dying from IHD than Whites, Hispanics and other races.

MORTALITY DATA – ISCHEMIC HEART DISEASE

Figure 7. Age-Adjusted Mortality Rates for Ischemic Heart Disease County Map, Texas, 2002-2003
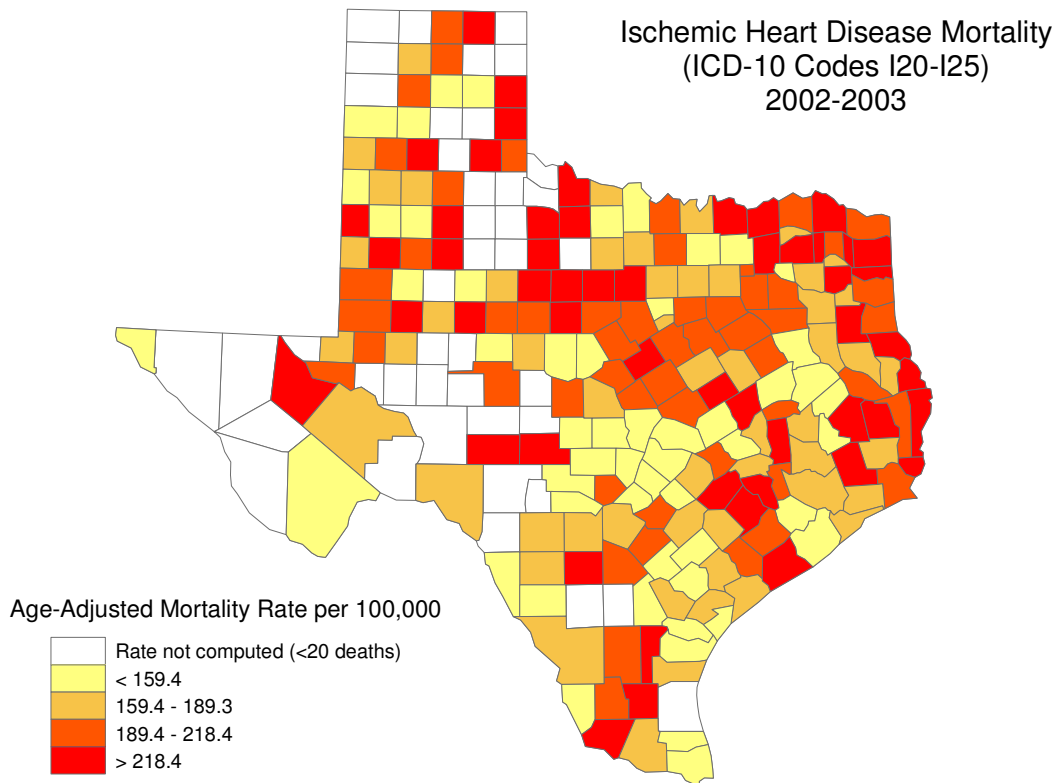
Ischemic Heart Disease Mortality
(ICD-10 Codes I20-I25)
2002-2003

Age-Adjusted Mortality Rate per 100,000

- Rate not computed (<20 deaths)
- < 159.4
- 159.4 - 189.3
- 189.4 - 218.4
- > 218.4

Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 2003

■ The darkest color on the map represents Texas counties with the highest mortality rates for IHD while the lightest color represents counties with the lowest mortality rates. County-specific mortality rates were age-adjusted and represent data for 2002-2003.

NOTE: 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. For each map, county-specific rates were ranked from highest to lowest and then categorized into quartiles.

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MORTALITY DATA – STROKE

Figure 8. Age-Adjusted Mortality Rates for Stroke by Gender & Race, Texas, 1999-2003
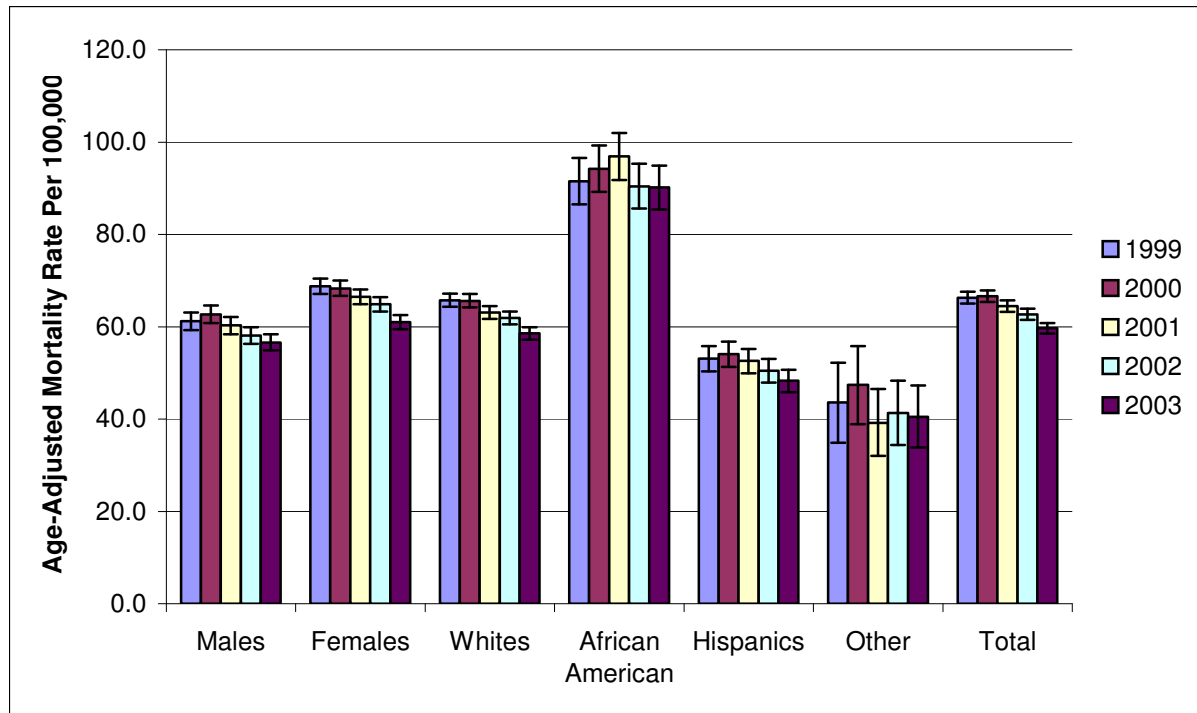
Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 1999-2003

■ The overall age-adjusted mortality rate (AAMR) for stroke declined from 66.3 per 100,000 in 1999 to 59.7 per 100,000 in 2003. The decrease was statistically significant. Among the race/ethnicity groups, AAMR for whites showed a significant decrease from a high of 65.7 per 1000,000 in 2001 to 58.6 per 100,000 in 2003.

■ Texas females have significantly higher risk of dying from stroke than males.

■ Among the race/ethnicity groups, African Americans have significantly higher mortality rates compared to Whites and Hispanics and other races.

MORTALITY DATA – STROKE

Figure 9. Age-Adjusted Mortality Rates for Stroke County Map, Texas, 2002-2003
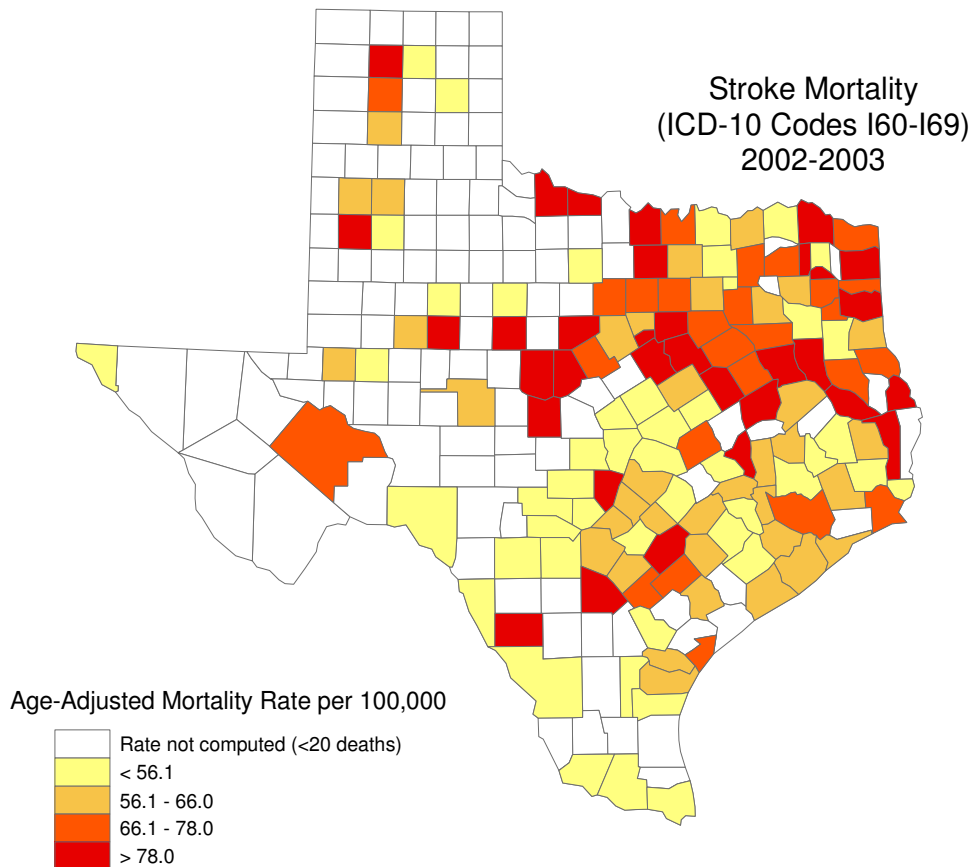
Stroke Mortality
(ICD-10 Codes I60-I69)
2002-2003

Age-Adjusted Mortality Rate per 100,000

- Rate not computed (<20 deaths)
- < 56.1
- 56.1 - 66.0
- 66.1 - 78.0
- > 78.0

Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 2003

- The darkest color on the map represents Texas counties with the highest mortality rates for stroke while lightest color represents counties with the lowest mortality rates. County-specific mortality rates were age-adjusted and represent data for 2002-2003.

NOTE: 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. For each map, county specific rates were ranked from highest to lowest and then categorized into quartiles.

MORTALITY DATA – Congestive Heart Failure

Figure 10. Age-Adjusted Mortality Rates for Congestive Heart Failure by Gender & Race, Texas, 1999-2003
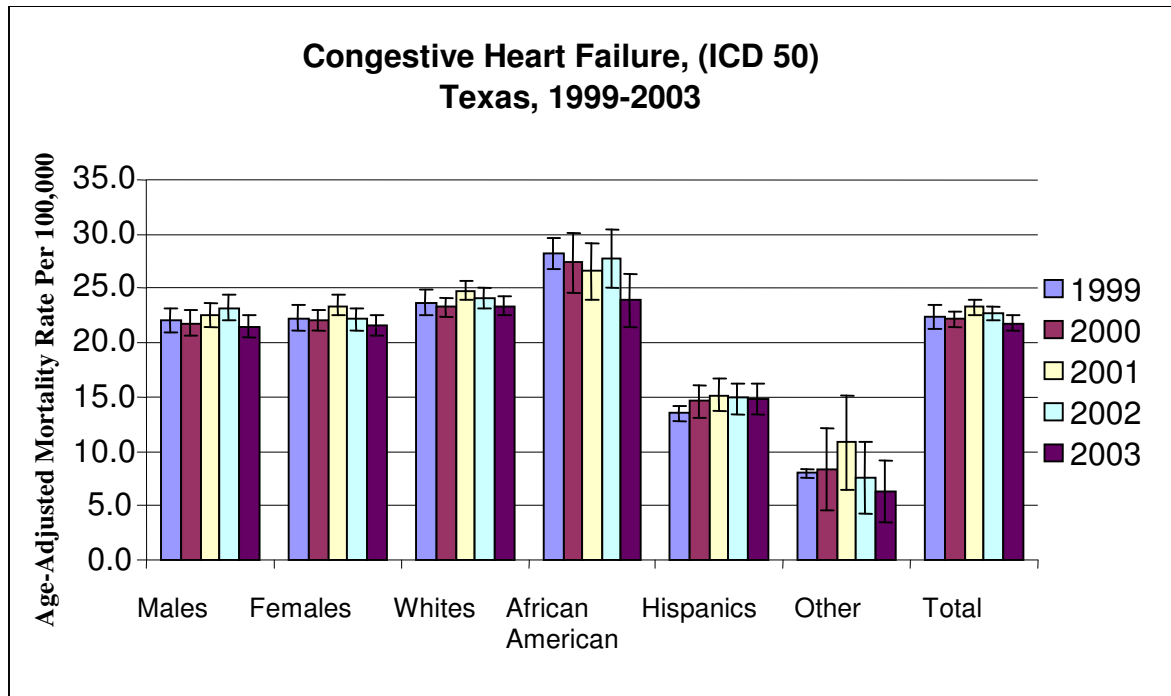
Data Source: Texas Vital Statistical Unit (VSU), Texas Department of State Health Services, 1999-2003

■ The overall age-adjusted mortality rate (AAMR) for heart failure remained relatively unchanged between 1999 and 2003 among the race/ethnicity groups, AAMR for African Americans showed a significant decrease from a high of 28.2 per 1000,000 in 1999 to 24.0 per 100,000 in 2003.

■ There was not a significant difference between males and females.

PREVALENCE DATA

CVD Prevalence

BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM (BRFSS)

Prevalence is the proportion of people in a population who have a specific disease at a point in time or a given time period. Prevalence estimates are often used to describe the burden of a disease for a given population. Texas cardiovascular disease prevalence estimates are based on self-reported data from BRFSS.

Since behavioral risk factors play a prominent role in chronic disease, finding ways to help people adopt healthier behaviors may be the most promising point of intervention. Surveillance of behavioral risk factors can provide the basis for both launching and evaluating programs designed to reduce the prevalence of unhealthy behaviors. Data on behavioral risk factors are necessary for formulating intervention strategies, justifying resources to support these strategies, and proposing new policies or legislation. The BRFSS is an ongoing annual telephone survey of adult Texans age 18 years and older using a standard protocol and standard interviewing methods.

Cardiovascular disease (CVD) includes all diseases directly related to the heart and blood vessels, such as coronary heart disease, stroke, congestive heart failure, hypertensive disease, and atherosclerosis. In this survey and analysis report, the survey respondents with CVD are those who were ever told by a physician or other health professional that they had a heart attack, angina, coronary heart disease, or a stroke. In this section, an overview of the CVD prevalence at both the national and state level is presented in terms of total number and percentage of CVD patients as well as statistics on specific cardiovascular diseases (heart disease and stroke).

Texas/US Comparison

Texas/US Comparison

According to 1999-2005 BRFSS survey data, there was a steady rise in CVD prevalence in Texas. From 2002 to 2005, Texan adults had higher CVD prevalence rate than the nation's average (Figure 11). The CVD prevalence rate in Texas was 8.7% in 2003 and 8.5% in 2005 while the national average was 8.0% and 8.3% respectively.

Figure 11. CVD Prevalence: Texas & US., BRFSS 1996-2005
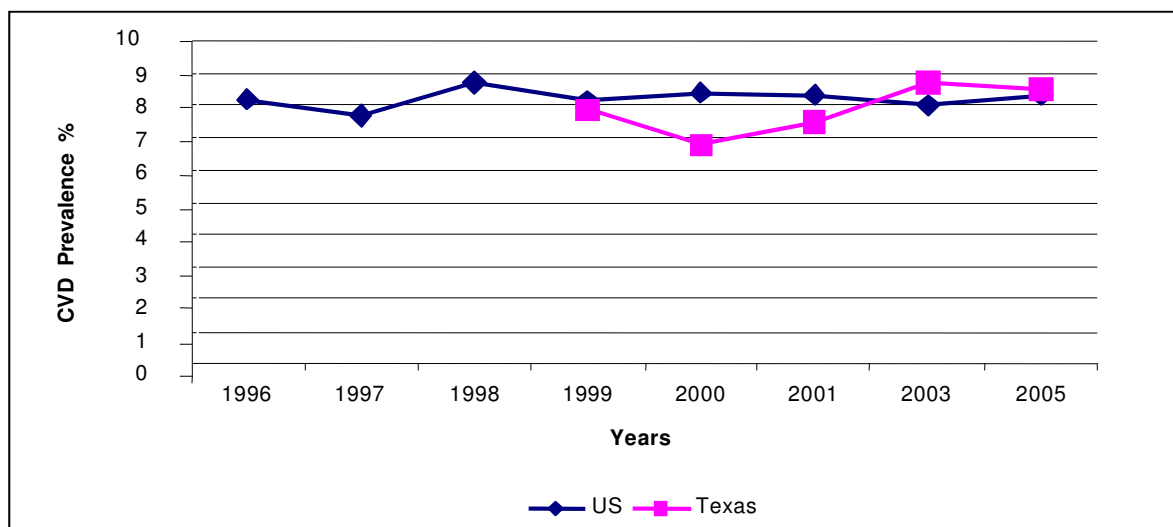
Data Source: Texas Behavioral Risk Factor Surveillance Survey (BRFSS), Department of State Health Services, 1997-2005

Texas Prevalence

The CVD prevalence data for Texas was derived from the annual Behavior Risk Factor Surveillance System (BRFSS) survey. The BRFSS survey is administered only to individuals 18 years or older. The prevalence data in this report is based upon response to the question: "Have you EVER been told by a health professional that you had a heart attack, also called a myocardial infection, angina or coronary heart disease, or a stroke?"

Prevalence of Cardiovascular Disease

In 2005, 8.5% (1,422,000) of Texas adults (aged 18 years and older) reported that they have had a diagnosed heart attack, a stroke, an angina or a coronary heart disease. See Table 1 for prevalence rates broken down by various demographic characteristics. CVD prevalence in 2001, 2003, and 2005 were higher for the following groups of people:

- Over 45 years of age
- Lower education level, or
- Lower income

Age is a significant factor associated with CVD. Prevalence of CVD in adults aged 65 years or older was 2.4 times higher than adults aged 45-64 years and 7.4 times higher than that of adults between age 18 and 44. However, there is no significant difference between males and females (see table 2).

Table 2. Prevalence of CVD by Selected Demographic Characteristics, Texas, BRFSS, 2005

	Texas Population	Texas Estimated Number	CVD Rate%	95% CI Lower	95% CI Upper
Overall CVD Rate (Texas)	**16,725,350**	1,422,000	8.5	7.7	9.3
Sex					
Male	8,279,943	712,000	8.6	7.3	10.1
Female	8,445,407	701,000	8.3	7.4	9.3
Race/Ethnicity					
White	8,848,038	911,000	10.3	9.3	11.4
African American	1,837,203	162,000	8.8	6.3	12.1
Hispanic	5,374,414	269,000	5	3.9	6.3

Data Source: Texas Behavioral Risk Factor Surveillance Survey (BRFSS), Department of State Health Services, 2005

Prevalence of Cardiovascular Disease (CVD)

Figure 12. Prevalence of Cardiovascular Disease by Education & Income, Texas, BRFSS, 2005
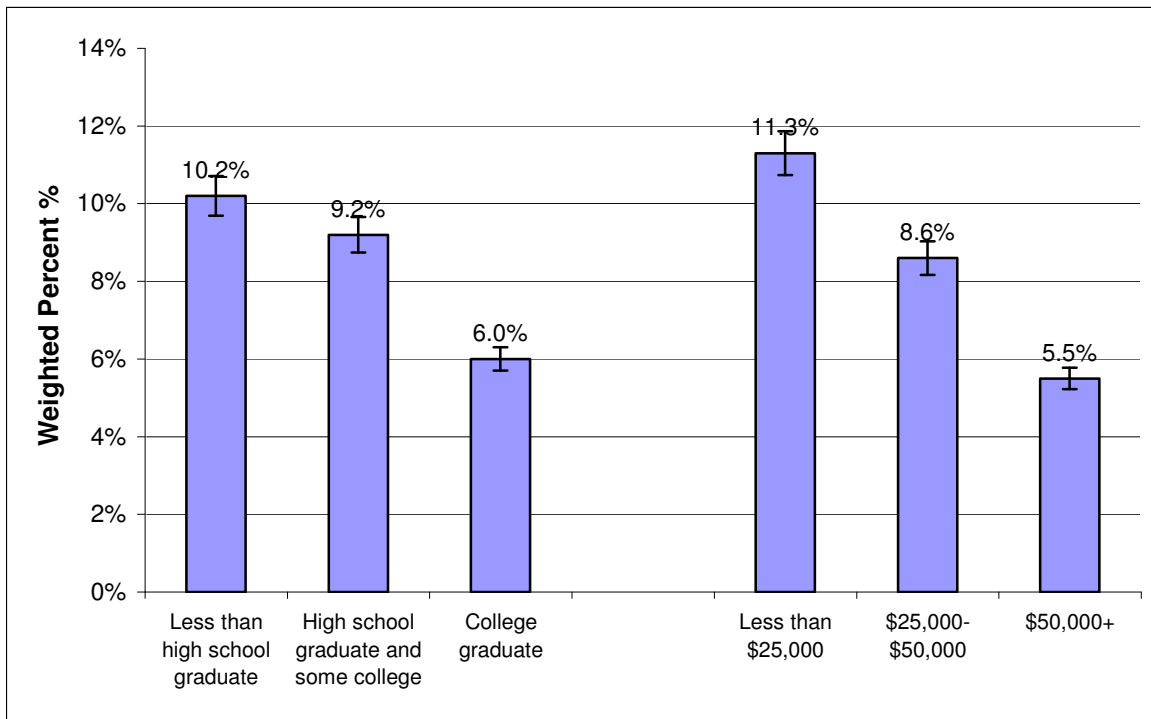
Data Source: Texas Behavioral Risk Factor Surveillance Survey (BRFSS), Department of State Health Services, 2005

■ Figure 12 provides the CVD prevalence by education and income. Overall, the higher the education and income level, the lower the prevalence of cardiovascular disease. The prevalence rate for Texans who did not graduate from high school was higher than the state rate (10.2% vs. 8.5%). CVD prevalence was highest among those whose annual income was less than $25,000 (11.3%) compared to all other income groups.

Prevalence of Heart Disease (HD)

In 2005, 6.6 percent of Texas adults reported that they have diagnosed HD (Table 3). This means that approximately 1,104, 000 Texas adults had diagnosed HD in 2005.
There was no significant difference between male and female. HD is strongly associated with age. Adults aged 65 years or older were 2.5 times more likely to have HD than adults aged 45-64 years and 7.5 times more likely than adults between 18 and 44. Adults with lower education level and/or lower income have higher HD prevalence rates (table 3 and figure 13).

Table 3. Prevalence of Heart Disease By Selected Demographic Characteristics, Texas, BRFSS, 2005

	Texas Population	Texas Estimated Number	CVD Rate%	95% CI Lower	95% CI Upper
Overall HD Rate (Texas)	**16,725,350**	1,101,000	6.6	5.9	7.4
Sex					
Male	8,279,943	604,000	7.3	6.1	8.7
Female	8,445,407	498,000	5.9	5.2	6.7
Race/Ethnicity					
White	8,848,038	713,000	8.1	7.2	9.1
African American	1,837,203	110,000	6.0	4.0	8.8
Hispanic	5,374,414	190,000	3.5	2.9	5.0

Data Source: Texas Behavioral Risk Factor Surveillance Survey (BRFSS), Department of State Health Services, 2005

Prevalence of Heart Disease (HD)

Figure 13. Prevalence of Heart Disease by Education & Income, Texas, BRFSS, 2005
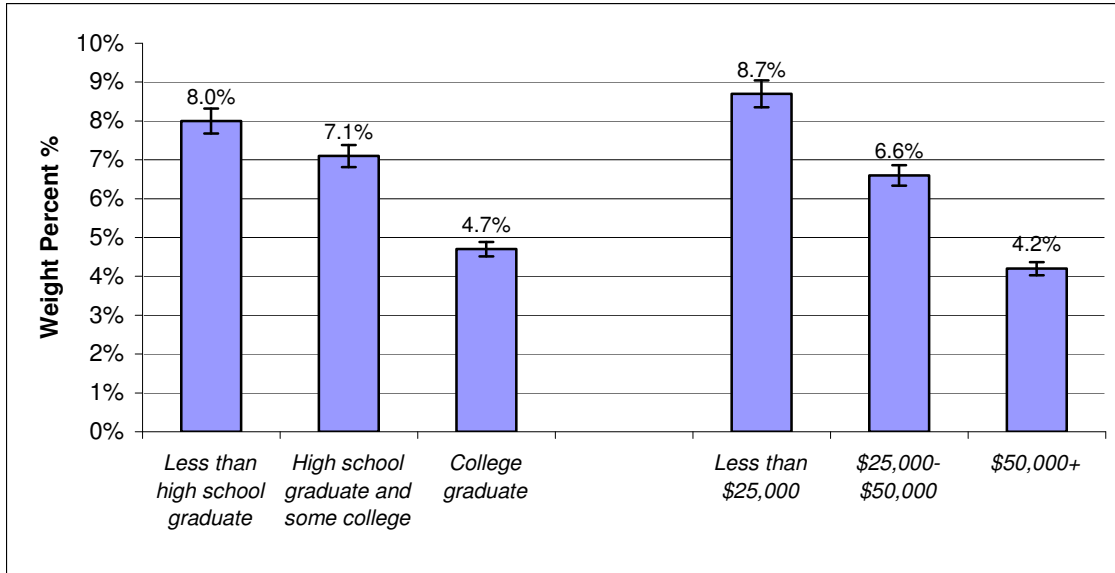
Data Source: Texas Behavioral Risk Factor Surveillance Survey (BRFSS), Department of State Health Services, 2005

■ Heart disease prevalence in Texas is also affected by the education level and income of the population. BRFSS data for 2005 show lower prevalence of heart disease at higher education and income levels. (Figure 13).

Prevalence of Stroke

In 2005, approximately 3 percent (2.8%) of Texas adults reported that they have had a diagnosed stroke (or they were told by a doctor, nurse, or health professional that they had a stroke (Table 4). This means that approximately 31,000 Texans have had a diagnosed stroke. Texas females were significantly more likely to reported having had a stroke than males (3.4% versus 2.1%).

Again, age is the single most dominant factor among those who reported having a stroke. Texas adults aged 65 years or older were 2.1 times more likely to reported having had a stroke than adults aged 45-64 and 10.3 times more likely than adults aged 18-44.

Table 4. Prevalence of Stroke By Selected Demographic Characteristics, Texas, BRFSS, 2005

	Texas Population	Texas Estimated Number	CVD Rate%	95% CI Lower	95% CI Upper
Overall Stroke Rate (Texas)	**16,725,350**	467,000	2.8	2.4	3.2
Sex					
Male	8,279,943	177,000	2.1	1.6	2.8
Female	8,445,407	290,000	3.4	2.9	4.1
Race/Ethnicity					
White	8,848,038	296,000	3.3	2.8	3.9
African American	1,837,203	90,000	4.9	3.1	7.7
Hispanic	5,374,414	82,000	1.5	1.0	2.4

Data Source: Texas Behavioral Risk Factor Surveillance Survey (BRFSS), Department of State Health Services, 2005

Prevalence of Stroke

Figure 14. Prevalence of Stroke by Education & Income, Texas, BRFSS, 2005
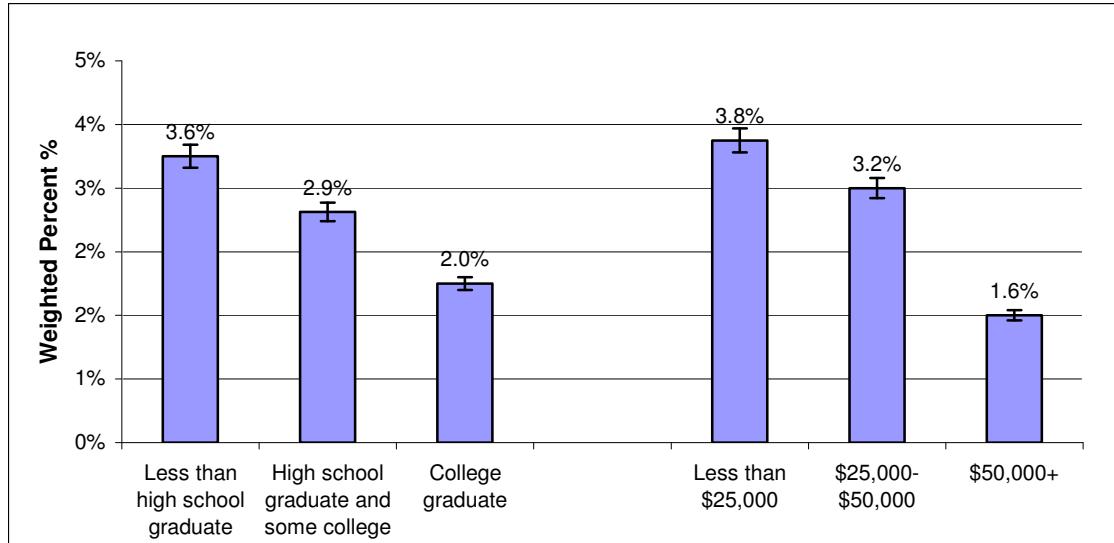
Data Source: Texas Behavioral Risk Factor Surveillance Survey (BRFSS), Department of State Health Services, 2005

■ Stroke prevalence in Texas varies by educational level and income. The 2005 BRFSS data showed that Texans in the higher education and income levelshad lower prevalence of stroke (figure 14).

CVD Prevalence by Geographic Area

Table 5. Prevalence of CVD by Geographical Area: Texas BRFSS, 2001, 2003, and 2005

Area	Prevalence (%)	95% CI	
		Lower	Upper
National 2005	8.3	8.1	8.4
Texas	**8.3**	**7.7**	**8.9**
PHR 1	9.4	7.1	12.2
PHR 2/3	8.5	7.5	9.6
PHR 4/5N	11.1	9.1	13.6
PHR 6/5S	8.1	7.0	9.4
PHR 7	6.7	5.5	8.3
PHR 8	7.3	5.9	9.1
PHR 9/10	9.5	6.5	13.6
PHR 11	6.9	5.0	9.3
Border	7.8	5.5	10.9
Non-Border	8.3	7.8	8.9
MSA	7.6	7.0	8.2
Non-MSA	11.4	9.8	13.3
Austin-Round Rock MSA	5.6	4.0	7.8
Dallas-Plano-Irving PMSA	6.4	5.2	7.9
Ft. Worth-Arlington PMSA	8.9	7.1	11.0
El Paso MSA	7.0	4.9	9.9
Houston-Baytown-Sugar Land MSA	7.6	6.4	8.9
San Antonio MSA	6.0	4.6	7.9

Note: For Definition of Geographic Groups, see Appendix. All reported rates are weighted for Texas demographics and the probability of selection
Data Source: Texas Behavioral Risk Factor Surveillance Survey (BRFSS), Department of State Health Services, , 2001, 2003, 2005

■ Table 5 shows the 2001, 2003 and 2005 combined BRFSS survey results for Texas CVD prevalence in terms of geographical location (DSHS Health Service Regions) and national average for the corresponding statistics. Texas had the same prevalence of CVD (8.3%) as the national average (8.3%).   It is worth noting that CVD prevalence rates in PHR 4/5N (11.1% 95%CI 9.1%-13.6%), were significant higher than the State rate (8.3% 95%CI 7.7-8.9%). The difference in CVD prevalence rates between border counties (the 32 counties on the Texas border with Mexico) and non-border counties was not significant. Non-MSA counties had significantly higher prevalence of CVD than MSA counties (11.4% 95%CI 9.8-13.3% vs. 7.6% 95%CI 7.0-8.2%). Among the six largest Texas metropolitan areas, there was no statistically significance difference among Metropolitan Statistical Areas.

Prevalence of Heart Disease by Geographic Area

Table 6. Prevalence of Heart Disease by Geographical Area: Texas BRFSS, 2001, 2003, and 2005

Area	Prevalence (%)	95% CI	
		Lower	Upper
National 2005	6.6	6.5	6.8
Texas	**6.7**	**6.2**	**7.2**
PHR 1	7.8	5.8	10.5
PHR 2/3	6.7	5.8	7.7
PHR 4/5N	8.6	6.8	10.7
PHR 6/5S	6.7	5.7	7.9
PHR 7	5.3	4.2	6.7
PHR 8	6.2	4.8	7.9
PHR 9/10	7.8	5.0	12.0
PHR 11	5.2	3.6	7.4
Border	6.6	4.4	9.7
Non-Border	6.7	6.2	7.2
MSA	6.1	5.6	6.7
Non-MSA	9.3	7.7	11.1
Austin-Round Rock MSA	4.8	3.3	7.0
Dallas-Plano-Irving PMSA	5.1	4.0	6.5
Ft. Worth-Arlington PMSA	6.7	5.2	8.6
El Paso MSA	5.8	3.9	8.6
Houston-Baytown-Sugar Land MSA	6.2	5.2	7.4
San Antonio MSA	4.8	3.5	6.5

Note: For Definition of Geographic Groups, see Appendix. All reported rates are weighted for Texas demographics and the probability of selection
Data Source: Texas Behavioral Risk Factor Surveillance Survey (BRFSS), Department of State Health Services, , 2001, 2003, 2005

■ Table 6 shows the 2001, 2003 and 2005 combined BRFSS survey results for Texas heart disease prevalence in terms of geographical location (Health Service Regions) and the corresponding statistics on the nation's average. Texas had the same prevalence of heart disease (6.7%) as the national average (6.6%).   Heart disease prevalence rates in PHR 4/5N (8.6%, 95%CI 6.8%-10.7%), were higher than the State rate (6.7% 95%, CI 6.2-7.2%) although the difference did not represent a statistical significance. The difference in heart disease prevalence rates between border counties (the 32 counties on the Texas border with Mexico) and non-border counties was not statistically significant. There was a significant difference between MSA (Metropolitan Statistical Areas) (6.1%, 95%CI 5.6%-6.7%) and non-MSA counties (9.3%, 95%CI 7.7%-11.1%). Among the six largest Texas metropolitan areas, there was no statistically significant difference among Metropolitan Statistical Areas.

Prevalence of Stroke by Geographic Area

Table 7. Prevalence of Stroke by Geographical Area: Texas BRFSS, 2001, 2003, and 2005

Area	Prevalence (%)	95% CI	
		Lower	Upper
National 2005	2.6	2.5	2.7
Texas	2.5	2.2	2.8
PHR 1	3.2	2.0	5.0
PHR 2/3	2.7	2.1	3.3
PHR 4/5N	3.7	2.6	5.3
PHR 6/5S	2.3	1.8	3.0
PHR 7	2.2	1.5	3.1
PHR 8	2.0	1.4	3.0
PHR 9/10	2.3	1.5	3.7
PHR 11	2.2	1.3	3.6
Border	1.9	1.2	3.0
Non-Border	2.6	2.3	2.9
MSA	2.2	1.9	2.6
Non-MSA	3.8	3.0	4.8
Austin-Round Rock MSA	1.2	0.7	2.0
Dallas-Plano-Irving PMSA	1.9	1.4	2.7
Ft. Worth-Arlington PMSA	3.2	2.1	4.7
El Paso MSA	1.9	1.0	3.4
Houston-Baytown-Sugar Land MSA	2.2	1.7	2.9
San Antonio MSA	1.8	1.1	2.9

Note: For Definition of Geographic Groups, see Appendix. All reported rates are weighted for Texas demographics and the probability of selection
Data Source: Texas Behavioral Risk Factor Surveillance Survey (BRFSS), Department of State Health Services, , 2001, 2003, 2005

■ Table 7 shows geographic differences in stroke prevalence among Texas, US, and Texas Health Service Regions using the BRFSS 2005 data. There is no significant difference between the US (2.6% 95%CI 2.5%-2.7%)), Texas (2.5% 95%CI 2.2%-2.8%), and the Health Service Regions. There is no significant difference between border regions and non-border regions. The prevalence of stroke in Non-MSA (3.8%, 95%CI 3.0%-4.8%) is significantly higher than MSA (2.2%, 95%CI 1.9%-2.6%). Among the six largest Texas metropolitan areas, Austin-Round Rock MSA had a significantly lower stroke rate than the state average, but there was not significant difference between the other Metropolitan Statistical Areas.

HOSPITAL DISCHARGE DATA

Hospital Discharge Data

Hospital discharge data are a rich resource of information about the patterns of care, the public health burden and the costs associated with chronic disease morbidity. The Texas Health Care Information Council (THCIC) is responsible for collecting hospital discharge data from all state licensed hospitals except those that are statutorily exempt from the reporting requirement. All reporting hospitals are required to submit discharged inpatient claims data on a quarterly basis, using the uniform bill (UB-92) format.

Hospital discharge data for CVD are obtained from the (THCIC) Inpatient Hospital Discharge Public Use data files. Hospital discharge data have been available in Texas Since 1999. The data represented in this report is for the period between 1999 and 2004.

- ICD Codes used for Hospital discharge data analysis are:
- Ischemic Heart Disease (IHD) ICD-9: 410-414
- Hemorrhagic Stroke (HS) ICD-9: 430-432
- Ischemic Stroke (IS) ICD-9: 436-438, 433, and 434
- Congestive Heart Failure (CHF) ICD-9: 428

Limitation of the data:

Valid hospital discharge data are only available since the third quarter of 2000. Earlier data were not reported correctly by some hospitals.
Hospitals must submit data no later than 60 days after the close of a calendar quarter. Depending on the hospitals' collection and billing cycles, not all discharges may have been billed or reported. This can affect the accuracy of source of payment data, particularly self pay and charity that later qualify for Medicaid or other payment sources.

TCHIC hospital discharge data represent the number of hospitalizations and not the number of individuals who had complications due to CVD. For CVD conditions, an individual can be hospitalized more than once for the same condition during the hospitalization period and multiple hospitalizations cannot be distinguished from the data source since the data has been de-identified.

HOSPITAL DISCHARGE DATA

Hospital Discharge of Cardiovascular Diseases

The American Heart Association (AHA) estimates that the costs of cardiovascular diseases in the United States in 2002 were at least $329.2 billion. This estimate includes both direct costs (hospitalizations, costs of professionals and the use of pharmaceuticals) and indirect costs (lost productivity resulting from morbidity and mortality).

Figure 15. Number of Selected First-Listed Hospital Discharge, Texas, THCIC, 2000-2004
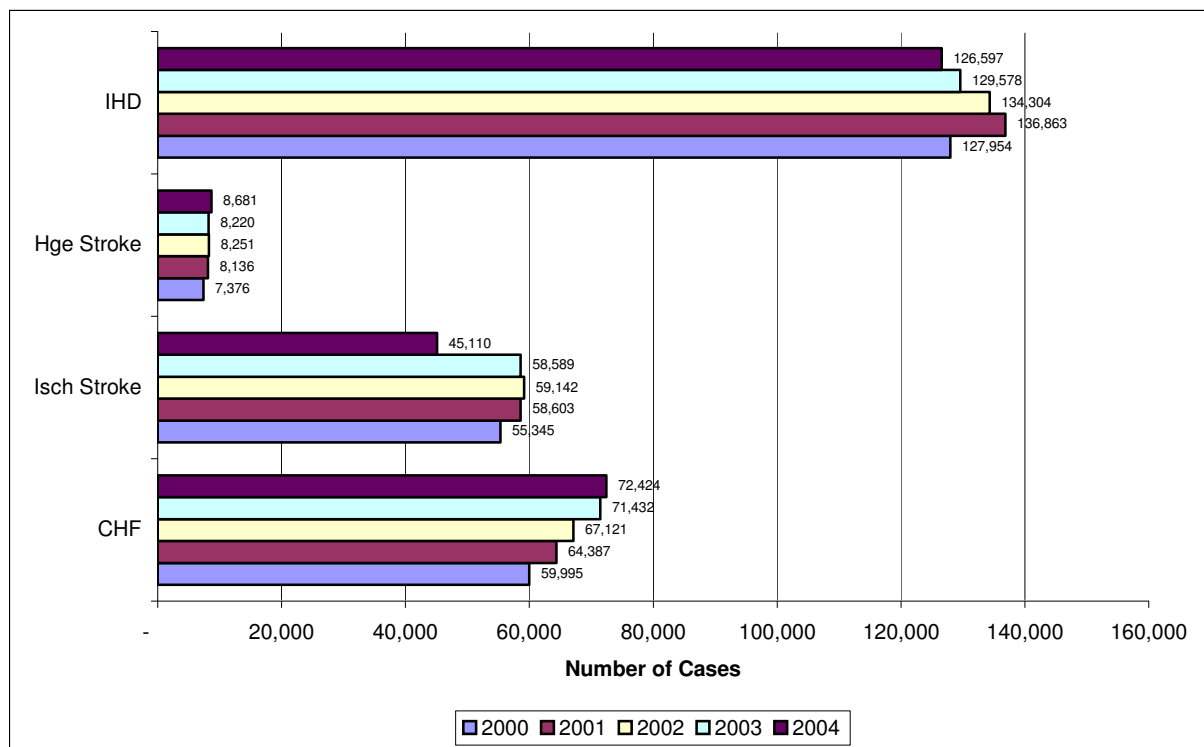
Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2000-2004

◼ The total number of hospitalizations due to CVD has increased each year from 2000 to 2004. Total hospitalizations were highest for ischemic heart disease followed by congestive heart failure, ischemic stroke and hemorrhagic stroke (See Figure 15).

HOSPITAL DISCHARGE DATA

Figure 16. Estimated Average Hospital Charge per Day for Selected CVD Diagnoses in Texas, THCIC, 2000-2004
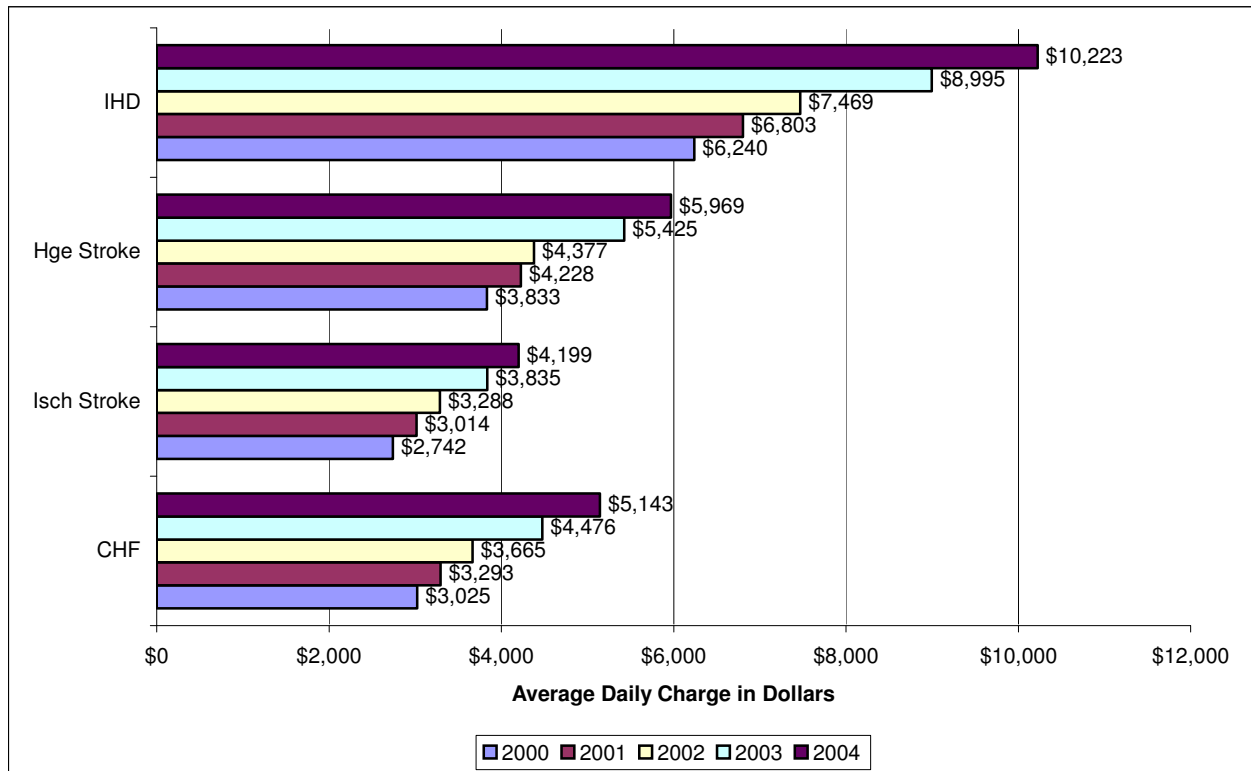
Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2000-2004

🔳 Estimated average hospital charges per day for selected CVD diagnoses have increased each year from 2000 to 2004. Among the specific CVD disease conditions, average hospital charges were highest for ischemic heart disease, followed by hemorrhagic stroke, congestive heart failure and ischemic stroke (Figure 16).

HOSPITAL DISCHARGE DATA

Figure 17. Total Hospital Charge for Selected CVD Diagnoses in Texas, THCIC, 2000-2004
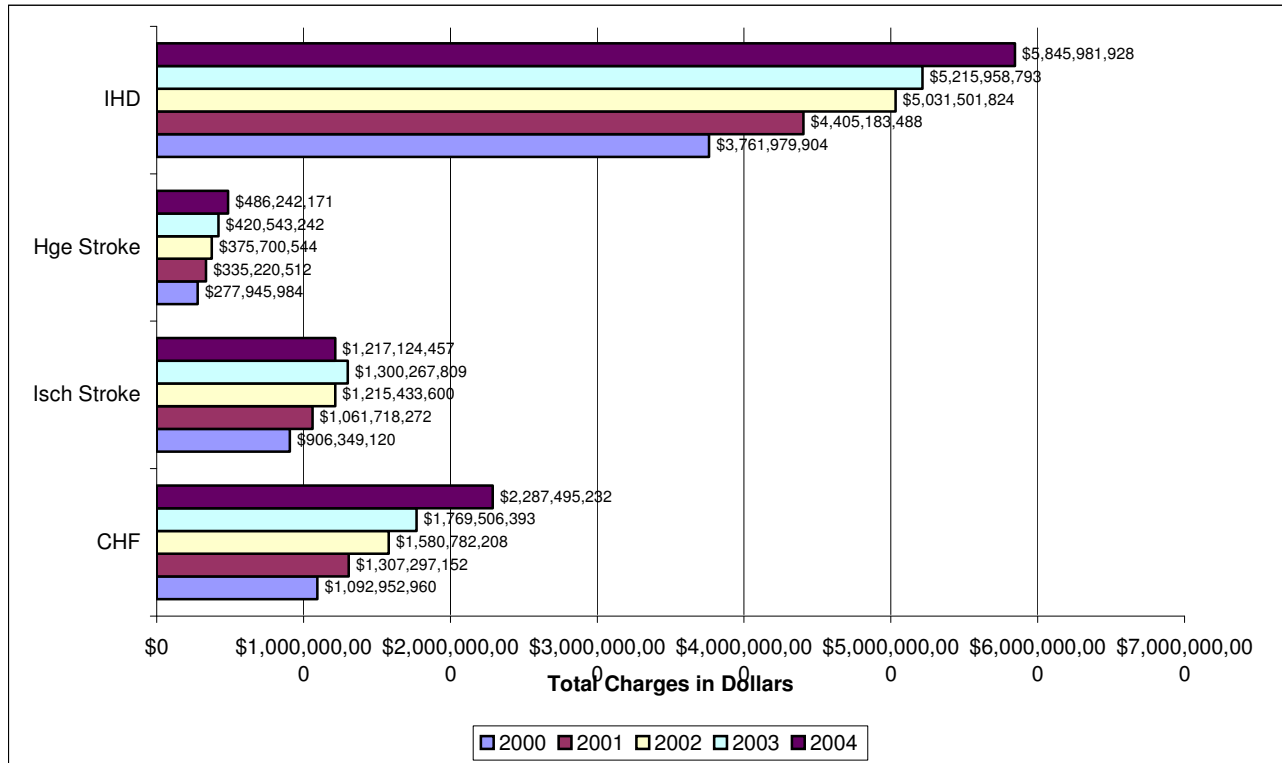
IHD	$5,845,981,928
	$5,215,958,793
	$5,031,501,824
	$4,405,183,488
	$3,761,979,904
Hge Stroke	$486,242,171
	$420,543,242
	$375,700,544
	$335,220,512
	$277,945,984
Isch Stroke	$1,217,124,457
	$1,300,267,809
	$1,215,433,600
	$1,061,718,272
	$906,349,120
CHF	$2,287,495,232
	$1,769,506,393
	$1,580,782,208
	$1,307,297,152
	$1,092,952,960

Total Charges in Dollars

Legend: ■ 2000 ■ 2001 □ 2002 □ 2003 ■ 2004

Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2000-2004

■ The total hospital charges for selected CVD diagnoses have increased each year from 2000 to 2004. Among the specific CVD disease conditions, total hospital charges were highest for ischemic heart disease, followed by congestive heart failure, ischemic stroke, and hemorrhagic stroke (Figure 17).

43

Figure 18. Standard Source of Primary Payment for Ischemic Heart Disease Discharges in Texas, THCIC, 2004
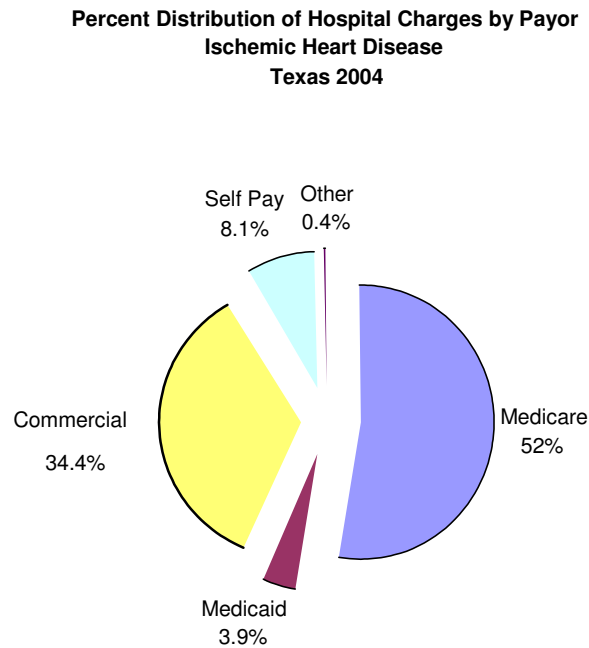
Percent Distribution of Hospital Charges by Payor
Ischemic Heart Disease
Texas 2004

Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2004

■ In 2004, standard sources of the primary payment for ischemic heart disease-related hospital discharges include Medicare (52 percent), commercial (34 percent), Medicaid (4 percent), other sources (e.g., worker's compensation, Blue Cross, CHAMPUS, other federal programs including VA) (0.4 percent) and self-pay (8 percent).

HOSPITAL DISCHARGE DATA – SOURCE OF PAYMENT

Figure 19. **Standard Source of Primary Payment for Ischemic Stroke Discharges in Texas, THCIC, 2004**

Percent Distribution of Hospital Charges by Payor
Ischemic Stroke
Texas 2004

Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2004

■ In 2004, standard sources of the primary payment for ischemic stroke-related hospital discharges include Medicare (65 percent), commercial (23 percent), Medicaid (4 percent), other sources (e.g., worker's compensation, Blue Cross, CHAMPUS, other federal programs including VA) (0.2 percent) and self-pay (8 percent).

HOSPITAL DISCHARGE DATA – SOURCE OF PAYMENT

Figure 20. Standard Source of Primary Payment for Hemorrhagic Stroke Discharges in Texas, THCIC, 2004

Percent Distribution of Hospital Charges by Payor
Hemorrhagic Stroke
Texas 2004
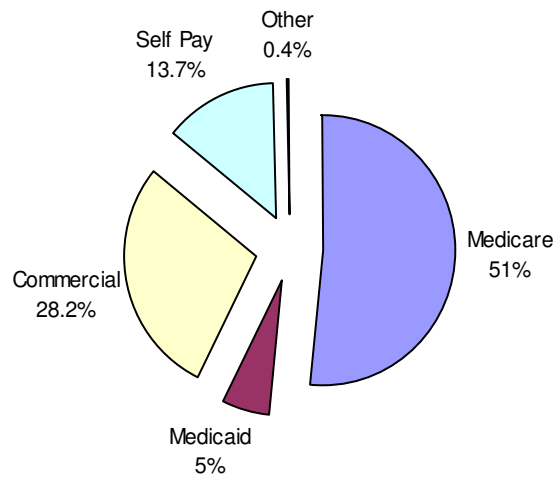
Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2004

■ In 2004, standard sources of the primary payment for hemorrhagic stroke-related hospital discharges include Medicare (51 percent), commercial (28 percent), Medicaid (5 percent), other sources (e.g., worker's compensation, Blue Cross, CHAMPUS, other federal programs including VA) (0.4 percent) and self-pay (14 percent).

HOSPITAL DISCHARGE DATA – SOURCE OF PAYMENT

Figure 21. Standard Source of Primary Payment for Congestive Heart Failure Discharges in Texas, THCIC, 2004

Percent Distribution of Hospital Charges by Payor
Congestive Heart Failure
Texas 2004
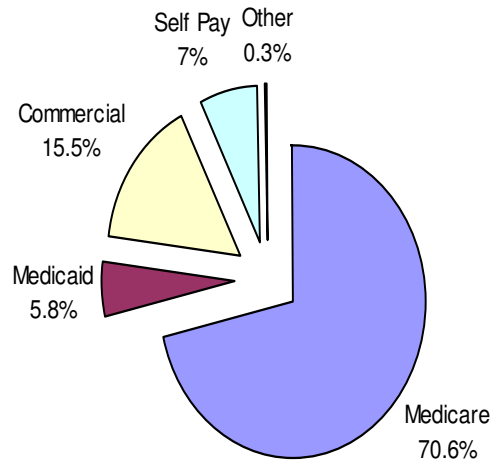
Self Pay 7%   Other 0.3%
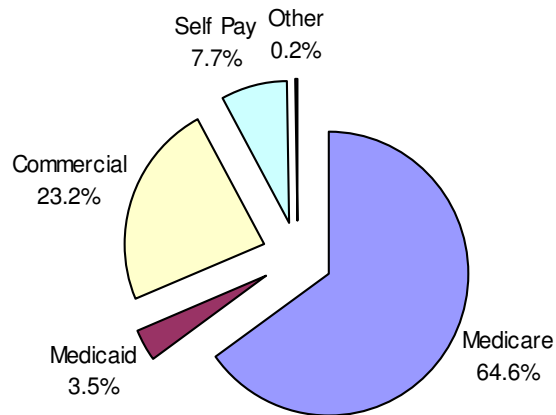
Commercial 15.5%

Medicaid 5.8%

Medicare 70.6%

Data Source: Texas Health Care Information Collection (THCIC), Department of State Health Services, 2004

■ In 2004, standard sources of the primary payment for congestive heart failure-related hospital discharges include Medicare (71 percent), commercial (16 percent), Medicaid (6 percent), other sources (e.g., worker's compensation, Blue Cross, CHAMPUS, other federal programs including VA) (0.3 percent) and self-pay (7 percent).

Medicaid Claims Data

Medicaid Claims Data

The data is based on Medicaid claims paid for Fee-For-Service (FFS) and Patient Care Case Management (PCCM) clients. It does not include information on individuals served by Medicaid HMOs (approximately 1/3 of Texas Medicaid clients) or those served by STAR+PLUS.

This information is derived from paid or partially paid Medicaid claims and does not include data on denied or pending claims.

Figure 22. Primary CVD Diagnoses, Inpatient Cost, Texas, 2005

Ischemic Heart Disease	$47,697,130
Congestive Heart Failure	$30,885,743
Stroke	$20,071,425
Hypertension	$2,132,630
Hypertensive Heart Disease	$1,655,524
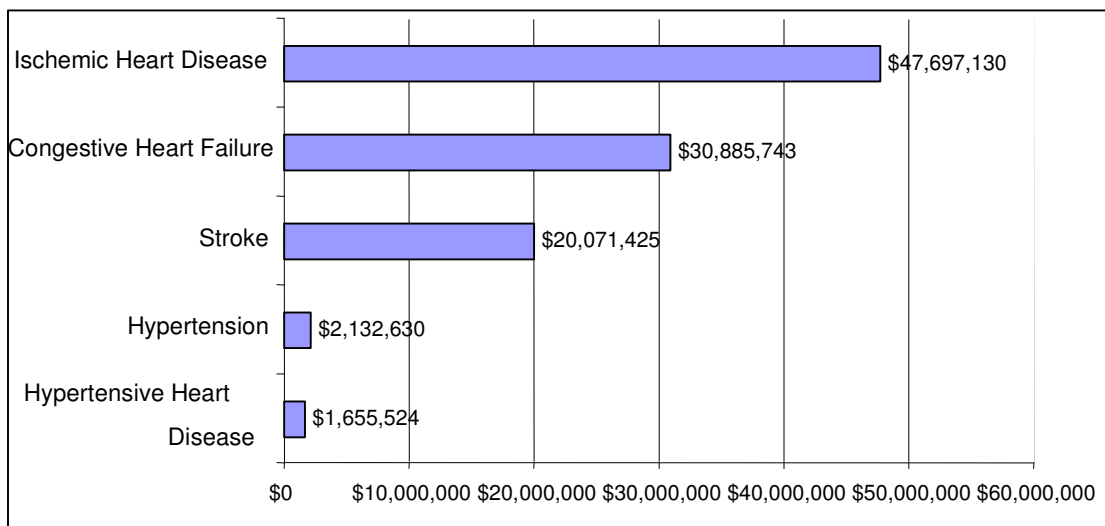
Source: Fee for Service (FFS) and Patient Care Case Management (PCCM) clients, 2005

■ Figure 22 shows the 2005 total Medicaid inpatient costs data due to CVD in Texas.

■ The highest cost was ischemic heart disease followed by congestive heart failure, stroke, and hypertension.

Medicaid Claims Data

Figure 23. Primary CVD Diagnoses, Outpatient Cost, Texas, 2005
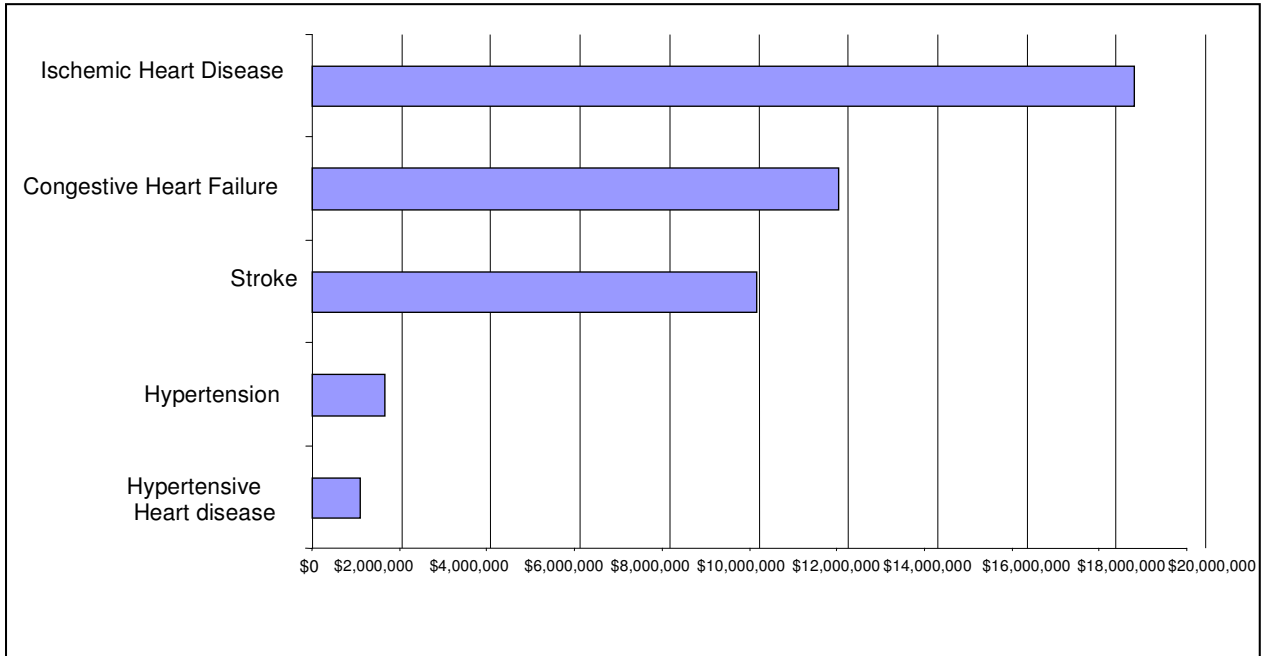
Source: Fee for Service (FFS) and Patient Care Case Management (PCCM) clients, 2005

- Figure 23 shows the total 2005 Medicaid outpatient costs data due to CVD in Texas.

- The highest cost was ischemic heart disease followed by congestive heart failure, stroke, and hypertension.

Medicaid Claims Data

Figure 24. Primary CVD Diagnoses, Emergency Department Cost, Texas, 2005
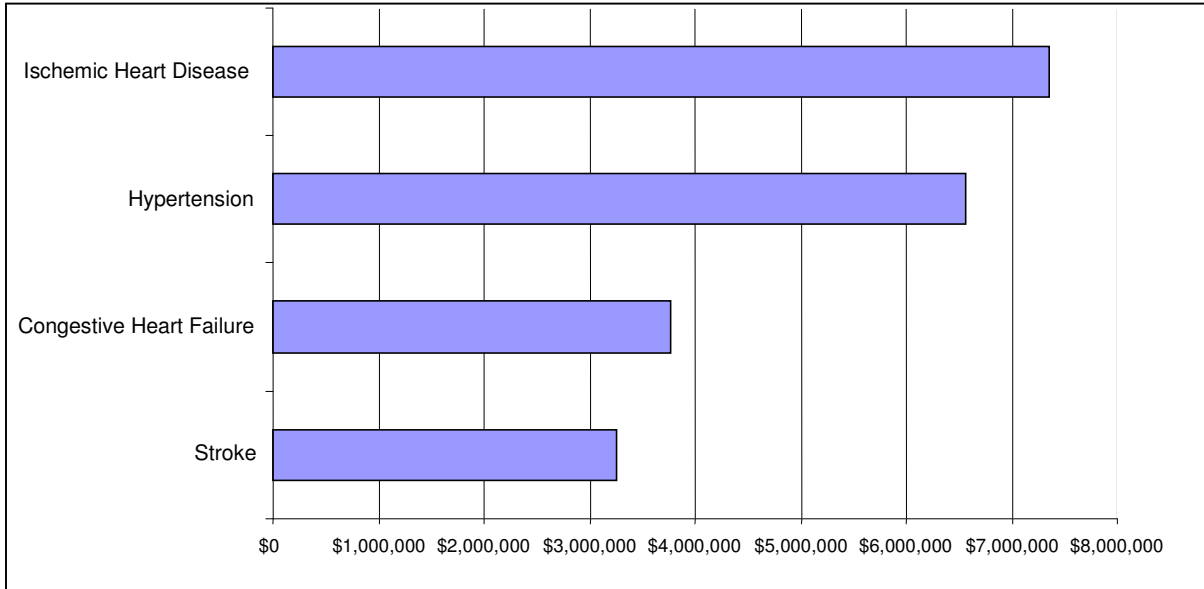
Source: Fee for Service (FFS) and Patient Care Case Management (PCCM) clients, 2005

- Figure 24 shows the 2005 total Medicaid costs for emergency department usage due to CVD in Texas 2005.

- The highest cost was ischemic heart disease followed by hypertension, congestive heart failure, and stroke.

Medicaid Claims Data

Table 8. Number of Hospitalizations, Medical Claims, and Cost due to CVD, Texas, 2005

	Inpatient	Emergency Department	Outpatient
Number of unduplicated CVD patients	43,168	157,845	912,748
Total number of CVD claims	52,494	258,012	2,060,936
Medicaid Paid Amount for CVD	$182,524,852.67	$42,641,919.19	$103,351,622.91

Source: Fee for Service (FFS) and Patient Care Case Management (PCCM) clients

- Table 8 shows the number of hospitalizations, medical claims, and costs due to CVD in Texas during 2005.

- Of the total visits due to CVD in 2005, 157,845 Texans visited the emergency department 912,748 was outpatient visits, and 43,168 were inpatient visits.

- Inpatient visits accounted for the highest costs, followed by outpatient, and emergency department.

ACCESS TO CVD CARE AND QUALITY OF LIFE

Access to Cardiovascular Care

Health Insurance

The BRFSS survey has included questions about adult health care coverage since 1991. Figure 24 shows that the percentage of Texas adults who did not have health insurance has been increasing steadily from 1995 through 2005 and the statewide rate is significantly higher than that of the national level. In 2005, 28% of Texas adults did not have health care coverage as compared to the U.S. median of 14.5%.

Figure 25. No Health Insurance, Texas and United State, BRFSS, 1995-2005
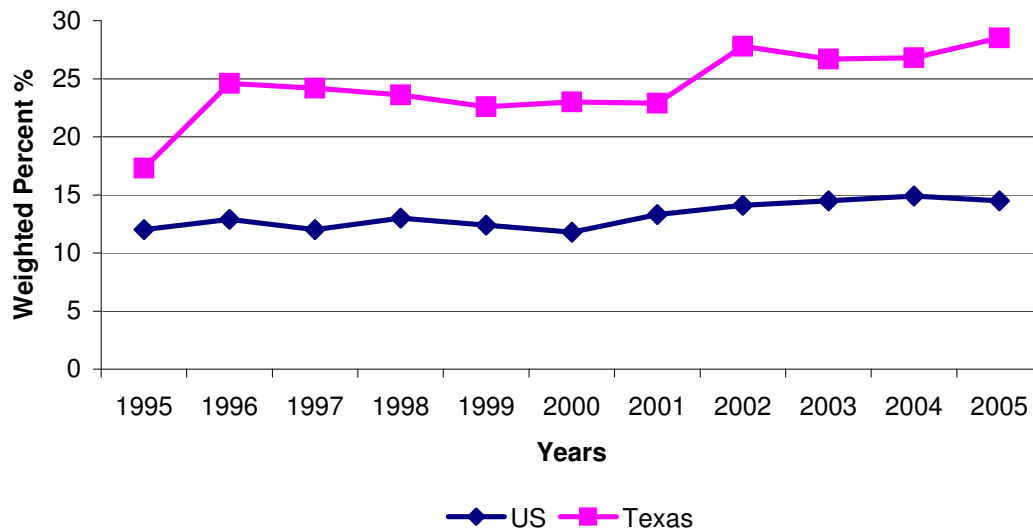
*Respondents 18 years and older who report that they have no health insurance.
 Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

Access to Cardiovascular Care

Table 9. Prevalence of Lacking Health Care Coverage in Texas, Adults Ages 18+ Years, Texas BRFSS, 2005

Demographics		Percent (%)	95% CI	
			Lower	Upper
Totals		28.5	26.9	30.1
Sex				
	Male	29.2	26.8	31.8
	Female	27.7	25.9	29.7
Race/Ethnicity				
	White	14.4	13.0	16.0
	African American	24.4	19.6	30.0
	Hispanic	55.8	52.7	58.9
Age Groups				
	18-44 years	38.2	35.8	40.7
	45-64 years	22.7	20.6	25.0
	65+ years	3.6	2.7	5.0
Educations				
	< High School	56.2	52.3	60.0
	HS graduate & some college	28.9	26.8	31.2
	College graduate	8.2	6.8	9.9
Income				
	< $ 25,000	52.5	49.5	55.5
	$25,000 to $49,999	22.9	20.1	25.9
	$50,000 +	6.0	4.8	7.5

*Respondents 18 years and older who report that they have no health insurance.

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

■ Table 9 lists the percentage of Texas adults who had no health care coverage in 2005 by various categories. Twenty nine percent of men and 27.7% of women reported having no health insurance. Hispanics and African-American were more likely to lack health care coverage than Whites, e.g., 55.8% and 24.4% vs. 14.4%. Younger Texas adults are more likely to be uninsured than older Texans, e.g., 38.2% for the18-44 age group versus 22.7% for age 45-64 and 3.6 % for the 65 plus age group.

■ The lower the education degree earned, the greater the likelihood of having no health insurance, e.g., 56.2% for Texans having less than high school education, 28.9% among those with a high school education or some college education, and only 8.2% among those with a college degree or higher education.

■ The prevalence of lacking health care coverage decreased with increasing annual income, e.g., 52.5% among those having less than $25,000 annual income versus 22.9% with income of $25,000-$49,999 and 6.0% among those with higher income (>$50,000 per year).

Access to Cardiovascular Care

Table 10. Prevalence of Could Not See a Doctor Because of Cost, Adults Ages 18+ Years, Texas BRFSS, 2005

Demographics		Percent (%)	95% CI Lower	95% CI Upper
Totals		19.1	17.9	20.4
Sex				
	Male	14.0	12.3	15.8
	Female	24.1	22.4	25.9
Race/Ethnicity				
	White	13.1	11.8	14.4
	African American	25.3	20.6	30.7
	Hispanic	28.8	26.1	31.7
Age Groups				
	18-44 years	22.3	20.4	24.3
	45-64 years	19.1	17.2	21.2
	65+ years	7.0	5.5	8.8
Educations				
	< High School	32.0	28.5	35.8
	HS graduate & some college	19.4	17.8	21.2
	College graduate	9.4	7.9	11.2
Income				
	< $ 25,000	35.6	32.8	38.6
	$25,000 to $49,999	19.1	16.8	21.7
	$50,000 +	4.9	3.9	6.0

*Respondents 18 years and older who report that they could not see a doctor in the past 12 months

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

- Table 10 shows various categories of Texas adults who could not afford to see a doctor in 2005. About 20% of adult Texans could not see a doctor due to cost. About 14.0% of men and 24.1% of women could not afford to see a doctor. Hispanics (28.8%) and African-American (25.3%) were more likely than Whites (13.1%) to lack the financial resources to see a doctor.

- More young Texas adults than older adults could not afford to see a doctor, e.g., 22.3% for the 18-44 age group, 19.1% for the 44-64 age group, and only 7.0 % for the 65+ age group.

- Adults with lower levels of education or income were less able to afford to visit a doctor than those with higher education degrees or income, e.g., 32.0% among those receiving no high school degrees or equivalence, 19.4% among those with high school education or some college level education, and 9.4% among those with a college or higher education, and 35.6% among those with income <$25,000 vs. 19.1% among those making $25,000-$49,999, and 4.9% among those earring $50,000+.

Access to Cardiovascular Care

Table 11. Percentage of No Routine Health Checkup within Past Year by Selected Characteristics, Texas 2005

Demographics		Percent (%)	95% CI Lower	95% CI Upper
Totals		37.1	35.5	38.7
Sex				
	Male	42.7	40.1	45.3
	Female	31.7	29.9	33.6
Race/Ethnicity				
	White	34.4	32.5	36.4
	African American	23.2	18.7	28.4
	Hispanic	44.3	41.1	47.5
Age Groups				
	18-44 years	45.1	42.6	47.6
	45-64 years	31.8	29.5	34.3
	65+ years	17.9	15.7	20.3
Educations				
	< High School	42.2	38.2	46.3
	HS graduate & some college	37.8	35.5	40.1
	College graduate	32.3	29.7	35.0
Income				
	< $ 25,000	43.5	40.4	46.6
	$25,000 to $49,999	38.9	35.7	42.1
	$50,000 +	31.1	28.5	33.7

*Respondents 18 years and older who report that they did not have a Routine Checkup within Past Year.
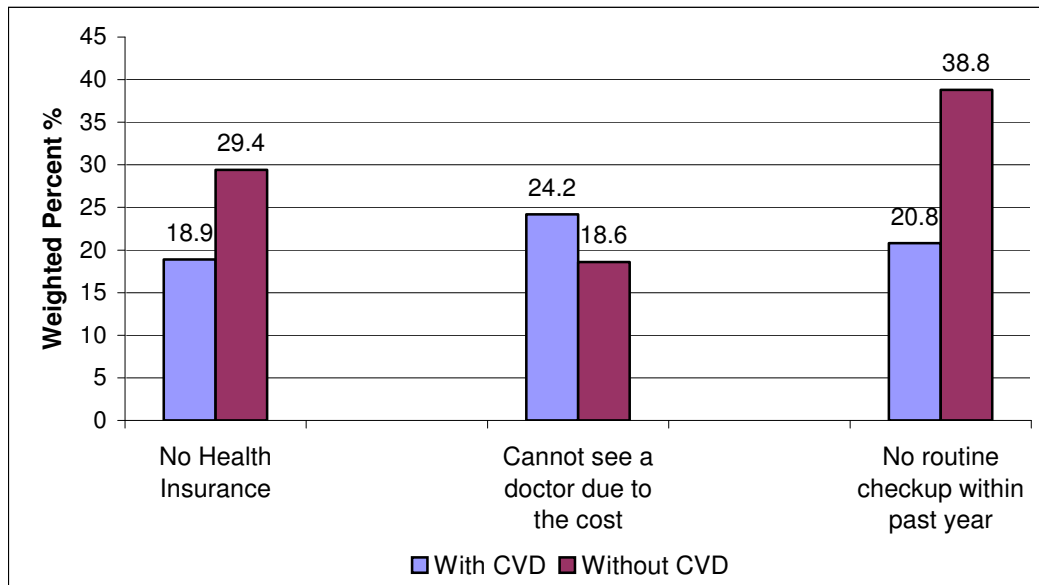
 Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

◼ As see in Table 11, overall, 37.1% of Texas adults did not have a routine health checkup within the past year. More males (42.7%) than females (31.7%) did not have routine health check in the past year. The prevalence of no routine health checkup within past year for Whites, African-American and Hispanics are 23.2%, 34.4% and 44.3% respectively. Younger adults are less likely than older adults to have had a routine health checkup within the past year, e.g., 45.1% for the 18-44 age group, 31.8% for the 45-64 age group, and 17.9% for the 65+ age group had no routine health checkup.

◼ The lower the education level, the more likely respondents were to have not had a routine health checkup, e.g., 42.2% among those having less than a high school degree, 37.8% among those with a high school and/or some college education, and 32.3% among those with a college or higher education. The same is true for income, e.g., the lower the income, the more likely respondents are to have not had a routine health checkup.

Access to Cardiovascular Care

Texas adults with CVD were more likely to have health insurance coverage than those who did not have CVD (Figure 26). Since CVD is more prevalent among those aged 65 years and older, more people with CVD tend to covered with either Medicaid or Medicare. Figure 26 shows that more Texans with CVD were unable to see a doctor due to the cost compared with those without CVD. People with CVD are more likely to have health checkups than those without CVD.

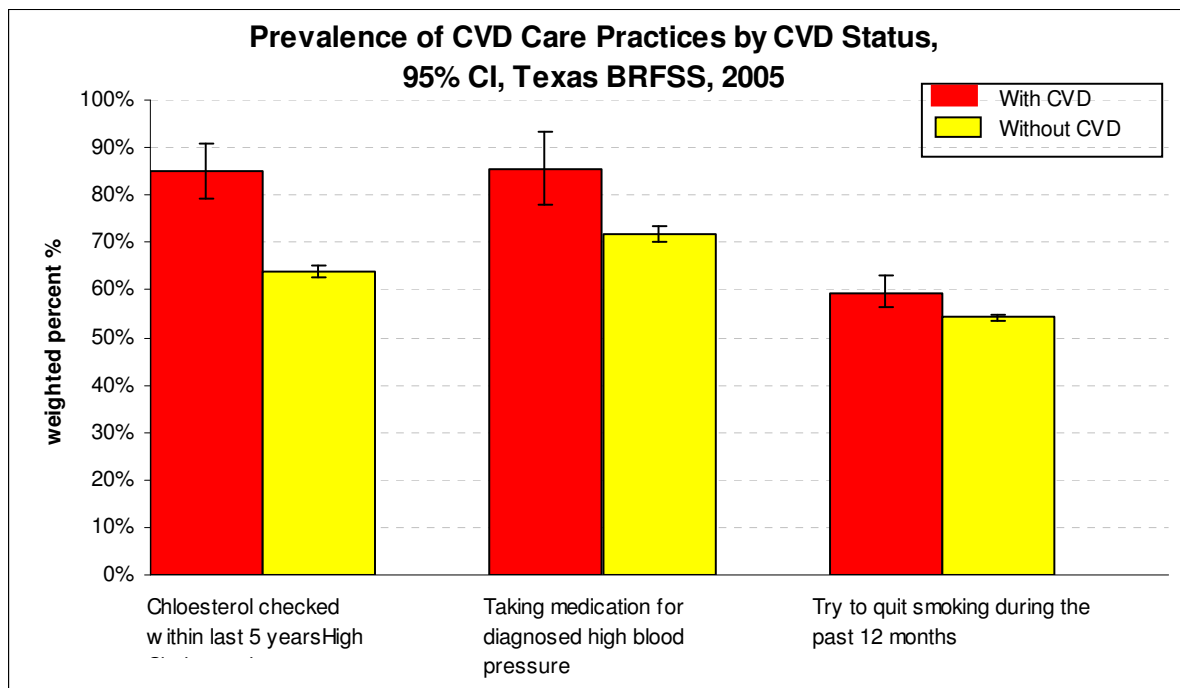**Figure 26. Access to Health Care by CVD Status, Texas BRFSS, 2005**

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

CVD Management

Each year, more than 57,000 Americans die needlessly because they do not receive appropriate health care.[1] Most die as a result of high blood pressure or high elevated cholesterol not being adequately monitored and controlled. Other deaths occur from failure to provide correct preventive or follow-up care.

Cholesterol is a fat like substance that serves many functions. Low-density lipoproteins (LDL) carry cholesterol where it is needed. High-density lipoproteins (HDL) carry leftover cholesterol back to the liver. When cholesterol levels are high, LDL dumps cholesterol in the arteries, making them rigid and narrow. The result can be high blood pressure, blood clots, heart attack and stroke [2]. Almost 85% of Texans with CVD had their cholesterol checked within the past year as compared to 64% of people without CVD. Nearly 85% of Texans with CVD are taking medication for their high blood pressure compared to 71% of people without CVD . About 59% of Texas adults who reported they had CVD and were current smokers, tried to quit smoking during the past 12 months (Figure 27).

Figure 27. Prevalence of CVD Care Practice by CVD Status, Texas, BRFSS, 2005

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

CVD Management

Health Plan Employer Data and Information Set (HEDIS®)

HEDIS® is a set of standardized performance measures designed to ensure that health plan purchasers and consumers have the information they need to reliably compare the performance of managed health care plans. The performance measures in HEDIS® are related to many significant public health issues such as cancer, heart disease, smoking, asthma and diabetes. HEDIS® is sponsored, supported and maintained by the National Committee on Quality Assurance (NCQA), a not for profit organization committed to assessing, reporting on and improving the quality of care provided by organized delivery systems [3].

For more information on HEDIS®, Quality Compass or NCQA please visit www.ncqa.org.

Table 12. HEDIS results for Blood Pressure Control and Cholesterol Screening in Texas, Compared with National data.

	2001	2002	2003	2004	2005
Blood Pressure					
Controlling High blood Pressure[1]					
Texas Average	47.8	50.9	57.9	59.2	64.5
NCQA's Quality Compass	50.5	55.4	58.4	62.2	66.8
Blood Cholesterol					
Cholesterol Management After Acute Cardiovascular Events:LDL-C Level<130mg/dl[2]					
Texas Average	31.7	42.6	57.7	56.3	55.8
NCQA's Quality Compass	45.3	51.5	59.3	65.1	68.0
Blood Cholesterol					
Cholesterol Management After Acute Cardiovascular Events:LDL-C Level Screening[3]					
Texas Average	72.4	76.2	77.1	77.9	79.4
NCQA's Quality Compass	73.5	77.1	79.4	80.3	81.8
Beta Blocker Treatment After a heart Attack[4]					
Texas Average		90.3	86.9	85.2	83.3
NCQA's Quality Compass		92.5	93.5	94.3	96.2

*Standardized performance measures designed for comparing the quality of care of manage care organizations

1. Age 46-85 years old diagnosed with high blood pressure whose blood pressure was reading below 140mmHg systolic and 90mmHg diastolic.
2. Age 18-75 years old that had an LDL-C level of less than 130mg/dL performed on or between 60 and 365 days after discharge for an acute cardiovascular event.
3. Age 18-75 years old that had an LDL-C level of less than 130mg/dL screening performed on or between 60 and 365 days after discharge for an acute cardiovascular event.
4. Age 35 years and older who were hospitalized during the measurement year with a diagnosis of acute myocardial infection and who received an ambulatory prescription for beta-blockers upon discharge.

Quality of Life

Behavioral Risk Factor Surveillance System (BRFSS) Data

The quality of life, both physical and mental, for people with CVD is decreased compared to without CVD. More than half of Texas adults with CVD reported that their general health was fair or poor, while only 18% of those without CVD reported fair or poor health status.

Table 13. Health Related Quality of Life Indicators by CVD Status: Texas BRFSS, 2005

HRQL Indicator	With or Without CVD	Prevalence (%)	95% CI Lower	95% CI Upper
General Health Fair to Poor	**Total**	19.8	18.6	21.1
	With CVD	50.5	44.6	56.4
	With out CVD	17.5	16.2	18.8
	Total	16.8	15.8	18.0
Physical Health Not Good for 5 or more days	**With CVD**	40.1	34.6	45.9
	With out CVD	15.1	14.0	16.3
	Total	17.0	15.8	18.2
Mental Health Not Good for 5 or more days	**With CVD**	27.4	22.5	32.8
	With out CVD	16.1	14.9	17.4
Kept from doing Usual Activities for 5 or more days	**Total**	10.1	9.2	11.0
	With CVD	25.1	20.8	30.0
	With out CVD	8.9	8.1	9.9
Needs Special Equipment	**Total**	5.7	5.2	6.4
	With CVD	25.0	20.7	29.9
	With out CVD	4.3	3.8	4.9
Currently Employed (age 18-64 years)	**Total**	68.8	67.1	70.4
	With CVD	53.2	44.5	61.6
	With out CVD	69.6	67.9	71.3

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

■ Table 13 shows the health related quality of life indicators by CVD status. More than 50% of Texas adults with CVD reported that their general health was fair or poor. Over 40% of Texas adults with CVD reported that their physical health was poor for 5 or more days in the past month compared with 15% of those without CVD. Poor mental health was reported by 27.4% of those with CVD; 25.1% report that they cannot participate in their usual activities; and 25.0% report needing special equipment. BRFSS results for 2005 show that the employment rate for people with CVD who are 18 to 64 years of age is 53.2%, compared with 70% for those adults without CVD.

KNOWLEDGE OF SIGNS AND SYMPTOMS OF HEART ATTACK AND STROKE

Knowledge of Signs and Symptoms of Heart Attack and Stroke

Recognizing the symptoms of heart disease or stroke is vitally important for preventing deaths from these events.

Heart attack warning signs include:
- Chest discomfort. Most heart attacks involve discomfort in the center of the chest that lasts for more than a few minutes, or goes away and comes back. The discomfort can feel like uncomfortable pressure, squeezing, fullness, or pain
- Discomfort in other areas of the upper body. Can include pain or discomfort in one or both arms, the back, neck, jaw, or stomach.
- Shortness of breath. Often comes along with chest discomfort, but it can occur before chest discomfort.
- Other symptoms. May include breaking out in a cold sweat, nausea, or light-headedness.

Stroke warning signs include:
- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body.
- Sudden confusion, trouble speaking or understanding.
- Sudden trouble seeing in one or both eyes.
- Sudden trouble walking, dizziness, loss of balance or coordination.
- Sudden, severe headache with no known cause.

Recognition of heart attack and stroke signs and symptoms by the individual and/or their family/friends is the first and most crucial factor in timely emergency response for heart attack and stroke. There for, it is also important that more people learn to recognize symptoms of heart attack and stroke, and that they know to seek professional medical assistance immediately after recognizing these symptoms (e.g., call 911). Currently about 47% of heart attack and stroke victims die before medical personnel arrive [4].

The 2005 Texas BRFSS contained questions that tested participant's knowledge of heart attack and stroke symptoms. The series of question asked the participants if they thought each of the symptoms were a sign of a heart attack. Another series of questions asked the participants if they thought each of the symptoms were a sign of stroke. Participants could answer yes, no, don't know, or not sure. The results of these questions are summarized in the following table and figures.

Knowledge of Signs and Symptoms of Heart Attack and Stroke

Table 14 lists the percentage of Texas adults who recognized the various symptoms for heart attack and stroke in 2005. Approximately 13.5% of Texas adults could correctly identify all heart attack signs and symptoms, 21.1% could correctly identify all stroke signs and symptoms, and 85.1% recognized 911 as the first emergency response option for heart attack and stroke.

Table 14. Recognition of CVD Symptoms, and Emergency Response for Heart Attack and Stroke among Texas Adults, BRFSS 2005

Answered "Yes" to the following Questions	Prevalence (%)	95% CI	
		Lower	Upper
Heart Attack*			
Pain or discomfort in jaw, neck or back	39.3	37.6	41.0
Feeling weak, lightheaded, or faint	54.1	52.3	55.9
Chest pain or discomfort	86.5	85.1	87.8
Sudden trouble seeing in one or both eyes	30.0	28.4	31.7
Pain or discomfort in the arms or shoulders	78.4	76.8	79.9
Shortness of breath	79.0	77.5	80.5
Recognizes all heart attack symptoms	8.9	8.0	9.9
Stroke*			
Sudden confusion or trouble speaking	76.3	74.5	77.9
Sudden numbness or weakness of face, arms, legs (especially on one side)	86.5	85.1	87.9
Sudden trouble seeing in one or both eyes	61.6	59.8	63.3
Sudden chest pain or discomfort	37.0	35.3	38.8
Sudden trouble walking, dizziness, or loss of balance	78.2	76.6	79.7
Severe headache with no known cause	57.4	55.6	59.2
Recognizes all stroke symptoms	17.0	15.8	18.3
Would call 911 as a first response if **Heart Attack OR Stroke** is suspected	85.1	83.7	86.4

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

Knowledge of Signs and Symptoms of Heart Attack

Figure 28. Percent of Recognition of Symptoms for Heart Attack among Texas Adults by Gender, BRFSS 2005
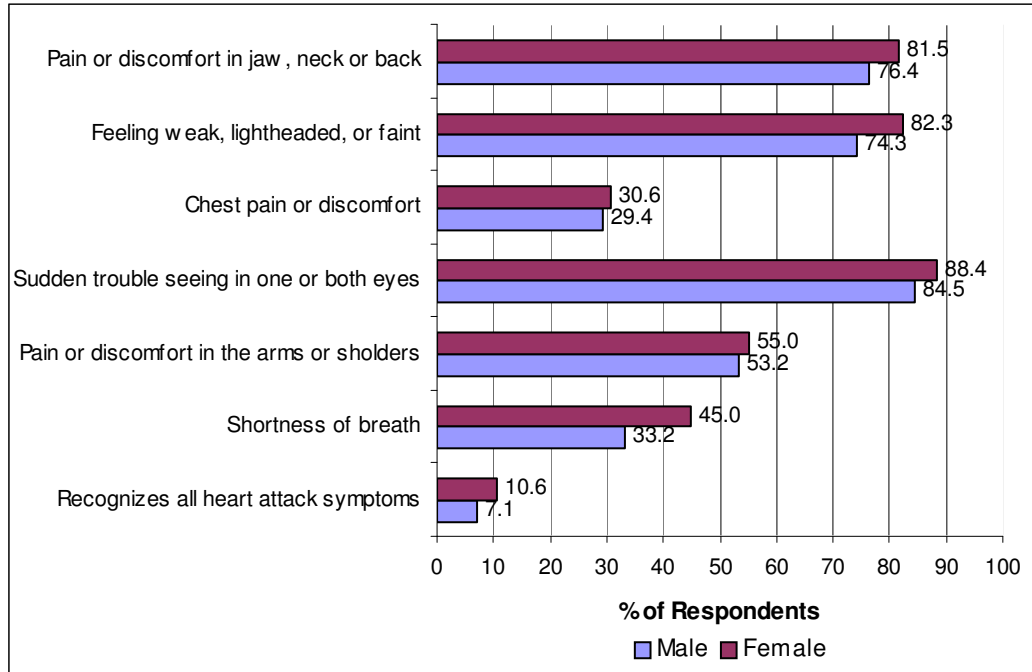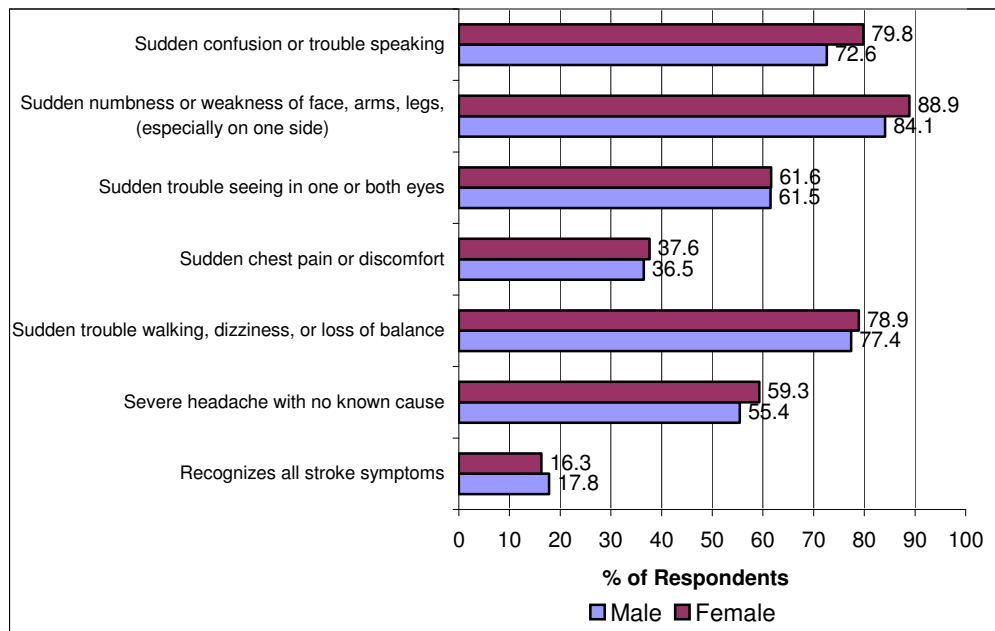

Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

■ Figure 28 show that more females than males could correctly identify each of the heart attack symptoms. Females were also more likely than males to correctly identify all heart attack signs and symptoms.

Knowledge of Signs and Symptoms of Stroke

Figure 29. Percent of Recognition of Stroke Symptoms among Texas Adults, BRFSS 2005

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

▪ Figure 29 shows that gender difference in knowledge of some stroke signs and symptoms is not significant. More females than males could correctly identify sudden confusion or trouble speaking and numbness or weakness of face, arms, and legs as symptoms of stroke.

CVD Risk Factors

Risk Factors for CVD and Stroke

Risk factors are the health-damaging factors that increase the risk of developing CVD morbidity and mortality. Two of the major risk factors for CVD are high blood pressure and high blood cholesterol. Tobacco is also a major risk factor for CVD. Other risk factors for CVD include poor nutrition and physical inactivity [2].

The annual BRFSS survey data provides important information on the key risk factors for CVD. The Technical Notes section provides background information on the BRFSS survey. Table 15 displays the Federal and state's Year 2010 Health Objectives.

Table 15. Year 2010 Health Objectives for Nationwide: State Summary of CVD Risk Factors* Data for 2005

| Healthy People 2010** Objective***	2010 Target	U.S, 2005	Texas, 2005
Diabetes, Clinically Diagnosed (Objective #5.3)			
Ages $\geq$ 18	2.50%	7%	8%
Diagnosed High Cholesterol			
Ages $\geq$ 18	17%	36%	34%
Diagnosed High Blood Pressure			
Ages > 18	16%	26%	24%
Obese, BMI $\geq$ 30 (Objective #19.2)			
Ages $\geq$ 20	15%	28%	28%
Overweight or Obese, BMI $\geq$ 25			
Ages $\geq$ 20	NA	64%	65%
No Leisure Time Physical Activity (Objective #22.1)			
Ages $\geq$ 18	15%	24%	27%
Consume fruit or vegetable 5 or more times per day			
Ages > 18	NA	23%	23%
Cigarette Smoking (Objective #27.1a)			
Ages $\geq$ 18	12%	21%	20%

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

* Behavioral Risk Factor Surveillance System
** Public Health Service. Healthy People 2010: National Health Promotion and Disease Prevention Objectives -- full report with commentary. Washington, DC: U.S. Department of Health and Human Services, 2000.

Risk Factors for CVD and Stroke

Figure 30. Risk Factor Prevalence: With vs. Without CVD, Texas, BRFSS, 2005
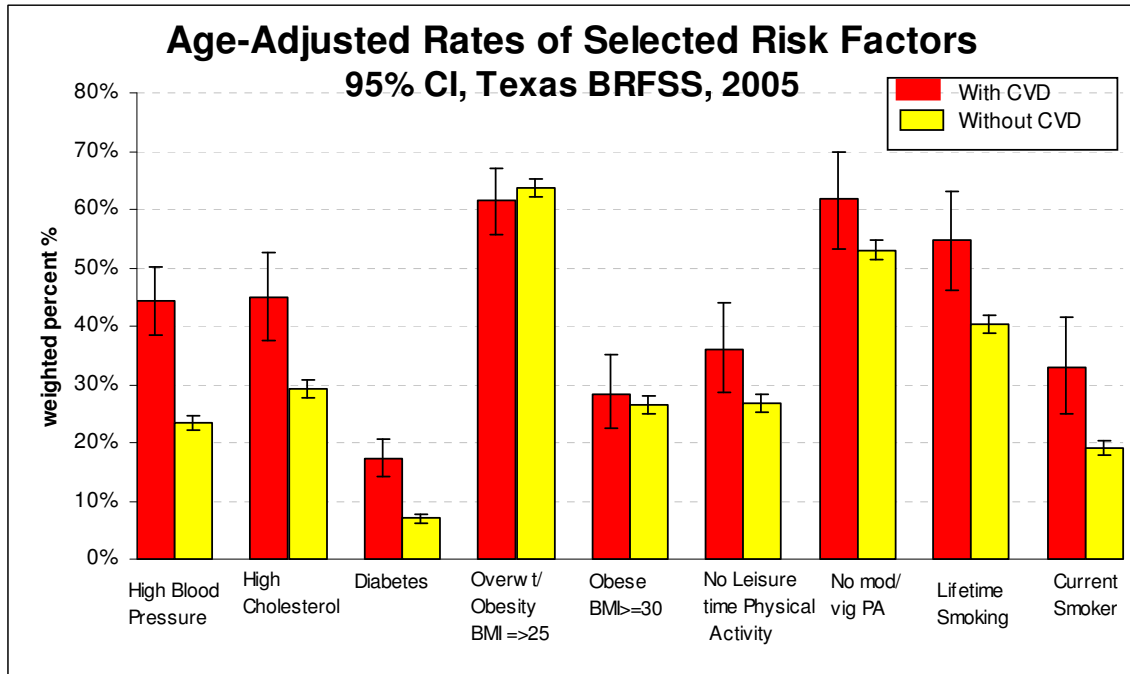
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

■ Figure 30 displays Texas 2005 BRFSS data on selected physical and behavioral risk factors for CVD by CVD status. The major risk factors for CVD include high blood pressure, high blood cholesterol levels, diabetes and overweight or obesity. Since these risk factors are influenced by non-modifiable factors such as heredity, modifiable behavioral factors are even more important for reducing and preventing CVD.

Risk Factors for CVD and Stroke-High Blood pressure

High Blood Pressure (HBP) – High blood pressure increases the risk of stroke, heart attack, kidney failure, and congestive heart failure. About half of people who have a first heart attack have blood pressures higher than 160/95 mm Hg. When high blood pressure exists and is combined with obesity, smoking, high blood cholesterol levels or diabetes, the risk of heart attack or stroke increases dramatically [2].

Table 16 shows blood pressure classification according to the joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. The classification is based on the average of two or more properly measured seated BP readings on each of two or more office visits.

Table 16. Classification of Blood Pressure for Adults

Classification	Systolic (mmHg)	Diastolic (mmHg)
Normal	<120	and <80
Prehypertension	120-139	or 80-89
Stage 1 Hypertension	140-159	or 90-99
Stage 2 Hypertension	>=160	or>=100

The data presented here are from the 2005 Texas BRFSS. Participants were asked the following question about hypertension: "Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?" These data do not include females who were told they had hypertension only when they were pregnant.

Figure 31. Diagnosed with High Blood Pressure, Texas and US, 1995-2005
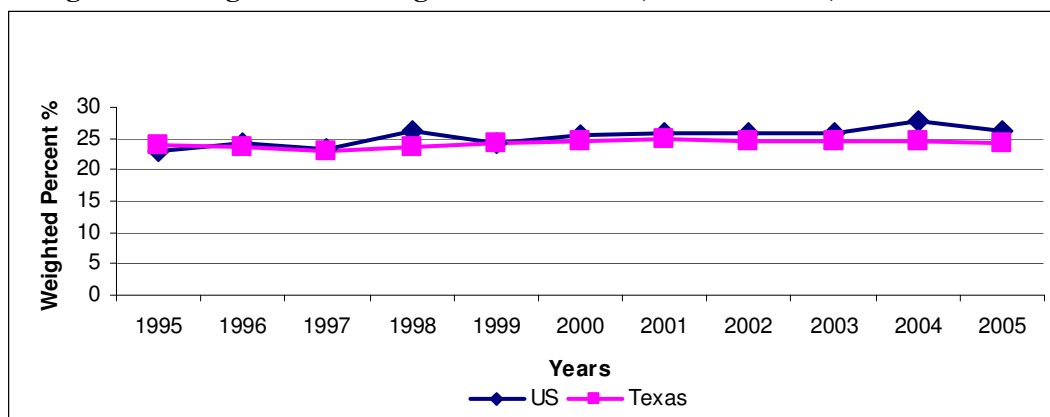
 * Adults who were ever told by a doctor, nurse, or other health professional that they have high blood pressure
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

High blood pressure is defined as P$\geq$140/90 mm Hg. The BRFSS collects blood pressure data every other year. Between 1995 and 2005, the trend in diagnosed high blood pressure among Texas adults and US adults has remained unchanged at approximately 24% (Figure 31).

Risk Factors for Heart Disease and Stroke-High Blood pressure

Figure 32. Prevalence of High Blood Pressure by Demographics, Texas, BRFSS, 2005
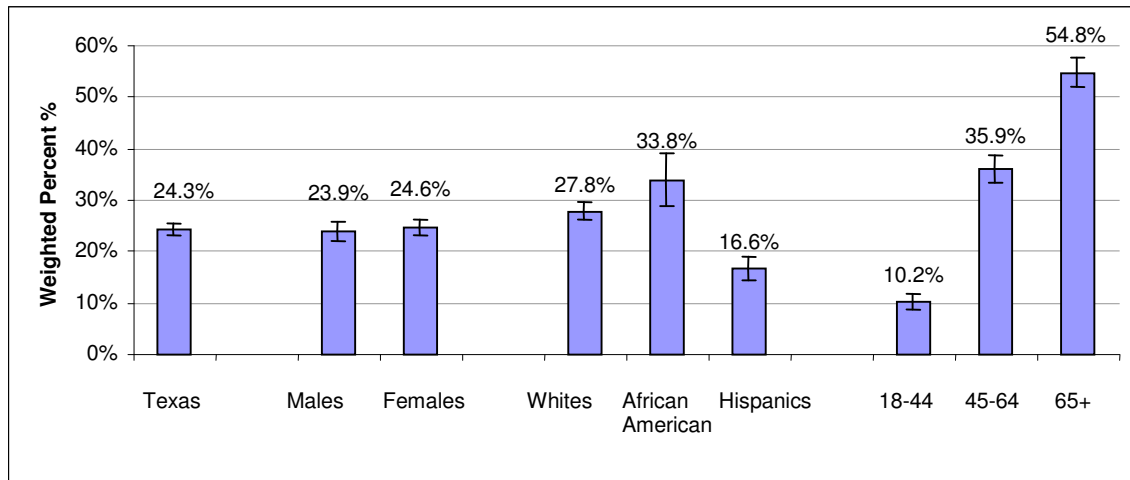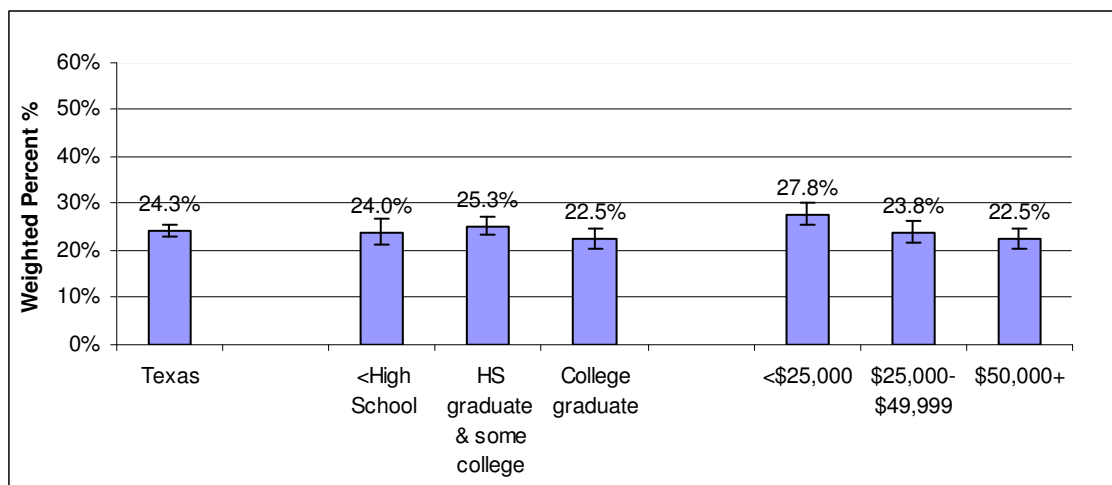

Figure 33. Prevalence of High Blood Pressure by Education & Income, Texas, BRFSS, 2005

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

- Texas prevalence rates of high blood pressure are lower than the national average (24.4 % vs.26.3%).
- Among the race/ethnic groups, African-American had the highest prevalence of high blood pressure.
- High blood pressure prevalence increases significantly with increasing age.
- Level of income is associated with high blood pressure but education is not.
- As level of income increases, high blood pressure decreases (Figure 32 & Figure 33).

Risk Factors for Heart Disease and Stroke- High Blood Cholesterol (HBC)

High Blood Cholesterol (HBC): Cholesterol is a fat like substance or lipid present in cells. It travels in the blood through distinct particles containing both lipids and proteins (lipoproteins). There are three major classes of lipoproteins high density lipoproteins (HDL), low density lipoproteins (LDL), and very low density lipoproteins (VLDL). Studies have demonstrated that LDL cholesterol plays a major role in heart disease. An important way to reduce CVD risk is to maintain healthful blood cholesterol levels, e.g., high density lipoproteins (HDL) $\geq$60 mg/dL; low density lipoproteins (LDL) <130 mg/dL; and triglycerides <150 mg/dL.

Table 17 Classification of LDL, Total, and HDL Cholesterol (mg/dl)

| Classification	
LDL Cholesterol	
<100	Optimal
100-129	Near optimal/above optimal
130-159	Borderline high
160-189	High
>=190	Very high
Total Cholesterol	
<200	Desirable
200-239	Borderline high
>=240	High
HDL Cholesterol	
<40	Low
>=60	High

Data presented here are from the Texas 2005 BRFSS. The survey question was asked: "Have you ever been told by a health professional that your blood cholesterol is high?"

■ Table 17 is from the Third Report of the National Cholesterol Education Program Expert Panel (NCEP) on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults.

Risk Factors for Heart Disease and Stroke - High Blood Cholesterol (HBC)

Figure 34 shows diagnosed high blood cholesterol among Texas and US adults during 1995 to 2005. Between 1995 and 2005, diagnosed high blood cholesterol among US adults increased from 28.4% to 36%. From 1997 to 2005, diagnosed high blood cholesterol among adult Texans increased 28.7% to 34%.

Figure 34. Diagnosed High Blood Cholesterol* Among Texas and US Adults
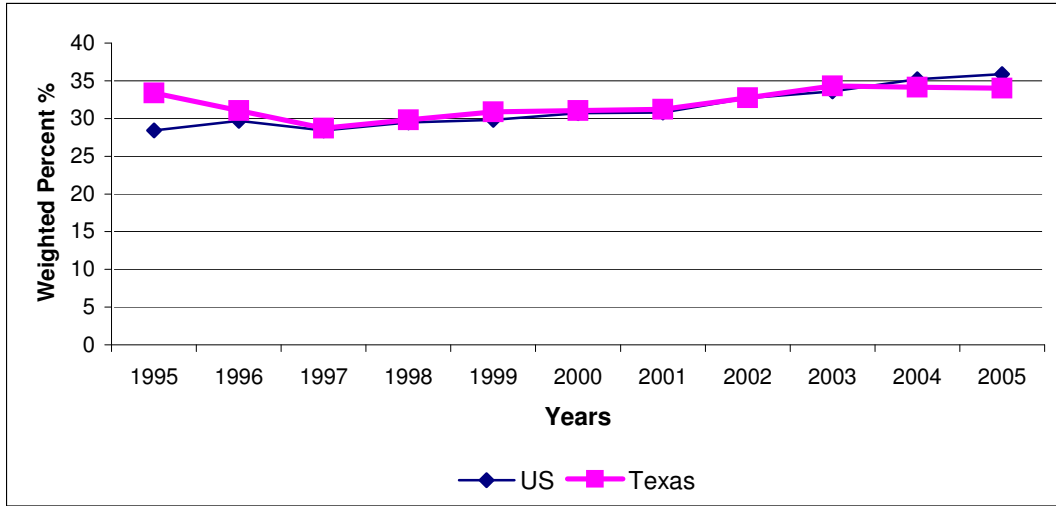
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995- 2005

Figure 35. Prevalence of High Blood Cholesterol among Texas Adults by demographics, 2005
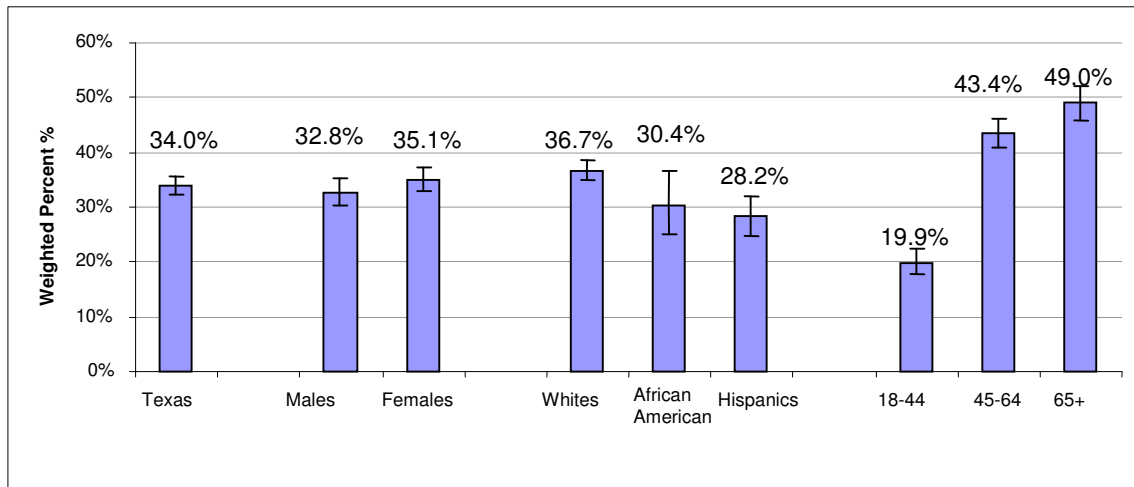
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

Risk Factors for Heart Disease and Stroke-High Blood Cholesterol (HBC)

**Figure 36. Prevalence of High Blood Cholesterol by Education & Income, Texas, BRFSS, 2005**
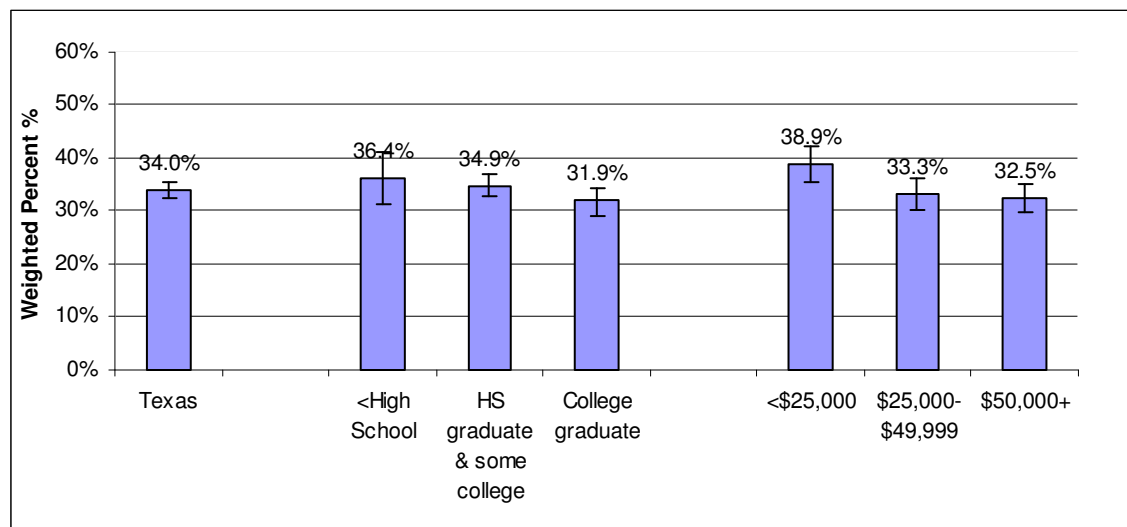
- Thirty-four percent of Texas adults reported being told by a doctor or a health professional that they had high blood cholesterol.

- There was no statistically significant difference between male (32.8%) and female (35.1%) in HBC.

- White adults (36.7%) tend to have higher HBC than black adults (30.4%). Hispanic adults tend to have lower HBC (28.2%).

- Among Texas adults, older adults are more likely to have high blood cholesterol than younger adults, e.g., 20% for the 18-44 age group and 49% for the 65 + age group.

- The HBC rate appeared to decrease slightly with increasing levels of education: 36.4% among those with less than a high school education, 34.9% among those with a high school education and some college education, and 31.9% among those with a college education, although these differences were not statistically significant.

- The prevalence of high blood cholesterol decreased with increasing annual income, e.g., from 38.9% among those having less than $25,000 annual income to 32.5% among the higher income group (Figure 35 & Figure 36).

Risk Factors for Heart Disease and Stroke - Diabetes

According to the BRFSS, there was a steady rise in diabetes prevalence from 1995 through 2005, both nationally and statewide. Texas adults have had slightly higher prevalence than that for the nation (Figure 37). The diabetes prevalence rate in Texas in 2005 was 7.9%, which was approximately 20% higher than that of 1995.
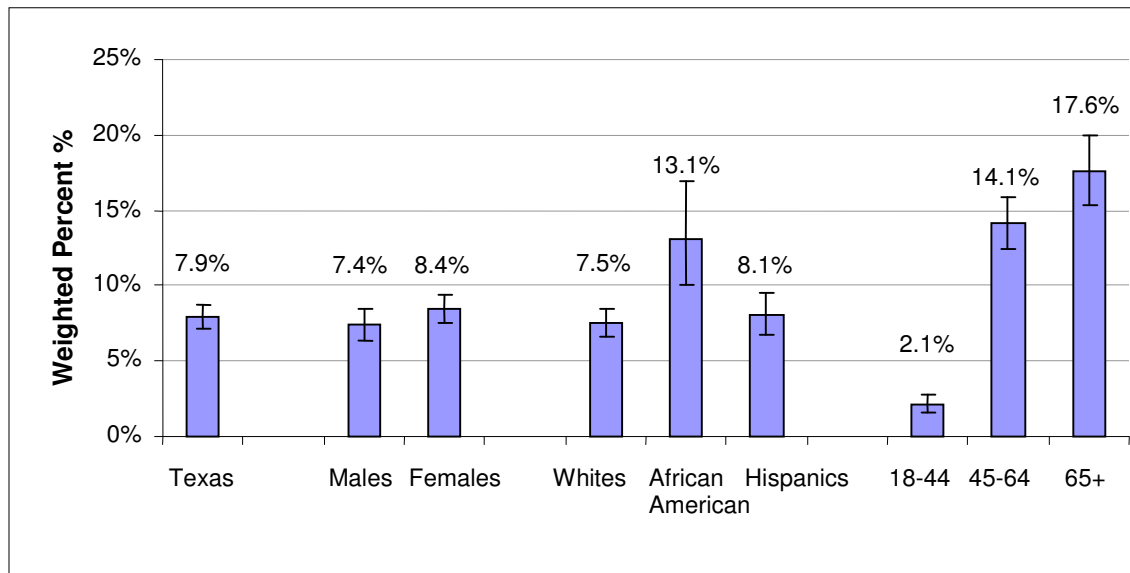
Figure 37. **Diagnosed with Diabetes for Texas and US, 1995-2005**.
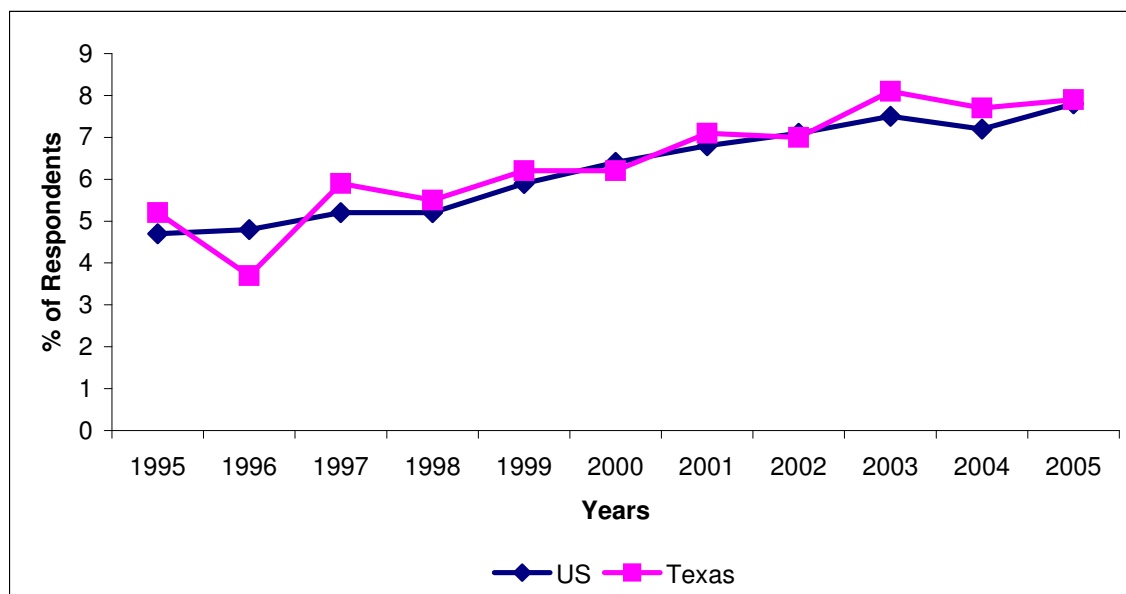
Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2005

Risk Factors for Heart Disease and Stroke - Diabetes

Figure 38. Prevalence of Diabetes among Texas Adults by demographics, Texas, BRFSS, 2005
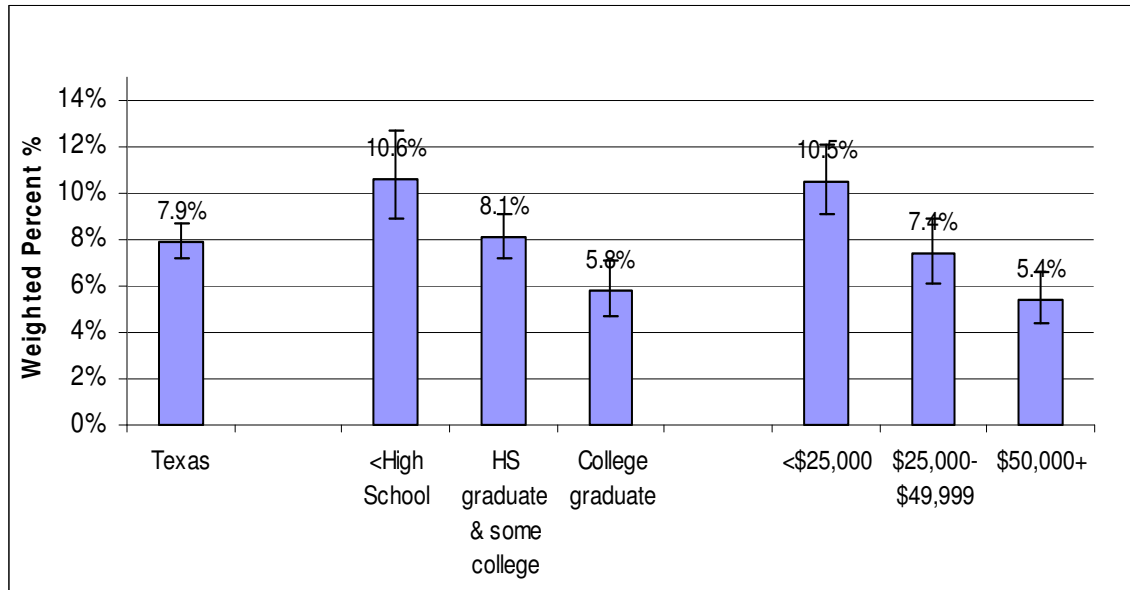

Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

- Texas adults (7.9%) reported being told by a doctor that they have diabetes.

- Diabetes prevalence did not differ significantly by gender (7.4% for males and 8.4% for females).

- In 2005, the prevalence of diagnosed diabetes for African-American (13.1%) was significantly higher than that for Whites (7.5%) and Hispanics (8.1%).

- Among Texas adults, older adults are more likely to have diabetes than younger adults; 2.1% in the 18-44 year age group, 14.1% in the 45-64 year age group, and 17.6% in the 65+ age group.

Risk Factors for Heart Disease and Stroke - Diabetes

Figure 39. Prevalence of Diabetes among Texas Adults by Education and Income, Texas, BRFSS, 2005

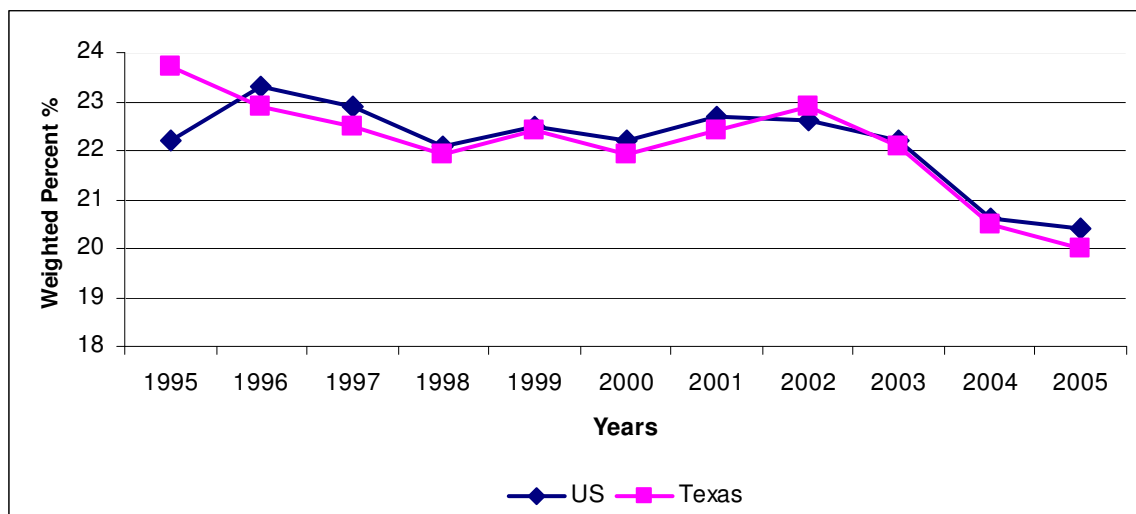Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

■ Diabetes prevalence in Texas also differs by education level and income of the population. BRFSS data show that, overall, the higher the education levels are, the lower the prevalence of diabetes: 10.6% among those with less than a high school education, 8.1% among those with a high school and some college education, and 5.8% among those with a college education.

■ The prevalence of diabetes decreased with increasing annual income, from 10.5% among those earning <$25,000 group to 5.4% in the highest income group (Figure 39).

Risk Factors for Heart Disease and Stroke - Tobacco Use

Tobacco use remains the single most preventable cause of disease and death in the United States today. In the U.S., Cigarette smoking is responsible for approximately 440,000 deaths annually-about 20 percent of all deaths in this country.[4] Tobacco is a major risk factor for heart attacks and stroke.

The data presented in this report is from Texas 2005 BRFSS survey. A current smoker was defined as: Persons who reported smoking at least 100 cigarettes in their lifetime, currently smokes, and has smoked for at least of the past 30 days.

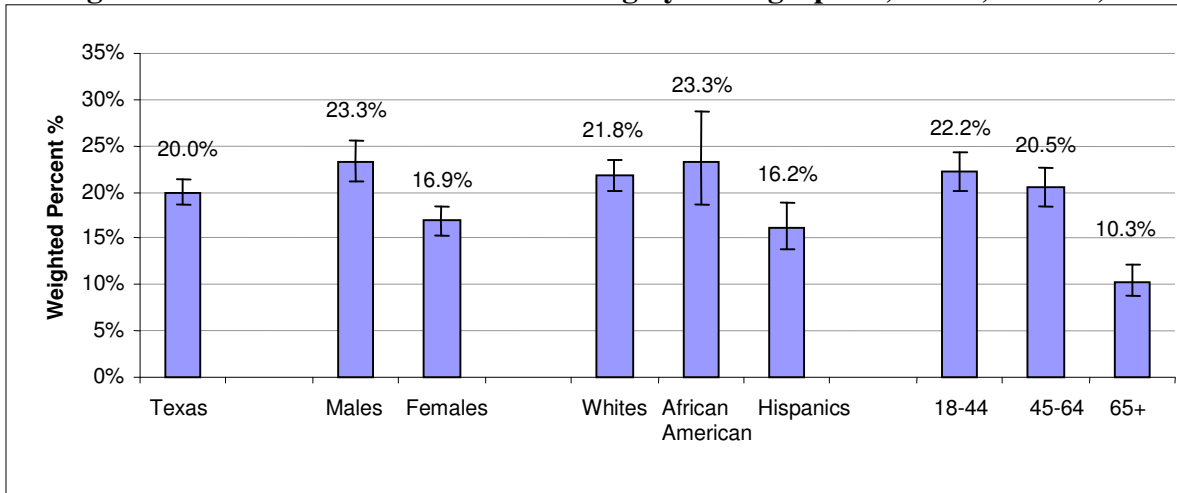**Figure 40. Prevalence of Current Cigarette Smoking Among Texas and US Adults, 1995-2005**

Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2005

- Prevalence of smoking remained fairly steady at approximately 22% between 1997 and 2002.

- The prevalence of smoking in Texas has steadily decreased since 2002, from 23% to 20%.

- Texas prevalence rates of current smoking were slightly lower than the national average in 2005.

Risk Factors for Heart Disease and Stroke -Tobacco Use

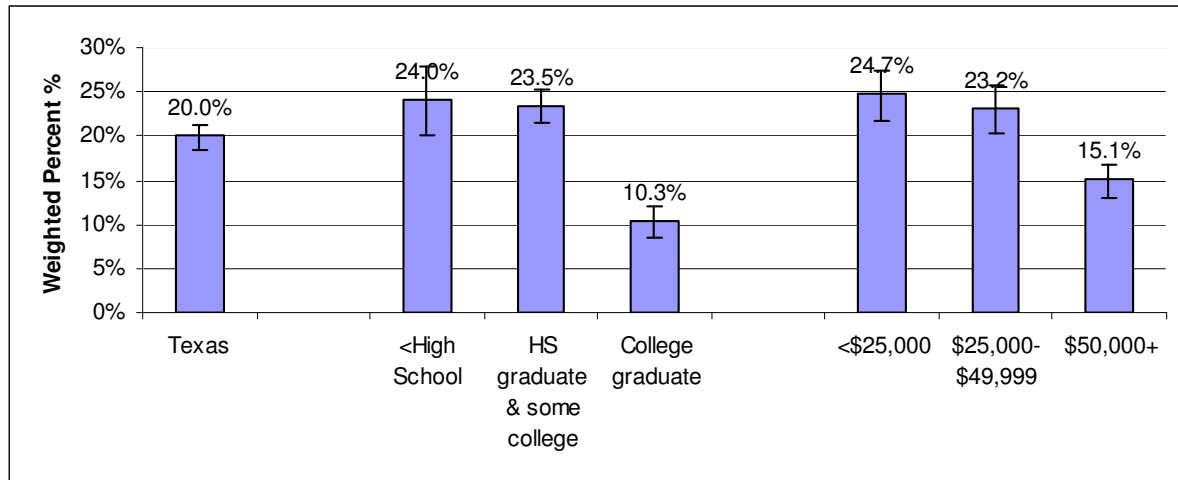**Figure 41. Prevalence of Current Smoking by Demographics, Texas, BRFSS, 2005**

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

Texas 2005 BRFSS data in Figure 41 show that:

- Twenty percent of Texans were current smokers.

- A significantly higher proportion of males (23.3%) than females (16.9%) were current smokers.

- Hispanics had lower smoking prevalence than Whites & African-American, although these differences were not statistically significant.

- Smoking prevalence was greater among younger age groups, 22.2% in 18-44 age group, 20.5% in 45-64 age group, and only 10.3% in the 65 and older age group.

Risk Factors for Heart Disease and Stroke -Tobacco Use

Figure 42 Prevalence of Current Smoking by Education and Income, Texas, BRFSS, 2005

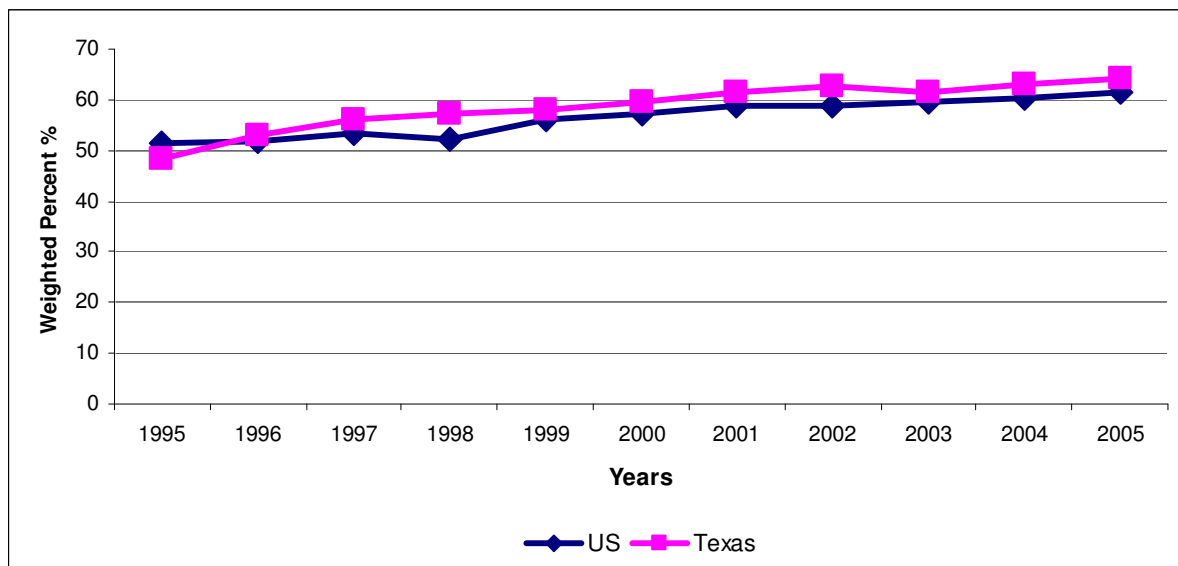Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

■ The prevalence of current smoking decreased with increasing education level, from 24.0% among those with less than a high school education to 10.3% among those with a college education.

■ Smoking prevalence decreased with increasing annual income, from 24.7%among those earning <$25,000 to 15.1% in the highest income group.

Risk Factors for CVD and Stroke -Overweight and Obesity

The prevalence of Overweight and Obesity among adults and adolescents has increased considerably over the past two decades in the United States and in Texas. Being overweight or obese substantially raises the risk of heart disease and stroke, high blood pressure, high blood cholesterol, type 2 diabetes, other chronic diseases, and some cancers. Overweight and obese individuals also may suffer from social stigmatization, discrimination, and poor body image. According to the Centers for Disease Control and Prevention (CDC), there is an obesity epidemic occurring among both youth and adults in America.

Overweight or obesity classifications are determined by body mass index (BMI), which is based on an individual's weight-to-height ratio. **Overweight** is defined as a BMI between 25 and 29.9 and **obesity** as a BMI of 30 or higher. Overweight or obesity is defined as a BMI of 25 or higher.

Figure 43.Prevalence of Overweight or Obesity among Texas and US Adults, 1995-2005
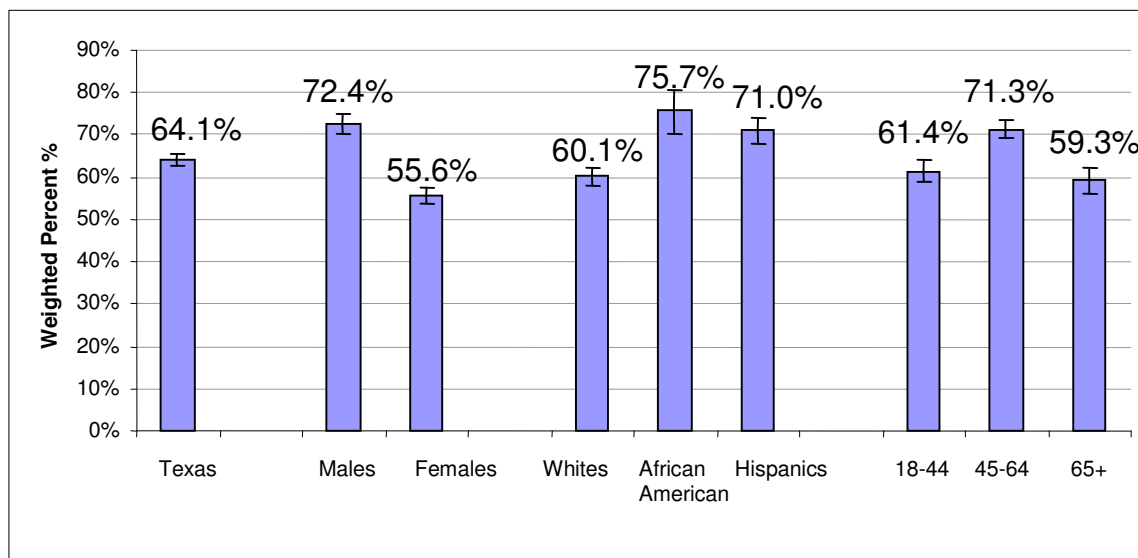

Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2005

- The percentage of overweight or obese U.S. adults increased approximately 19% (from 51.5% to 61.3) between 1995 and 2005. (Figure 43)

- During the same period 1995-2005, the percentage of overweight or obesity in Texas adults increased 33% (48.2% in 1995 to 64.1% in 2005).

- Texas prevalence rates of overweight or obesity have been higher than the national average since 1996.

Risk Factors for CVD and Stroke - Overweight and Obesity

Figure 44. Prevalence of Overweight or Obesity by Demographics, Texas, BRFSS, 2005
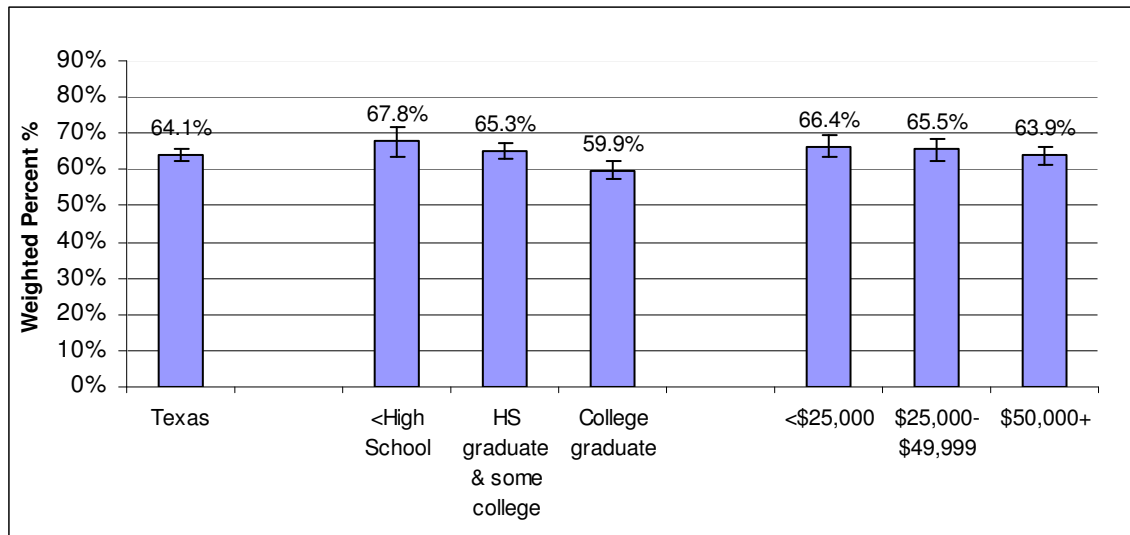

Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

In Texas, 2005 BRFSS data (Figure 44) show that:

- Texas respondents (64.1%) were either overweight or obese.

- Middle aged Texans (age 45-64) had significantly higher prevalence than both younger and older Texans.

- The overweight or obesity rate for males (72.4%) was higher than that of females (55.6%).

- The rate of overweight or obesity for African-American (75.7%) was significantly higher than that of Whites (60.1%). There was not significant difference between African Americans (75.7%) and Hispanics (71.0%).

Risk Factors for CVD and Stroke - Overweight and Obesity

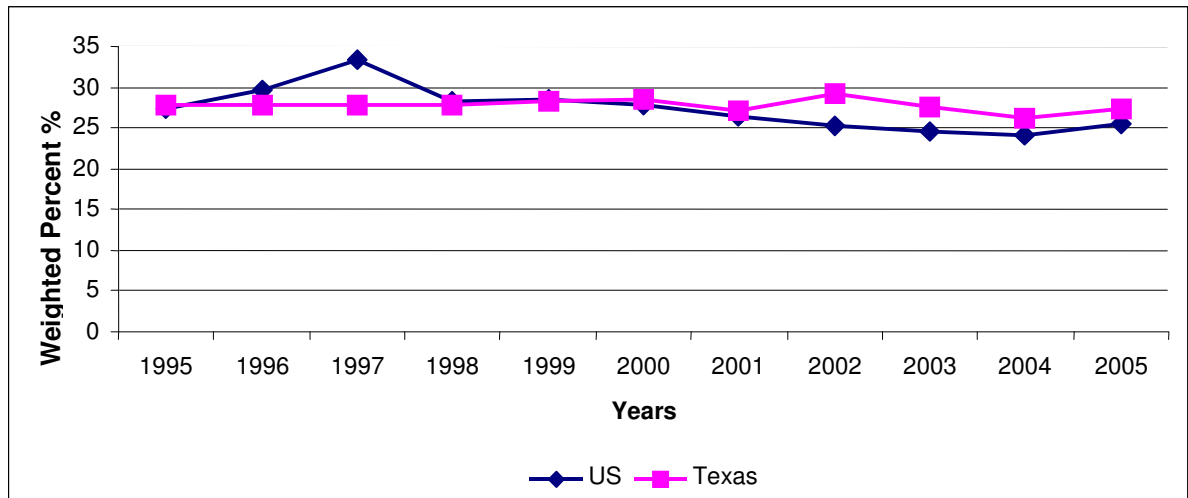**Figure 45. Prevalence of Overweight or Obesity among Texas Adults by Education and Income, BRFSS 2005**

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

■ The overweight or obesity rate decreased with increasing education level, from 67.8% among those with less than a high school education to 59.9% among those with a college education.

■ Overweight or obesity rates were not significantly different by income category.

Risk Factors for CVD and Stroke - Physical Activity

Regular physical activity can decrease the risk of CVD, control high blood pressure, high blood cholesterol and weight. It can also decrease the risk of diabetes, colon cancer and help maintain healthy bones, muscles, and joints.

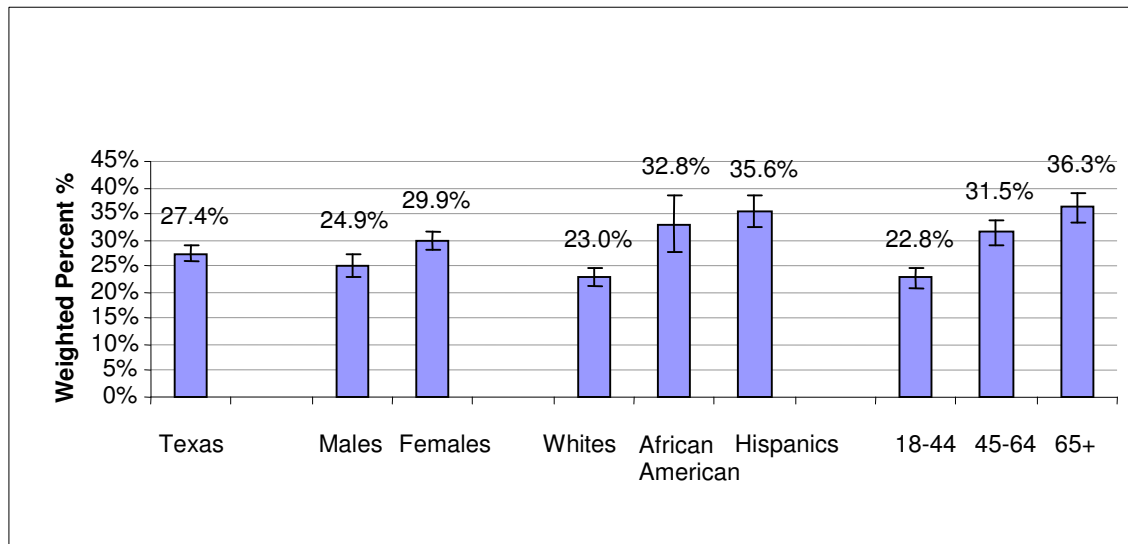**Figure 46. Prevalence of No Leisure Time Physical Activity among Texas and US Adults, BRFSS, 1995-2005**

Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 1995-2005

- Between 1995 to 2005, the leisure time physical activity rate remained relatively unchanged (Figure 46).

- Texas adults have a higher prevalence of not participating in leisure time physical activity compared to U.S. prevalence.

- The Healthy People 2010 goal is 20% or less of respondents reporting no leisure time physical activity. Among Texas adults, this percentage remained at about 27% as of 2005.

Risk Factors for CVD and Stroke - Physical Activity

Figure 47. Prevalence of No Leisure Time Physical Activity by Demographics, Texas, BRFSS, 2005
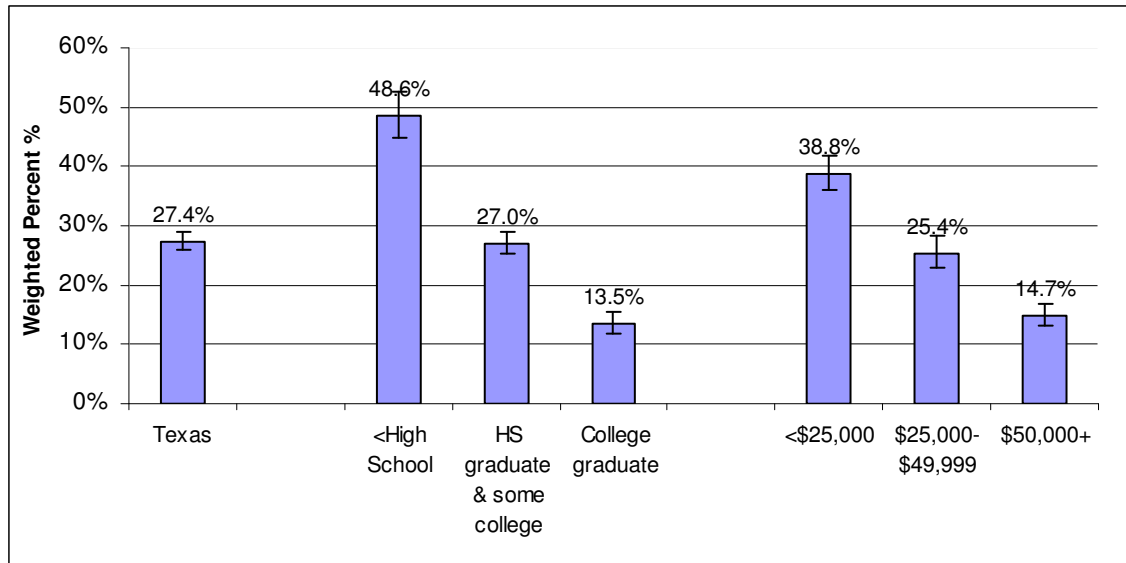

Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

■ In 2005, 27.4% of Texans reported they were physically inactive and did not participate in any leisure time activity in the past 30 days.

■ A significantly higher proportion of females (29.9%) than males (24.9%) reported no physical activity.

■ The rate of no physical activity was significantly higher among Hispanics (35.6%) and African-American (32.8%) compared to Whites (23.0%).

■ The prevalence of no physical activity with age, 22.8% in age 18-44, 31.5% in age group 45-64, and 36.3% in age group 65 and older.

Risk Factors for CVD and Stroke - Physical Activity

Figure 48. Prevalence of No Leisure Time Physical Activity by Education & Income, Texas, BRFSS, 2005

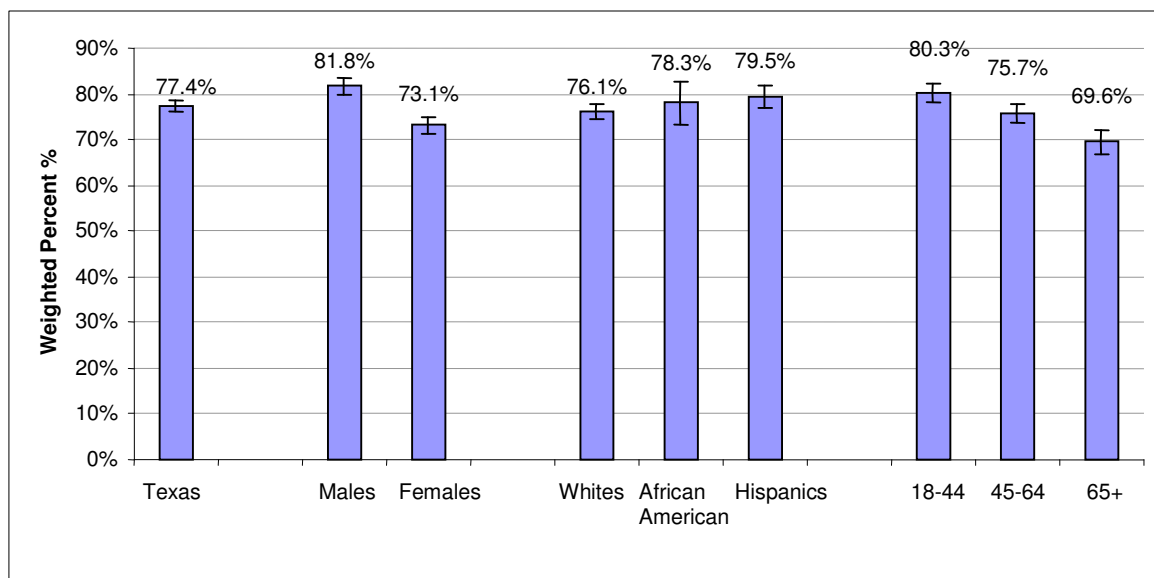Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

■ The lack of physical activity decreased with increasing education level, from 48.6% among those with less than a high school education to 13.5% among those with a college education.

■ The rate for no leisure time physical activity decreased with increasing annual income level, from 38.8% among those earning less than $25,000 to 14.7% among those earning $50,000 plus.

Risk Factors for CVD and Stroke -Fruit & Vegetable consumption

Vegetables, fruit and grains are good sources of complex carbohydrates and dietary fiber, as well as vitamins, minerals, antioxidants, and photochemicals that are important for good health[5].

For the data presentd below, intake of fruit & vegetables is < 5 servings a day in defined as respondents 18 years and older who report that they have < 5 servings of fruits, fruit juices, or vegetables per day.

Figure 49. Prevalence of Intake of Fruit & Vegetables is < 5 servings a day by Demographics, Texas, BRFSS, 2005

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

A diet high in fat, and low in fruits, vegetables, and fiber, is a direct contributor to CVD.

- Texans (77.4%) did not consume enough fruit and vegetables.

- A significantly higher proportion of males (81.8%) than females (73.1%) reported eating less than the recommended amount.

- There were no significant differences noted among race groups.

- The rate of inadequate fruit and vegetable consumption was the highest in the younger age group. (80.3% in age group18-44, 75.7% in age group 45-64, and 69.6% in age group 65 and older).

Risk Factors for CVD and Stroke - Multiple Risk Factors

Most patients have multiple cardiovascular risk factors.

Cardiovascular disease and all-cause mortality increases with each additional risk factor present (current smoking, overweight, hypertension, high blood cholesterol, and diabetes). [4]

Health care professionals are well aware that most patients have multiple cardiovascular risk factors. These risk factors, when combined together, can increase the risk for cardiovascular disease as well as other chronic diseases.

**Figure 50. Multiple Risk Factors* for CVD, Texas, BRFSS, 2005**
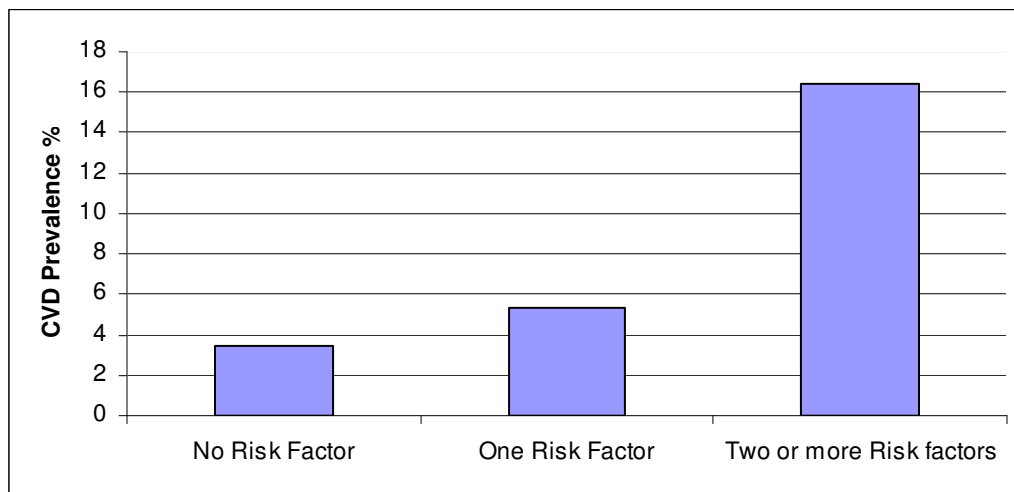
* From the following risk factors: high blood pressure, high cholesterol, diabetes, obesity, no leisure time physical activity, lifetime smoking, and current smoking
 Data Source: Texas Behavioral Risk Factor Surveillance System, Texas Department of State Health Services, 2005

- The prevalence of CVD among persons with two or more CVD risk factors was more than three times higher than persons with no risk factors and two times higher than persons with only one risk factor.

- About 16% of people who had two or more risk factors had CVD.

Risk Factors for CVD and Stroke - Youth Risk Behavior Survey

Figure 51. Prevalence of Risky Behaviors among Public High School Students -- At Risk for Becoming Overweight
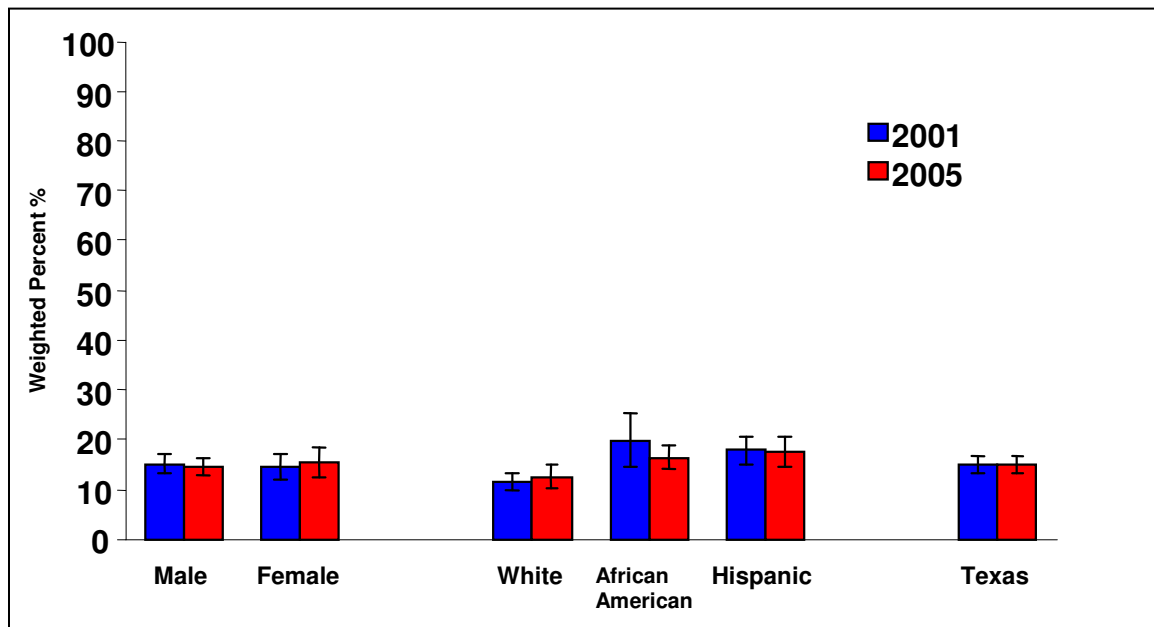
Data

Source: Texas Young Risk Behavior Surveys (YRBS), Texas Department of State Health Services, 2001, 2005 (Excluding Houston ISD) High School Survey

■ The percentage of students who are at risk for becoming overweight changed little from 2001 (14.8% 95% CI, 12.9%-16.5%) to 2005 (15.7% (95% CI, 14.8%-16.6%).

■ The proportion of students who are at risk for becoming overweight is greater among African American (16.3%) and Hispanic students (17.4%) than among White students (12.4%), although differences are not statistically significant.   No differences exist among students by gender and grade levels.

Risk Factors for CVD and Stroke -Youth Risk Behavior Survey

Figure 52. Prevalence of Risky Behaviors among Public High School Students – Overweight
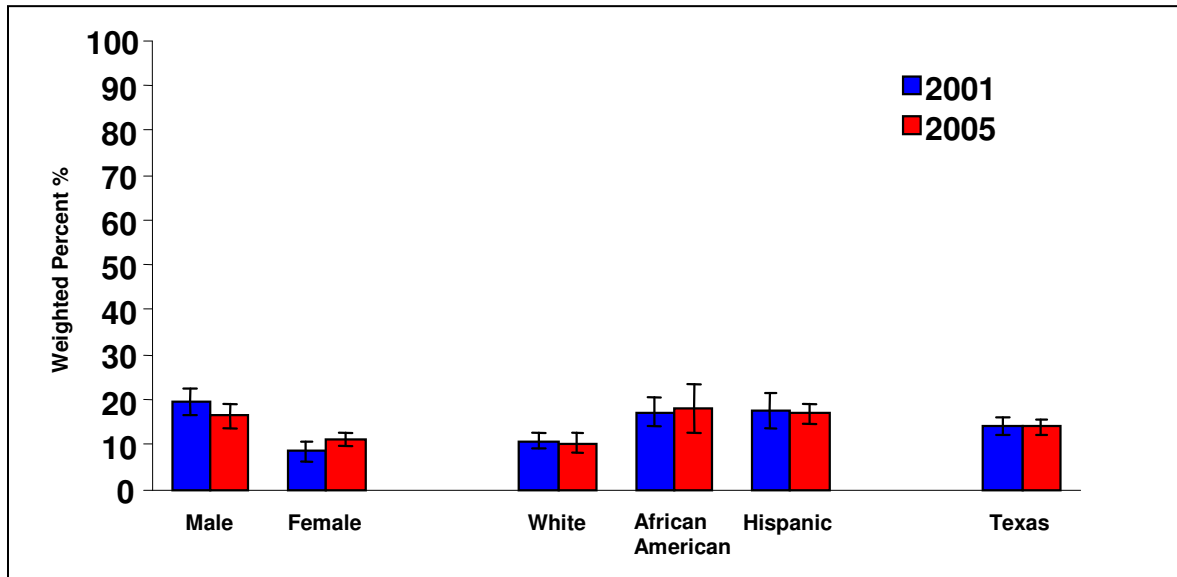

Data Source: Texas Young Risk Behavior Surveys (YRBS), Texas Department of State Health Services, 2001, 2005 (Excluding Houston ISD) High School Survey

- The percentage of students who are overweight decreased slightly from 14.2% (95% CI, 12.1%-16.2%) in 2001 to 13.9% (95% CI, 12.3%-15.5%) in 2003 (see Figure 2). The decline, however, was not statistically significant.

- Male students (16.4%) are significantly more likely than female students (11.2%) to be overweight.

- The proportion of students who are overweight is significant higher for African American (18.0%) and Hispanic students (16.9%) than White students (10.2%).

Risk Factors for CVD and Stroke -Youth Risk Behavior Survey

Figure 53. Prevalence of Risky Behaviors among Public High School Students – Did not Participate in any Vigorous or Moderate Physical Activity during the past 7 Days
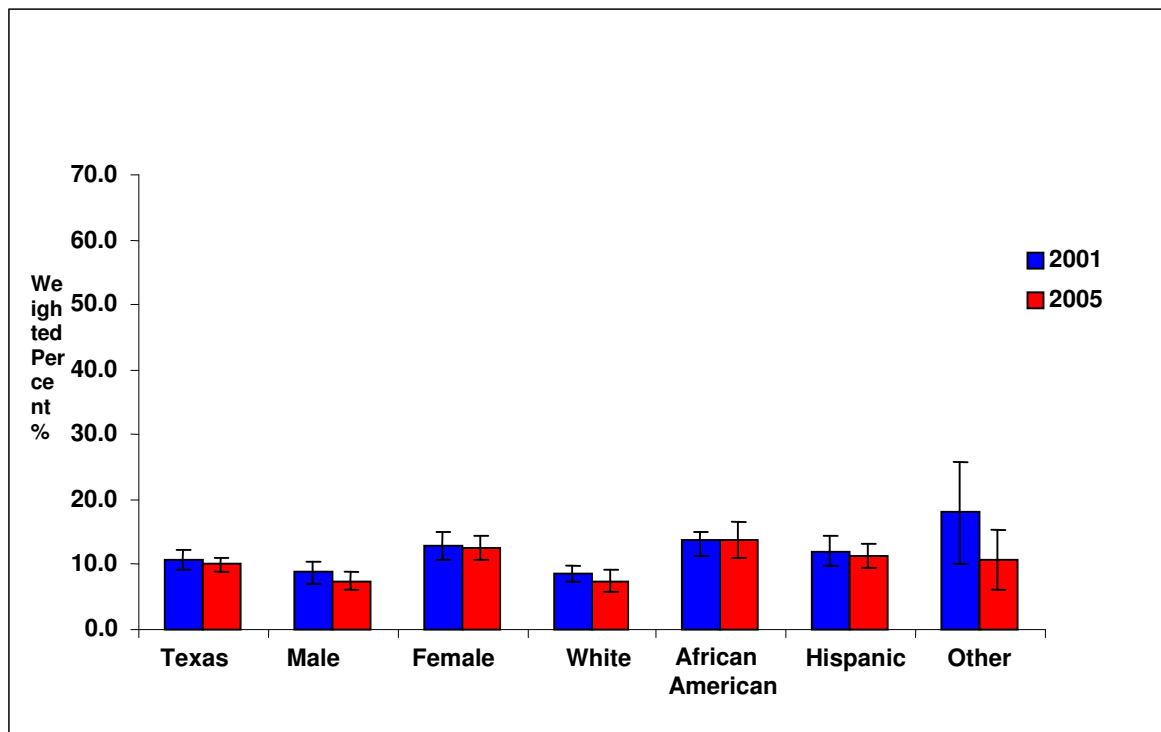

Data Source: Texas Young Risk Behavior Surveys (YRBS), Texas Department of State Health Services, 2001, 2005 (Excluding Houston ISD) High School Survey

- The percentage of students who did not participate in any vigorous or moderate physical activity during the past 7 days changed little from 2001 (10.8% 95% CI, 9.3%-12.3%) to 2005 (10.0% 95% CI, 8.9%-11.1%).

- Male students (8.8%) were more likely to participate in physical activity than female students (12.6%). The difference was statistically significant.

- African American students (13.8%) were significantly more likely to report that they did not participate in any vigorous or moderate physical activity than White students (7.4%) and Hispanic students (11.4%).

Risk Factors for CVD and Stroke -Youth Risk Behavior Survey

Figure 54. Prevalence of Risky Behaviors among Public High School Students -- 5 or more Servings of Fruits and Vegetables
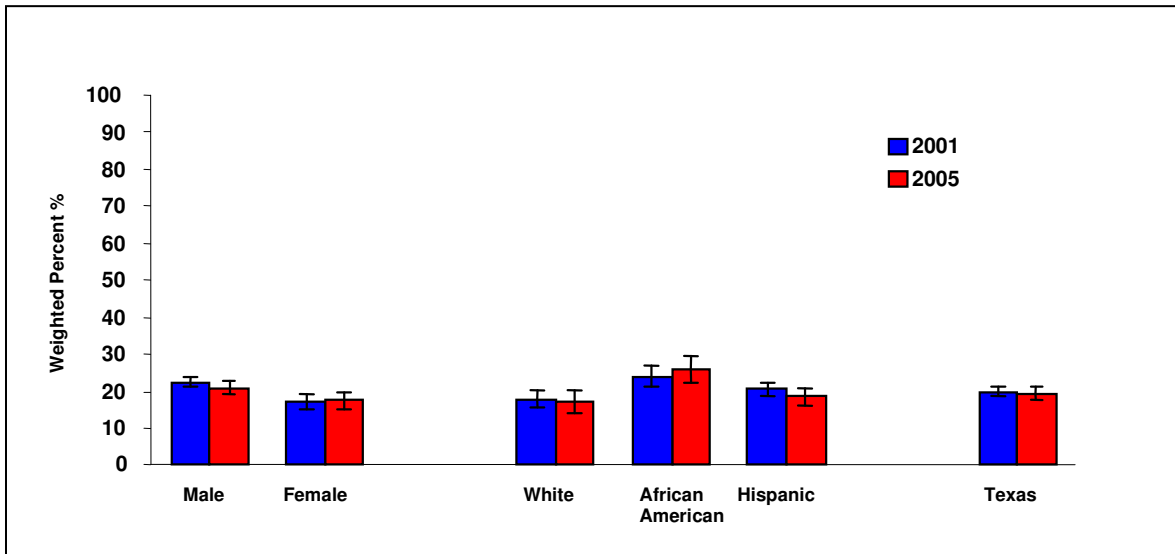

Data Source: Texas Young Risk Behavior Surveys (YRBS), Texas Department of State Health Services, 2001, 2005 (Excluding Houston ISD) High School Survey

- The percentage of students who reported that they ate five or more servings of fruits and vegetables per day during the past seven days changed little from 2001 (19.9% 95% CI, 18.6%-21.2%) to 2005 (19.4% 95% CI, 17.6%-19.2%).

- Male students (21.0%) were more likely to report that they ate five or more servings of fruits and vegetables per day during the past seven days than female students (17.6%), although the difference was not statistically significant.

- African American students (26.1%) were significantly more likely to report that they eat five or more servings of fruits and vegetables per day than White students (17.2%) and Hispanic students (18.6%).

Risk Factors for CVD and Stroke-- Youth Risk Behavior Survey

Figure 55. Prevalence of Tobacco Use among Public High School Students who smoked one or more Cigarettes in the Past 30 days –2001-2005
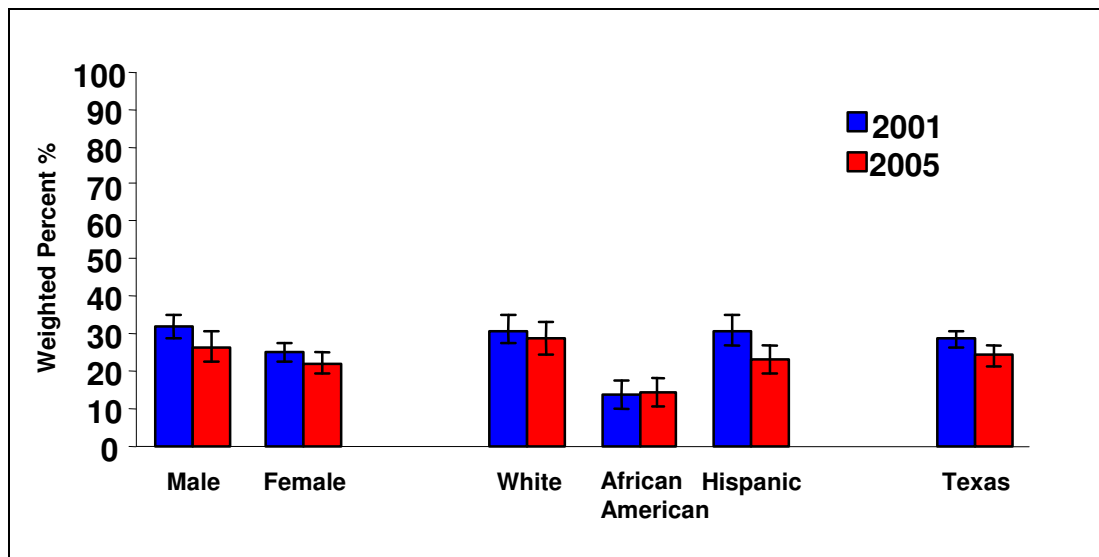
- The prevalence of current cigarette use (i.e., smoked cigarettes on $\geq$ 1 of the 30 days preceding the survey) decreased from 28.4% (95% CI, 26.1%-30.8%) in 2001 to 24.2% (95% CI, 21.3%-27.1%) in 2005. The decrease, however, was not statistically significant.

- The prevalence of current cigarette use declined among both male and female students from 2001 to 2005. The decrease, however, was not statistically significant.

- Overall, African American students (14.2%) were less likely to report current cigarette use than Hispanic (23.1%) or White (28.9%) students.

EMS Response Time for CVD and Stroke

Cardiovascular disease is a major cause for use of emergency medical services (EMS) in Texas. In 2003 at least 25,000 EMS transports occurred among people in Texas for suspected cardiac events (cardiac Arrest, cardiac rhythm disturbance, and chest pain/discomfort), and stroke.

The data in this report are from the 2003 Texas EMS/Trauma Registry, Department of State Health Services in Texas.

Data selection Criteria for use in this report are as follows:
- Calls received during 2003
- Suspected illness types include cardiac arrest, cardiac rhythm disturbance, and chest pain/discomfort
- Suspected illness types defined as stroke/CVA.
- Medical-related calls only (i.e. calls exclusively related to trauma were excluded)
- 911 calls only (no inter-facility transfers)
- Texas residents only

Data Limitations:
- The Registry does not receive medical-related calls from all participating EMS providers. Any numbers presented in this report are likely underestimations and caution should be exercised when interpreting these data.
- Due to the quality of data submitted to the Registry, identification of all reported CVD-related runs was not possible. Several fields were used in the creation of this dataset (see above), so data quality in each of these fields determined if a case was appropriately selected.
- These numbers are in terms of CVD-related runs, not necessarily in terms of people.
- City of residence is not reported with enough consistency to be utilized in analysis.
- In the following tables, total count refers to the total number of records in each geographic area being examined and valid values refers to the number of records within each geographic area that had the variables necessary to calculate the given indicator.

Counties designated as "Border" in the La Paz Agreement, utilized here, include Brewster, Brooks, Cameron, Crockett, Culberson, Dimmit, Duval, Edwards, El Paso, Frio, Hidalgo, Hudspeth, Jeff Davis, Jim Hogg, Kenedy, Kinney, La Salle, Maverick, McMullen, Pecos, Presidio, Real, Reeves, Starr, Sutton, Terrell, Uvalde, Val Verde, Webb, Willacy, Zapata, and Zavala.

EMS Response Time for CVD

Figure 56. EMS Response Time * (in minutes) for CVD, Texas Residents, 2003
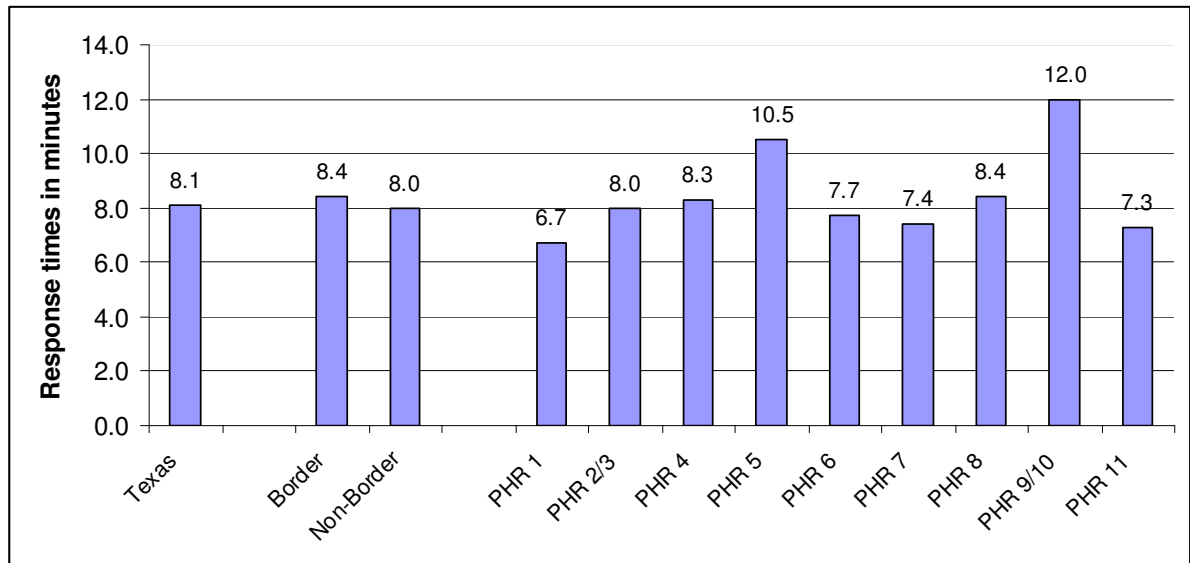
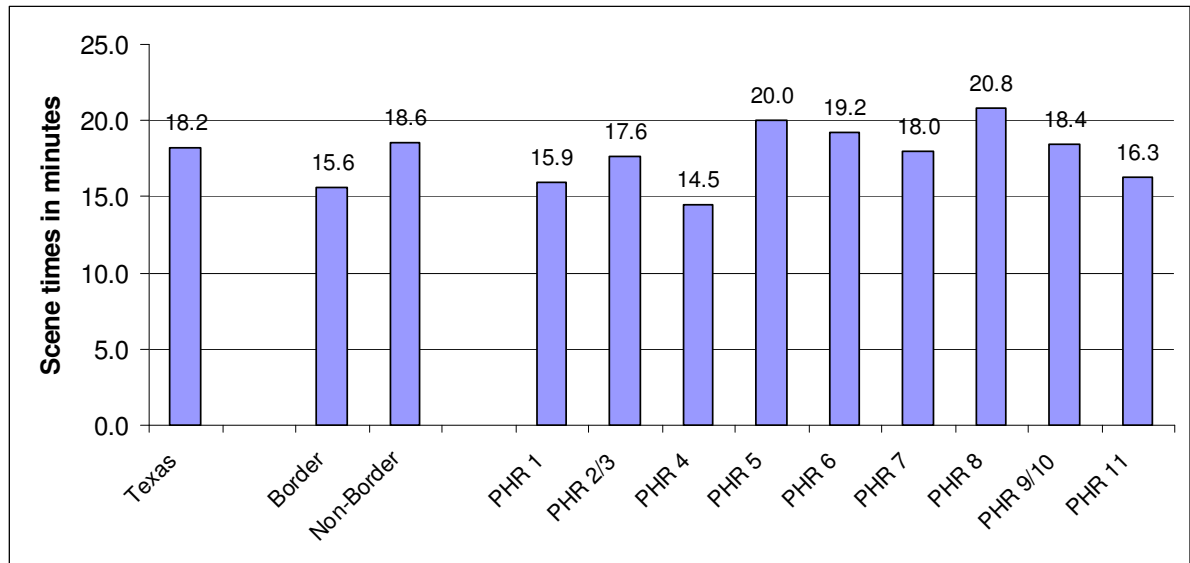*Response Times are defined as follows: Response Time = (Call Received Time - Time EMS Arrived on Scene);

Data Source: Texas EMS/Trauma Registry, 2003

- In 2003, the average EMS response time for a suspected cardiac event in Texas was around 8 minutes.

- There was not a large difference between the border and non-border regions.

- Public Health Region 1 had the shortest response time among all Public Health Regions.

- Public Health Regions 5 and 9/10 had the longest response times compared to the other regions.

EMS Scene Time for CVD

Figure 57. EMS Scene Time * (in minutes) for CVD, Texas Residents, 2003

Scene Time = (Time EMS Arrived on Scene – Time EMS Departed Scene.
Data Source: Texas EMS/Trauma Registry, 2003.

- In 2003, the average EMS scene time for a suspected cardiac event in Texas was about 18 minutes.

- The border region had shorter EMS scene times than non-border regions.

- Public Health Region 4 had the shortest scene time among all the Public Health Regions at 14.5 minutes.

- Public Health Regions 5 (20.0 minutes) and 8 (20.8 minutes) had the longest scene times compared to the other regions.

EMS Transport Time for CVD

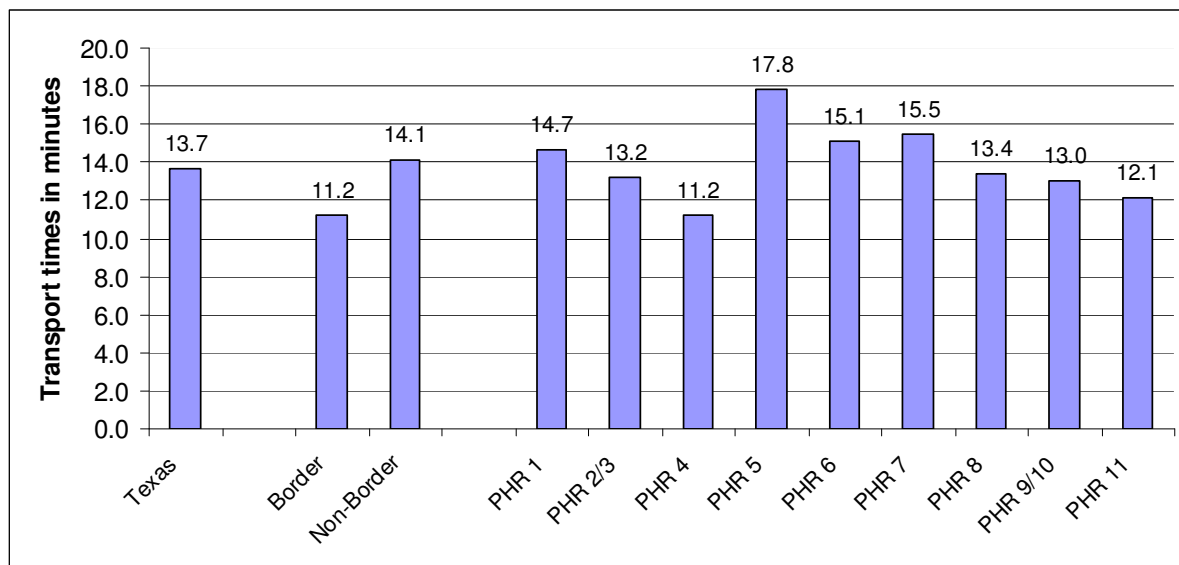**Figure 58. EMS Transport Time * (in minutes) for CVD, Texas Residents, 2003**

Transport Time = (Time EMS Departed Scene – Time EMS Arrived at Destination).
Data Source: Texas EMS/Trauma Registry, 2003.

- In 2003, the average EMS transport time for a suspected cardiac event in Texas was about 14 minutes.

- Border regions had shorter EMS transport times than non-border regions.

- Public Health Region 4 had the shortest transport time among all Public Health Regions at 11.2 minutes.

- Public Health Region 5 had the longest transport time among all public health regions at 17.8 minutes.

EMS Delivery Time for CVD

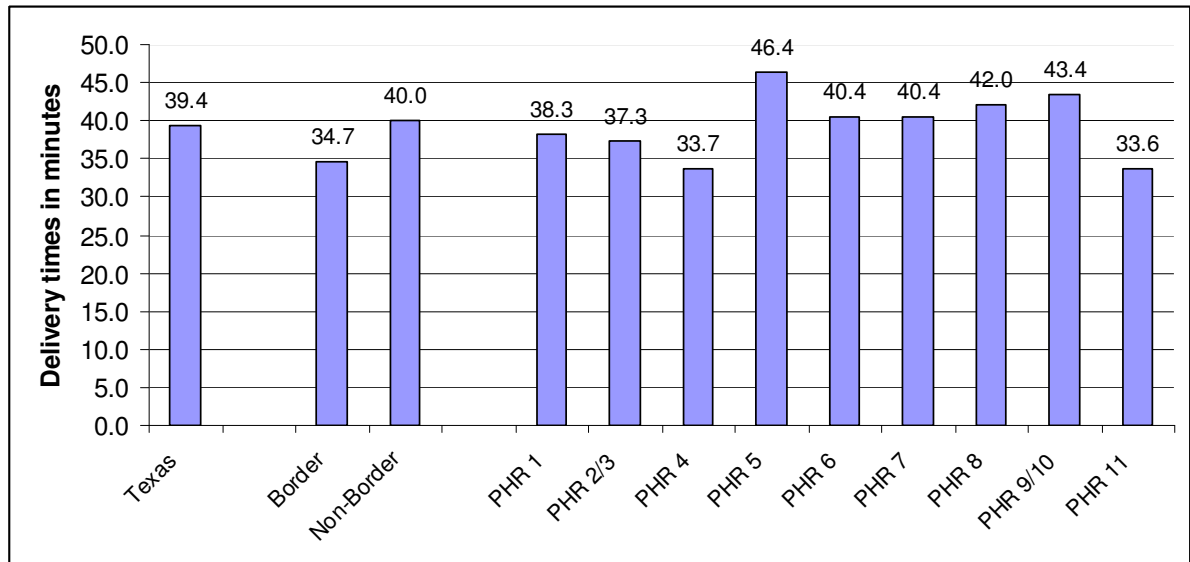**Figure 59. EMS Delivery Time * (in minutes) for CVD, Texas Residents, 2003**

Delivery Time = (Call Received Time – Time EMS Arrived at Destination)
Data Source: Texas EMS/Trauma Registry, 2003.

- In 2003, the average EMS delivery time for a suspected cardiac event in Texas was around 40 minutes.

- The border region had shorter EMS delivery times than non border regions.

- Public Health Region 4 (33.7 minutes) and 11(33.6 minutes) had the shortest delivery time compared to other Public Health Regions.

- Public Health Region 5 had the longest delivery time among all regions at 46.6 minutes.

EMS Response Time for Stroke

Figure 60. EMS Response Time * (in minutes) for Stroke, Texas Residents, 2003
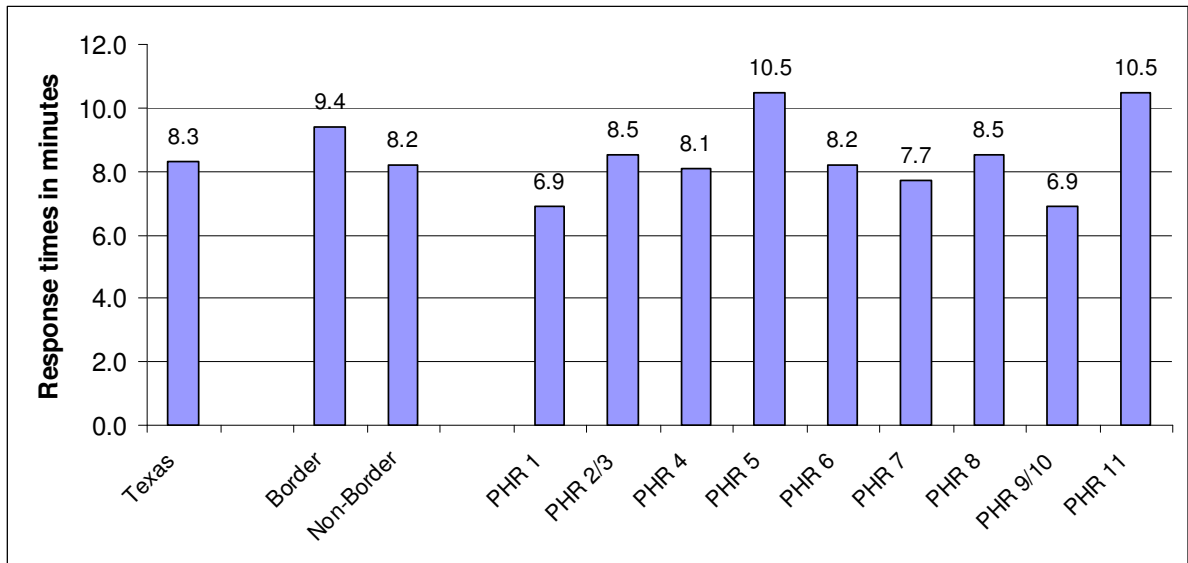

*Response Times are defined as follows: Response Time = (Call Received Time - Time EMS Arrived on Scene);
Data Source: Texas EMS/Trauma Registry, 2003

- In 2003, the average EMS response time for a suspected stroke event in Texas was around 8 minutes.

- Border and non-border regions had similar EMS response times for stroke.

- Public Health Regions 1(6.9 minutes) & 9/10 (6.9 minutes) had the shortest response times among all Public Health Regions.

- Public Health Regions 5 (10.5 minutes) and 11 (10.5 minutes) had longer response times than all other regions.

EMS Scene Time for Stroke

Figure 61. EMS Scene Time * (in minutes) for Stroke, Texas Residents, 2003
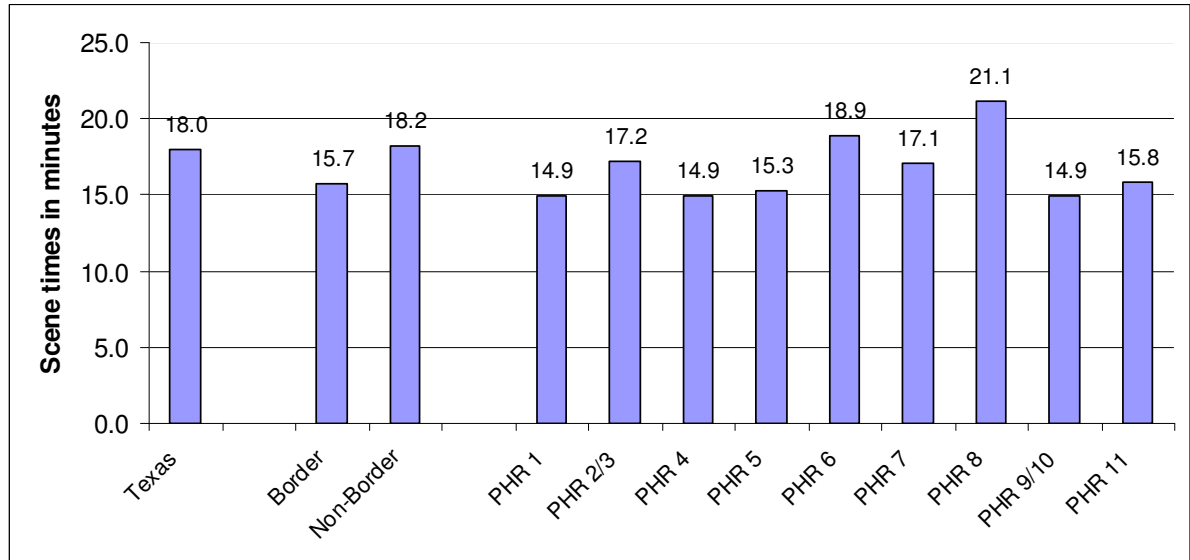
Scene Time = Time EMS Arrived on Scene – Time EMS Departed Scene.
Data Source: Texas EMS/Trauma Registry, 2003.

- In 2003, the average EMS scene time for a suspected stroke in Texas was about 18 minutes.

- The Border Regions had shorter EMS scene times than non-border regions.

- Public Health Regions 1, 4, and 9/10 had shorter scene times than other Public Health Regions.

- Public Health Regions 6 and 8 had longer scene times than other regions.

EMS Transport Time for Stroke

Figure 62. EMS Transport Time * (in minutes) for Stroke, Texas Residents, 2003
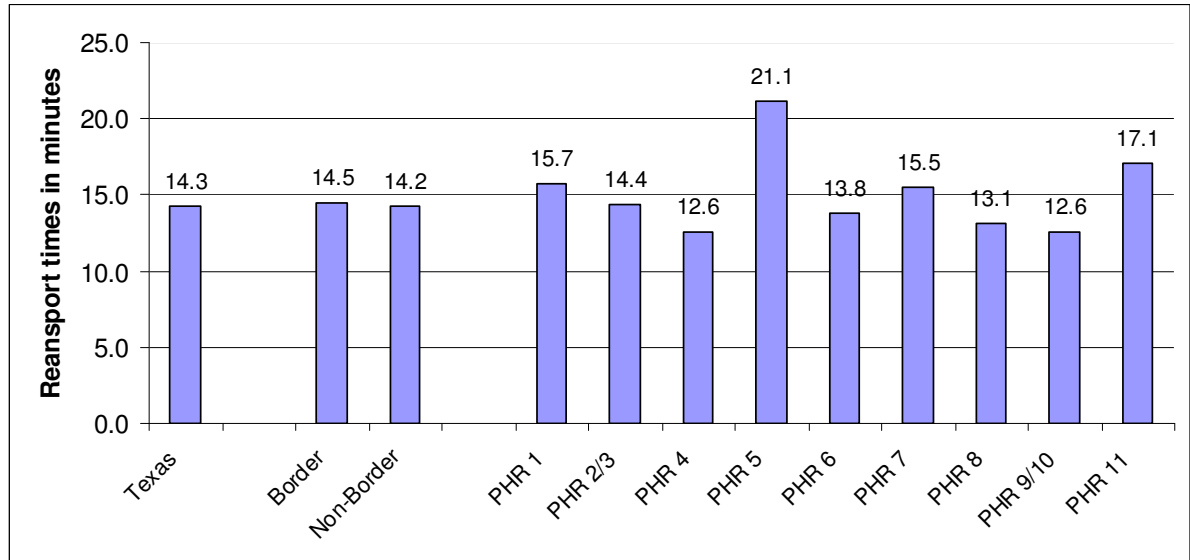
Transport Time = (Time EMS Departed Scene – Time EMS Arrived at Destination).
Data Source: Texas EMS/Trauma Registry, 2003.

- In 2003, the average EMS transport time for a suspected stroke in Texas was about 14 minutes.

- Border and non-border regions had similar EMS transport times for stroke.

- Public Health Regions 4 and 9/10 had the shortest transport times among Public Health Regions at 12.6 minutes.

- Public Health Region 5 had the longest transport time among the Public Health Regions at 21.1 minutes.

EMS Delivery Time for Stroke

Figure 63. EMS Delivery Time * (in minutes) for Stroke, Texas Residents, 2003

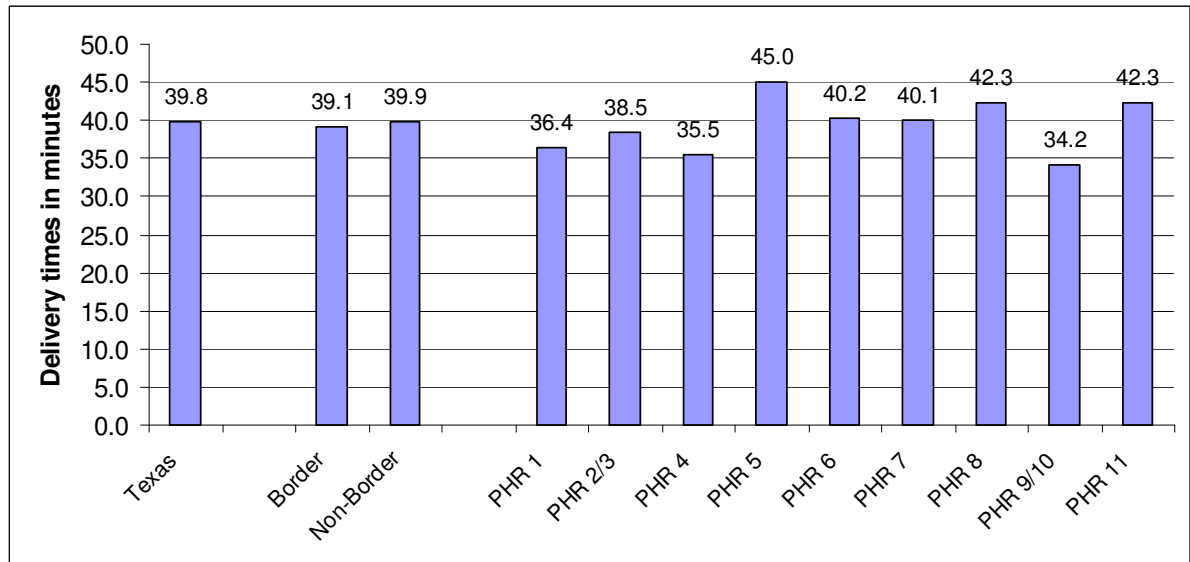*Delivery Time = Call Received Time – Time EMS Arrived at Destination.

Data Source: Texas EMS/Trauma Registry, 2003.

- In 2003, the average EMS delivery time for a suspected stroke in Texas was around 40 minutes.

- Border and non-border regions had similar EMS delivery times for stroke.

- Public Health Regions 4 (35.5 minutes) and 8/10 (34.2 minutes) had the shortest delivery times of all Public Health Regions.

- Public Health Region 5 had the longest delivery time among Public Health Regions at 45.0 minutes.

Appendix 1 – Geographical Area Defined

Texas Counties on the Border with Mexico (La Paz Agreement)		
Brewster	Brooks	Cameron
Crockett	Culberson	Dimmit
Duval	Edwards	El Paso
Frio	Hidalgo	Hudspeth
Jeff Davis	Jim Hogg	Kenedy
Kinney	La Salle	McMullen
Maverick	Pecos	Presidio
Real	Reeves	Starr
Sutton	Terrell	Uvalde
Val Verde	Webb	Willacy
Zapata	Zavala	

Map 1. Metropolitan Statistical Areas: Texas 2000

Metropolitan Statistical Areas Texas 2000

Source: U.S Census Bureau, Census 2000
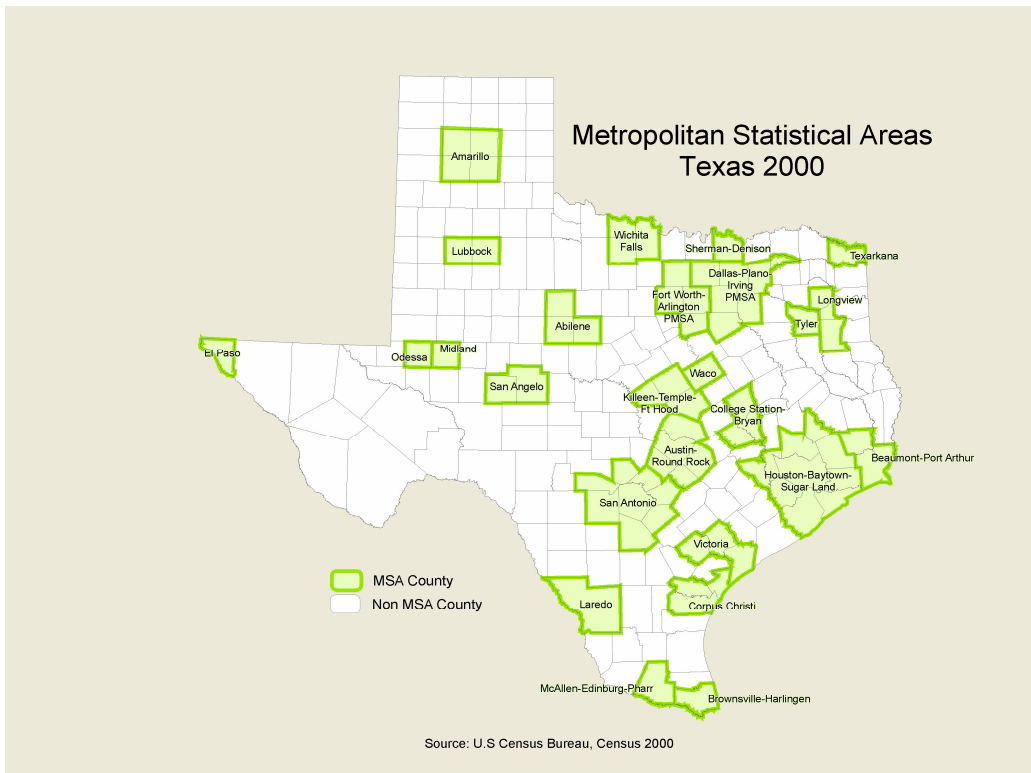
Appendix 2 – Metropolitan Statistical Area of Texas with Counties

Metropolitan Statistical Areas of Texas with Counties			
Abilene MSA Callahan, Jones, Taylor	**Amarillo MSA** Armstrong, Carson, Potter, Randall	**Austin-Round Rock MSA** Bastrop, Caldwell, Hays, Travis, Williamson	**Beaumont-Port Arthur MSA** Hardin, Jefferson, Orange
Brownsville-Harlingen MSA Cameron	**College Station-Bryan MSA** Brazos, Burleson, Robertson	**Corpus Christi MSA** Aransas, Nueces, San Patricio	**Dallas-Plano-Irving PMSA** Collin, Dallas, Delta, Denton, Ellis, Hunt, Kaufman, Rockwall
El Paso MSA El Paso	**Fort Worth-Arlington PMSA** Johnson, Parker, Tarrant, Wise	**Houston-Baytown-Sugar Land MSA** Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, San Jacinto, Waller	**Killeen-Temple-Fort Hood MSA** Bell, Coryell, Lampasas
Laredo MSA Webb	**Longview MSA** Gregg, Rusk, Upshur	**Lubbock MSA** Crosby, Lubbock	**McAllen-Edinburg-Pharr MSA** Hidalgo
Midland MSA Midland	**Odessa MSA** Ector	**San Angelo MSA** Irion, Tom Green	**San Antonio MSA** Atascosa, Bandera, Bexar, Comal, Guadalupe, Kendall, Medina, Wilson
Sherman-Denison MSA Grayson	**Texarkana-TX PMSA** Bowie	**Tyler MSA** Smith	**Victoria MSA** Calhoun, Goliad, Victoria
Waco MSA McLennan	**Wichita Falls MSA** Archer, Clay, Wichita		

Technical Notes

Definition:

Cardiovascular disease (CVD)

Cardiovascular disease (CVD) refers to a group of diseases including heart disease, stroke and congestive heart failure. Heart attack and stroke are caused in part by narrowed or blocked arteries resulting in decreased blood supply to the heart or brain.

Codes used to define CVD: ICD-10 codes I00-I99; ICD-9 codes 390-459

Heart Disease

Heart disease is a form of cardiovascular disease: It includes all diseases of the heart, which includes acute rheumatic fever and chronic rheumatic heart disease, hypertensive heart disease, hypertensive heart and renal disease, coronary heart disease, congestive heart failure, as well as other forms of heart disease.

In this report we used the ICD codes as follows:

Ischemic heart diseases

Codes used to define, Ischemic heart diseases ICD-9 410 – 414 and ICD-10 I20 - I25

Stroke [5]

Stroke is a type of cardiovascular disease. It affects the arteries leading to and within the brain.

Codes used to define: ICD-10 codes I60-I69 and ICD-9 430-432 (Hemorrhagic stroke), ICD-9 433, 434, and 436-438 (Ischemic stroke)

Heart Failure [6]

Congestive heart failure occurs when the heart loses its ability to pump enough blood through the body.

Codes used to define congestive heart failure: ICD-10 codes I50 and ICD-9 codes 428.

Technical Notes

Data Sources

Vital Statistics Unit

CVD mortality data used for this report are from 1999 through 2003 that was obtained from Vital Statistics Unit (VSU) death certificates.

For this report, age-adjusted CVD mortality rates are calculated and presented per 100,000 populations. Rates were age adjusted to the 2000 US population so that valid comparisons can be made between populations of different age distributions.

Data Limitations

Vital Statistics Unit (VSU) death certificates have CVD listed as an underlying cause of death. While the underlying cause of death has generally been used for charting temporal and geographic patterns of death, analyses based on underlying cause alone can fail to include significant conditions present at death. The mortality data from 1999 and later cannot be directly compared with the data from previous years due to the ICD-9 to ICD-10 coding change.

Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS) is the source of self-reported prevalence data. The Texas BRFSS collects health status, risk, and behavioral data by means of a monthly telephone survey of randomly selected Texas residents. Currently, the specific question that determines CVD prevalence in the state is "Has a doctor, nurse or other health professional ever told you had a heart attack or Myocardial infraction? Has a doctor, nurse or other health professional ever told you that you had angina or coronary heart disease? Has a doctor, nurse or other health professional ever told you that you had a stroke?"

The BRFSS survey does not include persons, who are under the age of 18 years, who live in institutions, have no telephone, or have only a mobile phone. The data are weighted to reflect the statewide age and sex distribution as well as the individual's probability of being selected and to provide estimates that represent the Texas population as a whole.

Technical Notes

Health Plan Employer Data and Information Set (HEDIS®)

HEDIS® is a set of standardized performance measures designed to ensure that health plan purchasers and consumers have the information they need to reliably compare the performance of managed health care plans. The performance measures in HEDIS® are related to many significant public health issues such as cancer, heart disease, smoking, asthma and diabetes. HEDIS® is sponsored, supported and maintained by the National Committee on Quality Assurance (NCQA), a not for profit organization committed to assessing, reporting on and improving the quality of care provided by organized delivery systems.

For more information on HEDIS®, Quality Compass or NCQA please visit www.ncqa.org.

Hospital Discharge Data

Hospital discharge data for CVD are obtained from the Texas Health Care Information Collection (THCIC) Inpatient Hospital Discharge Public Use data files. Hospital discharge data have been available in Texas since 1999. The data represented in report are from 1999-2003.

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