

## Storm-Related Mortality in Central Texas: October 17-31, 1998

On October 17, 1998, a series of upper level disturbances moved across the Central Texas and South Texas regions. The resulting storms dropped more than 15 inches of rain in many areas and spawned several tornados. Rainfall amounts in areas of Bexar and Comal counties reached as high as 22

supplemented in some cases by information provided by the Bureau of Vital Statistics. A case was defined as a death directly or indirectly related to the storm system that occurred October 17 through October 20, 1998. To capture all storm related deaths, traumatic deaths occurring from October 17 through October 31 were considered. A directly related death was defined as one that resulted from physical contact with a storm product such as flood water, hail, lightning, or wind. An indirectly related death was defined as one that did not result from physical contact with a storm product but would not have happened if the storm had not occurred. Thirty-one deaths met the above criteria as directly or indirectly related to the storm. These deaths occurred in 24 separate incidents. Thirty of the victims were Texas residents, and 1 was a Louisiana resident visiting in Texas.

**Figure 1. Cause of Death**

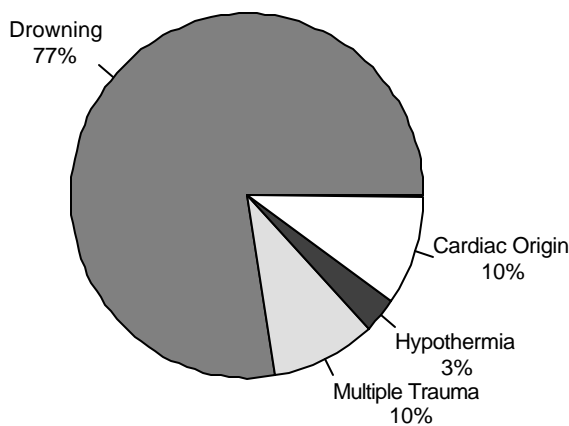
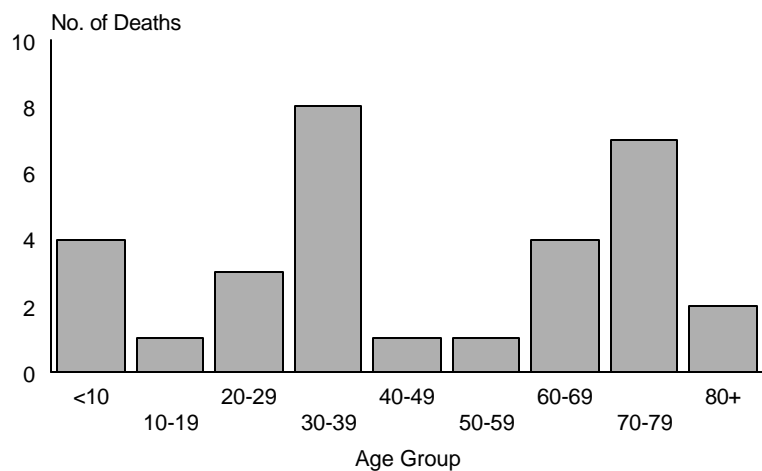


Figure 1 illustrates the cause of death for the 31 decedents: drowning 24 (77%);

inches. Sixty Texas counties reported flooding from October 17 through 19 as a result of this storm system. Thirty-six counties became eligible for federal and/or state assistance as a direct result of storm damage suffered October 17 through 31. The October floods reportedly damaged almost 12,000 homes, 700 businesses, and extensive public property at an estimated cost of just over \$900 million. This report summarizes findings of an epidemiologic investigation of deaths associated with the storm system.

**Figure 2. Deaths by Age**

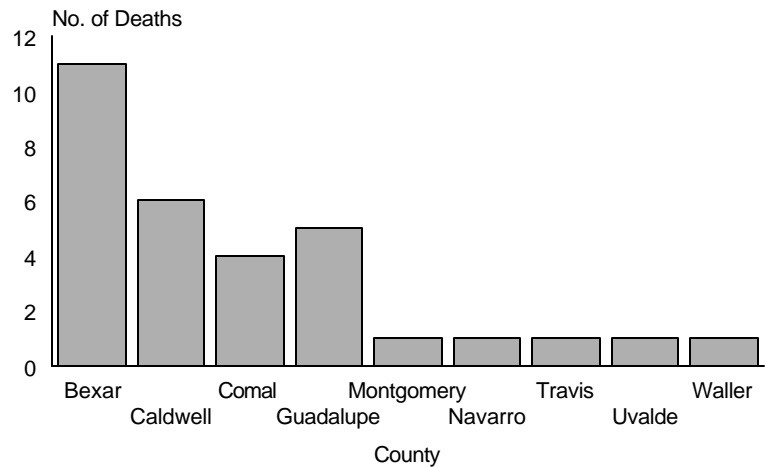


Information was obtained from the Bexar and Travis County Medical Examiners, as well as from Justice of the Peace offices and Department of Public Safety officers in outlying counties. Data was

cardiac origin 3 (10%); multiple trauma 3 (10%); and hypothermia 1 (3%). Twenty-nine (94%) of the deaths were **directly** related to the storm. Drowning was the cause of death in 24 (83%) of the directly related cases. Three persons died of multiple trauma (1 death related to flash flooding and the remaining 2 caused by tornados in Navarro and Waller counties), 1 person died of hypothermia after submersion in water, and 1 died of cardiac arrhythmia induced after he became trapped in a water crossing. Two (6%) of the deaths were **indirectly related** to the storm. One man died while awaiting rescue by EMS who were unable to reach his residence because of area flooding. The second man died in his truck in a water crossing on his property.

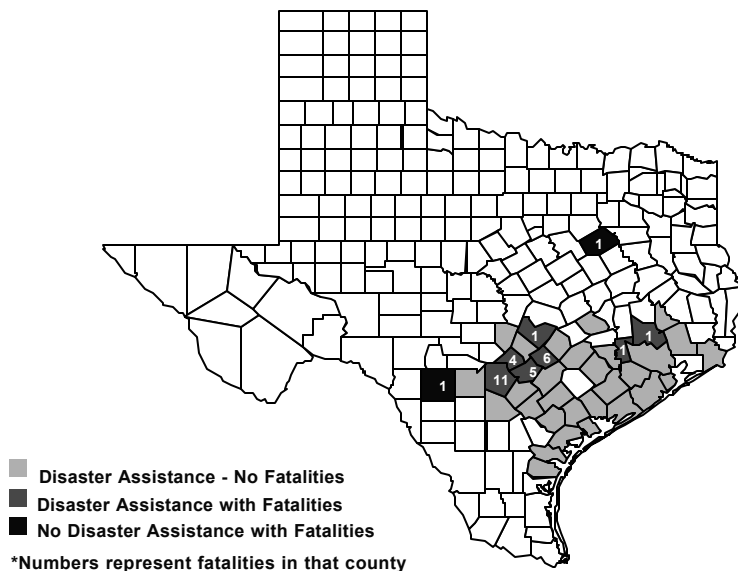
Figure 2 shows the age for all victims. Decedents ranged in age from 2 months to 83 years. Among the 31 decedents, males outnumbered females (20 [65%] to 11 [35%]). All 31 decedents were White, with 8 (26%) having Hispanic surnames. Deaths occurred in 9 Texas counties, as illustrated in Figure 3. Figure 4 illustrates the declared disaster areas and fatalities by county.

**Figure 3. Deaths by County of Occurrence**



The circumstances surrounding the deaths were known for all but 2 cases. Twenty-two (76%) of the 29 cases with known circumstances occurred because a vehicle was driven into high water. These deaths occurred in 16 separate incidents. Four of these incidents resulted in multiple deaths (3 incidents resulted in 2 deaths each, and the fourth resulted in 4 deaths). Of the 16 water crossing incidents, 11 (69%) occurred at locations known to reporting authorities to have a history of flooding.

**Figure 4. Declared Disaster Areas with Numeric Representation of Fatalities per County**



The type of vehicle driven is known for all 16 of the water-crossing incidents. Of these 16 vehicles, 10 (63%) were trucks, and/or sport-utility-vehicles. The largest of these vehicles was a produce truck swept off of the road into the Olmos Dam reservoir. Twenty (91%) of the vehicle related deaths were due to drowning.

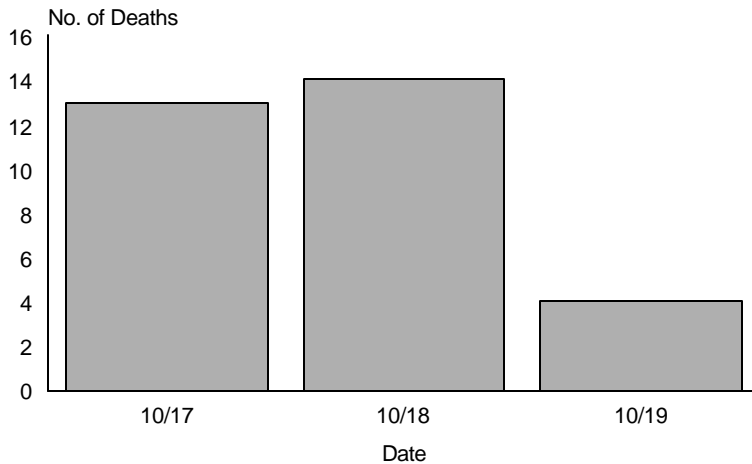
Seven (24%) of the 29 remaining deaths with known circumstances were not water-crossing incidents. Three individuals drowned in their homes (2 of these in the same incident), and 1 drowned near the boat dock on his property. Two cases resulted from tornado related trauma in Navarro and

Waller counties. One man died of a heart attack when the phone service was out and Emergency Medical Services were unable to reach his home because of flooding.

Figure 5 illustrates that most of the deaths (45% or 14/31) occurred on the second day of the storm.

Thirteen (42%) of the deaths occurred in the first day of the storm system (October 17, 1998). The last 4 deaths (13%) occurred on October 19. No deaths were reported after October 19, although rain and flooding persisted through October 31. Time of incident leading to death is known for 21 (72%) of the 29 cases with known circumstances. Nineteen (90%) of the deaths occurred within a 24-hour period, near the beginning of the storm, between 9:00 AM on October 17 to 9:00 AM on October 18. Seven (33%) of the 21 deaths occurred from midnight to 4:00 AM.

**Figure 5. Deaths by Date of Occurrence**



The South Central Texas region has historically been susceptible to damage and loss of life due to heavy rains. This period of flooding was the second most costly in terms of lives lost; 33 died in flooding August 1 through 4, 1978, and 29 died related to flooding during this storm period. This flood period was also the most costly: \$900 million compared with a previous record of \$110 million in 1978.

*Injury Epidemiology and Surveillance Program (512) 458-7266*