2011 marks the Tennessee Stroke Registry’s fourth year of serving the state. Through a partnership with East Tennessee State University, the American Heart Association, and the Tennessee Hospital Association, the registry continues striving to help Tennessee reach its goal of nurturing a healthier community.

**Tennessee Health Measures**

This year’s Health Rankings, produced by the United Health Foundation, scored Tennessee 42nd in the nation. This was a step up from 44th in 2009; however, the state has a long way to go. Risk behaviors for stroke, such as obesity and smoking, remain high (33% and 22% respectively) and prevalence of high blood pressure is the ninth highest in the nation.

Historically, Tennessee has experienced a higher mortality rate than the national average for many health outcomes including stroke. This is true for both genders and of both African American and Caucasian peoples.

**Figure 2: Mortality rate per 100,000 by race and gender (2005-2007).**

**Tennessee Stroke Registry 2011**

This year the registry had 3873 reported stroke cases. The majority of cases reported in Tennessee was diagnosed ischemic (vessel blocked), while a much smaller percentage were diagnosed hemorrhagic (vessel ruptured).

**Figure 3: Percent of stroke diagnosis in Tennessee**

![Figure 1: Prevalence of risk factors for stroke in Tennessee compared to the nation (2010).](image)
As shown below in Figure 4, the distribution of strokes reported to the Tennessee Stroke Registry in 2010 was only slightly higher than the nation for Caucasians and actually lower for African Americans. These findings reflect the population demographics in Tennessee as compared to the nation and do not indicate a difference in risk.

Figure 4: Distribution of stroke reported to the TSR by gender.

An important question to address is the cause of the disparity in stroke mortality rates in Tennessee. One possibility is patient response time after the onset of stroke symptoms. Tennessee still lags behind the nation in this area.

Figure 5: Arrival time from last known well to hospital

Only 9% of individuals in Tennessee experiencing a stroke made it to the hospital within the first hour. This represents just over half the national average. One possible reason for the slowed response time by individuals experiencing a stroke could be a general lack of knowledge of the warning signs of stroke onset. There are five basic symptoms that everyone should be aware of: poor balance, slurred speech/drooping facial muscles, numbness of limbs, blurred vision, and severe headache. The 2005 Behavioral Risk Factor Surveillance System (BRFSS) report in Tennessee indicated an increase in general knowledge of these symptoms from the year 2000.

Figure 6: Type of transportation by percentage for stroke patients in Tennessee

Another consideration in our largely rural state is self-transport. Many people elect to drive themselves to the hospital or to have a loved one take them. This increases the risk of permanent impairment from stroke. Clinical outcomes are generally better using EMS transport since supportive care can be given en route. Also, clinical data may be transmitted to the hospital by EMS which increases the readiness of the hospital to receive/manage strokes.

Figure 7: Stroke mortality by gender

Figure 7 clearly illustrates the disparity with a higher mortality for both men and women in Tennessee when compared to the rest of the country. Tennessee women between the ages of 35 and 44 die of their strokes with two-thirds greater frequency than do U.S. women of that age group. Within the state, women exhibit a higher stroke mortality rate than do men.

Figure 8: Trends in Tennessee Age-Adjusted Rate per 100,000 of Stroke Hospital Admissions, 1997-2002, by Gender. HDDS Inpatient Files

A first consideration may be that women are hospitalized more than men, yet Figure 8 shows that Tennessee women have consistently lower hospitalization rates for stroke than do men.

Figure 9: Percent reporting hypertension; Tennessee by gender, the U.S.; 2001-2009.

Does stroke risk, specifically for hypertension – stroke’s major risk factor, vary between Tennessee men and women? Figure 9 shows that Tennessee hypertension rates are higher than the U.S. rate. This is associated with the state’s higher stroke mortality risk. In addition, between the genders in Tennessee, women generally report a higher rate of hypertension.

Figure 10: TN Counties where Ischemic stroke mortality in women is elevated compared to men.

There was no clear effect of region found with regard to stroke incidence throughout the state. There were 17 counties in which mortality rates were significantly higher for women than for men and an additional 21 that were only marginally higher.
There are still over a million people within the state of Tennessee that are more than 50 miles from an accredited stroke center. This fact along with other contributing factors such as prevalence of smoking, obesity, and hypertension perpetuates the higher rates of mortality from stroke within our state.

Sources:
Outcome Science: https://qi.outcome.com/DPMT_portal.cgi?physician_id=182208
CDC Wonder: http://wonder.cdc.gov/

TN Advisory Council for Heart Disease and Stroke Prevention
Chairperson: Dr. Patti Van Hook
The TSR would like to express its sincere thanks to those hospitals which reported the information shared in this report.

TN Hospital Association: Bill Jolley, Vice President

For more information on the Tennessee Stroke Registry, contact:

Billy Brooks, TSR Coordinator
East Tennessee State University
College of Public Health
Box 70259
Johnson City, TN 37614
Voice: 423-439-4332
Fax: 423-439-6491
E-mail: brooksbl@goldmail.etsu.edu

http://www.etsu.edu/cph/biostat_epidemiology/TNstroke.aspx

Controllable Risk Factors for Stroke:
- Hypertension
- Obesity
- Diabetes
- Smoking (including formerly)

Five Signs of Stroke:
- Balance off?
- Speech slurred or face drooping?
- One side weak or numb?
- Vision lost or blurred?
- Severe headache?