



**DEATHS
FROM EXPOSURE TO
EXCESSIVE NATURAL HEAT
OCCURRING IN ARIZONA**

1992-2009

Public Health Services
Bureau of Public Health Statistics
Health Status and Vital Statistics Section



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1992-2009**

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**DEATHS FROM EXPOSURE TO EXCESSIVE NATURAL HEAT OCCURRING IN
ARIZONA, 1992-2009**

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Purpose

Our special report, *Deaths from Exposure to Excessive Natural Heat Occurring in Arizona, 1992-2002* was published in March, 2004.¹ It attracted a wide audience well beyond Arizona's borders. Ever since its publication we have been receiving numerous inquiries when are we going to update it.

The purpose of the original report was to provide information concerning deaths from exposure to heat due to weather conditions occurring in Arizona. Unlike our other reports, designed to monitor health status of the residents of Arizona, this publication was focused on mortality occurring in the State to both residents and non-residents. The data for 2002 (the latest year with complete information then available) were placed in a temporal context by comparison with the data for the preceding ten years.

Instead of preparing a separate publication which would provide more recent information than 2002 we have decided to update and expand the original report. Since we are interested not only in the spatial pattern but also temporal changes in mortality from exposure to excessive natural heat, expanding the number of available "data points" (1992-2009) obviously matters.

Methods and Sources

Data on the number and characteristics of deaths from heat due to weather conditions were obtained from the mortality database containing information from the death certificates filed with the Arizona Department of Health Services.

The *International Classification of Diseases* (ICD) permits the classification of environmental events and circumstances as the external cause of injury death. Beginning with the 2000 data year in Arizona (1999 nationally) the Tenth Revision of the International Classification of Diseases (ICD-10) has replaced the Ninth Revision (ICD-9), which was in effect since 1979. Exposure to excessive natural heat as the underlying cause of death is identified by a three-character category

¹ This online report was followed by a brief article published in the Morbidity and Mortality Weekly Report, *Heat-Related Mortality-Arizona, 1993-2002, and United States, 1979-2002*. MMWR 54(25); 628-630. July 1, 2005. For a complete list of contributors see <http://emergency.cdc.gov/disasters/extremeheat/pdf/070105mmwr.pdf>.

X30 in the Tenth Revision and corresponding to it code E900.0 in the Ninth Revision. In this report, the deaths from exposure to heat due to weather conditions are classified by ICD-9 for 1992-1999 and by ICD-10 for 2000-2009. In addition to death certificates where exposure to excessive natural heat was indicated as the underlying cause of death, heatstroke or sunstroke may be reported on death certificates as contributing factors that had a bearing on the death, but were not its underlying cause. For example, heatstroke and sunstroke were mentioned in 2003-2009 on 103 Arizona death certificates where atherosclerotic cardiovascular disease (I25.0), respiratory disease (J449), diabetes (E149), or drug overdose/alcohol intoxication (X41-X44) were reported as the underlying cause of death. Those heat-related deaths are beyond the scope of this report.

Limitations of the Data

In this report we distinguish three groups at risk of death from exposure to excessive natural heat: *Arizona residents, visitors to Arizona from other U.S. states, Canada or Europe, and illegal immigrants crossing the Arizona's border with Mexico*.

These groups differ not only in size but also with regard to sociodemographic characteristics, such as age composition, gender, occupation, or race/ethnicity. One of the primary objectives in the comparative analysis of mortality is to measure the likelihood (or risk) of death in the specified population during a particular time. Mortality rates express the likelihood of death – the frequency of a vital event (such as death) in the numerator occurring to individuals in the denominator – and they are generally expressed as units of population in the denominator (per 1,000, 10,000, 100,000, and so forth). It is important to note that the risk of death expressed as mortality rate can only be computed for the residents of Arizona. Neither the number of visitors to Arizona during a calendar year, nor the number of illegal border crossers can be estimated with any precision.

The value of comparing the absolute number of deaths, rather than group-specific relative frequencies, ought not to be overestimated. On the other hand, from an epidemiological or public health viewpoint, the number of deaths from a rare cause may be of great importance even if the statistically reliable mortality rate cannot be computed.

Summary of Findings

- ✓ From 1992 to 2009, 1,485 deaths from exposure to heat due to weather conditions occurred in Arizona.
- ✓ The annual number of deaths due this cause increased from 10 in 1992 to 225 in 2005 and then declined sharply to 137 in 2006, 111 in 2007, and 85 in 2008. In 2009, the number of deaths from exposure to excessive natural heat increased to 110.
- ✓ The illegal immigrants crossing the Arizona's border with Mexico accounted for the majority of these deaths (666 or 44.9 percent). The vast majority (464, or 69.7 percent) of these deaths occurred in the eight years from 2000 to 2007.
- ✓ There were 646 deaths from exposure to excessive natural heat among the residents of Arizona (43.5 percent of the total), or 36 deaths on average per year in 1992-2009.
- ✓ Visitors to Arizona from other U.S. states, Canada or Europe experienced 95 deaths from exposure to heat due to weather conditions in 1992-2009.
- ✓ The state or country of residence of the sixty-eight decedents in 1992-2009 remains unidentified.
- ✓ Approximately seven out of every ten deaths from exposure to excessive natural heat in 1992-2009 were males, and 54.6 percent were Hispanic or Latino.
- ✓ In 1992-2009, ninety-five percent of all deaths from exposure to heat to weather conditions occurred during the five months from May through September.
- ✓ In 1992-2009, deaths from exposure to excessive natural heat among migrants to Arizona occurred at younger ages compared to deaths from natural heat among the State's residents. Young adults 20-44 years old accounted for 71 percent of deaths from exposure to excessive natural heat among the migrants from Mexico and other Central/South American countries.
- ✓ In contrast, older adults 65 years or older have been at the highest risk of heatstroke or sunstroke among the age groups of Arizona residents. Less than one percent of all deaths from natural heat among migrants were 65 years and older, while 37.2 percent of fatalities due to exposure to heat among Arizona residents were this old.
- ✓ In 1992-2009, the four counties along the southern border of Arizona (Cochise, Pima, Santa Cruz, and Yuma) accounted for 90.4 percent of deaths from excessive heat due to weather conditions among the illegal immigrants.
- ✓ In contrast, the centrally situated Maricopa County accounted for the majority of deaths from heat due to weather conditions among both the residents of Arizona (64.2 percent) and visitors from other States (47.4 percent).
- ✓ Unprecedented increase in the number of deaths from natural heat among migrants (from no fatalities in 1992, to 13 deaths reported in 1998 and 116 deaths in 2005) was likely to be linked to an increase in illegal immigrant traffic across Arizona's part of the U.S. – Mexico border.

✓ The increase in illegal immigrant traffic across Arizona's border is a good example of the "law of unintended effect": the result of a rather successful crackdown on illegal immigrants in Texas, New Mexico, and California. By 1998, there was a substantial decline in the number of arrests in the traditional illegal immigration corridors of these three states, while the Tucson sector of Arizona was to become **the busiest illegal-crossing corridor along the Southwest border**. Prior to 1998, the average annual mortality from exposure to heat among the illegal immigrants crossing the State's southern border did not exceed three deaths per year.

✓ The number of deaths from excessive natural heat among illegal immigrants declined by 57.8 percent from 116 in 2005 to 49 in 2006. It then increased to 67 in 2007 and decreased again to 30 in 2008. Tougher enforcement and a weaker U.S. economy have reduced the number of people trying to cross illegally from Mexico. In addition, Hispanics, unlike any other race/ethnic group in Arizona, faced in 2008 not only the economic recession (shared by all), but also other challenges such as the employer-sanction law (a penalty on employers hiring illegal immigrants), and a widespread practice of e-verify (checking the legal-residence status of those seeking employment). The attractiveness of Arizona as a destination for migrants was dramatically diminished resulting not only in the decrease in illegal immigrant traffic across the State's southern border but also in out-migration of illegal residents.

✓ The factors behind the gradual decline in the number of deaths from exposure to excessive natural heat among Arizona residents from 77 in 2005 to 33 in 2008 are not clear. The decrease may signify improved heat response plans targeting the homeless and those with prolonged outdoor exposures, as well as reinforced heat advisories and warnings with recommendation to minimize heat exposure. As Fuyuen Yip et al. note "prior to 2005, homeless shelters were customarily open in the evenings and were closed during the day. In 2006, a rule has been enforced in the Arizona Department of Health Services Heat Emergency Response Plan to provide cooling stations such as outdoor tents for people outdoors during extremely hot days. New public health guidance in the Arizona Emergency Heat Response Plan is also provided to employers with outdoor occupational settings to ensure that their employees receive adequate opportunity to rest from the heat, shift schedules to avoid working during the warmest periods of the day and to stay well hydrated".²



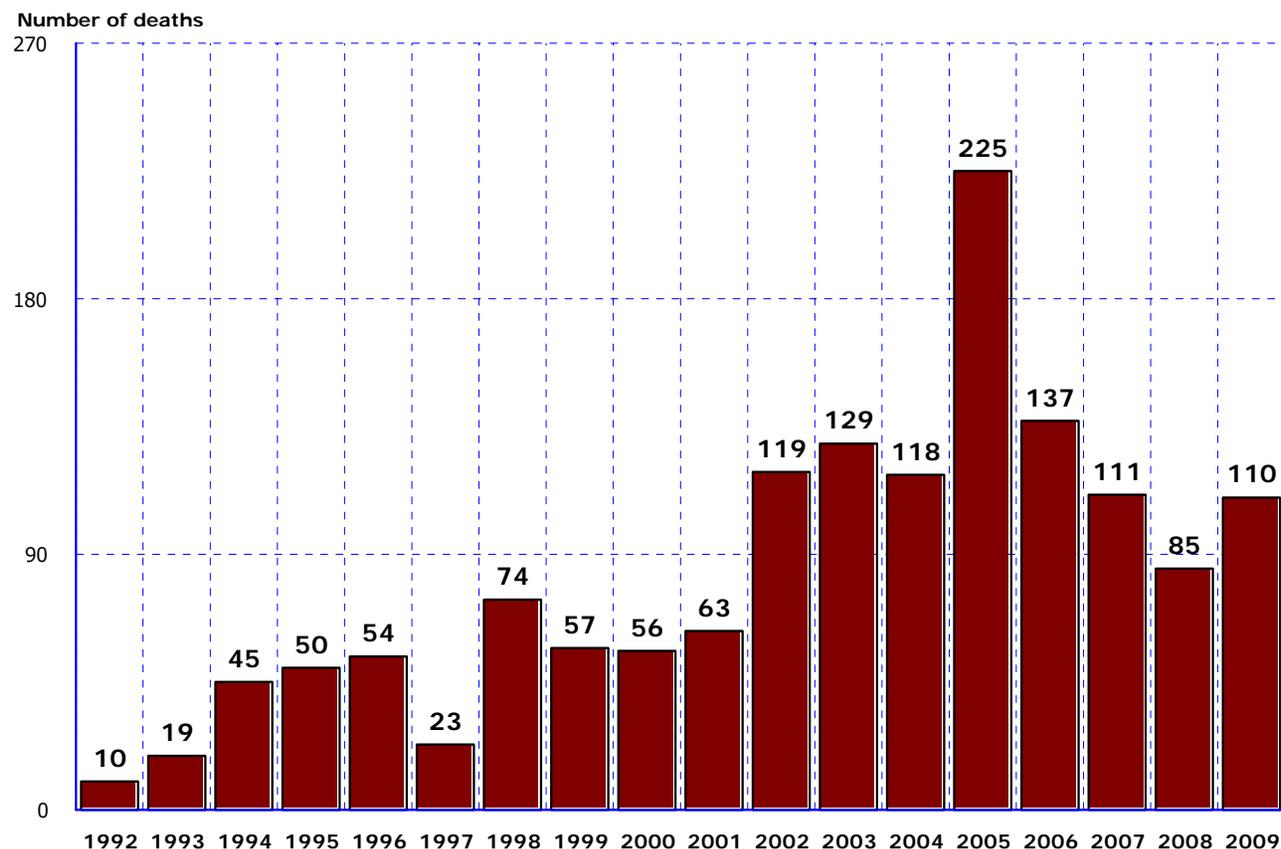
²Fuyuen Yip, W.D Flanders, A. Wolkin, D. Engelthaler, W. Humble, A. Neri, L. Lewis, L. Backer, C. Rubin: *Impact of Excess Heat Events in Maricopa County, Arizona: 2000-2005*. CDC: National Center for Environmental Health, Health Studies Branch, 2006.

Figure 1
DEATHS FROM EXPOSURE TO EXCESSIVE NATURAL HEAT*
OCCURRING IN ARIZONA BY YEAR, 1992-2009

In the eighteen-year period from 1992 to 2009, 1,485 deaths from exposure to excessive natural heat occurred in Arizona.

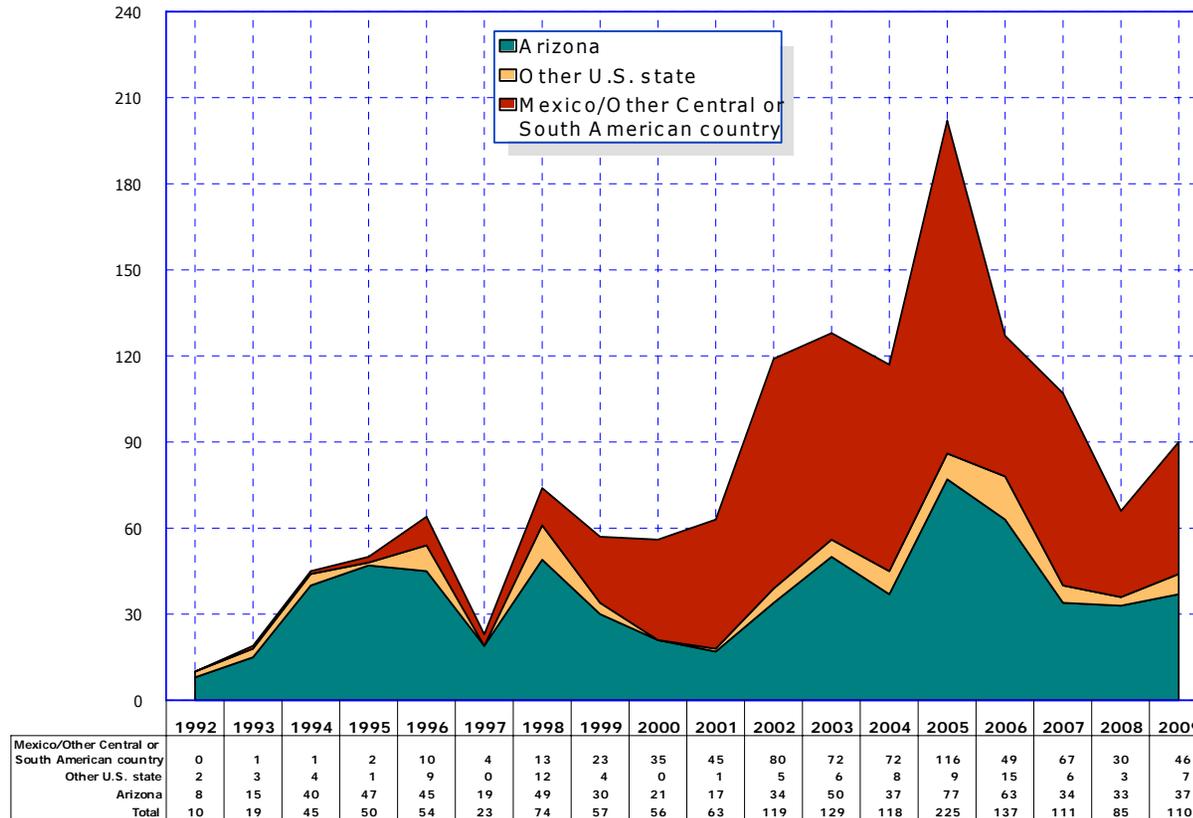
The number of deaths from exposure to excessive natural heat has shown a wide variation from year to year (low = 10 deaths in 1992, high = 225 deaths in 2005). On average, 82 people died every year from a heatstroke or sunstroke in 1992-2009 (**Figure 1, Table 1**).

Approximately seven out of every ten deaths from exposure to excessive natural heat in 1992-2009 were males (1,090/1,485 or 73.4 percent, **Table 1**), and 54.6 percent (811/1,485, **Table 1**) were Hispanic or Latino.



*The underlying cause of death was classified as E900.0 by ICD-9 (1992-1999) or as X30 by ICD-10 (beginning in 2000). Included are deaths occurring in Arizona from excessive heat due to weather conditions as the cause of heatstroke or sunstroke among both residents of Arizona and non-residents. Excluded are deaths due to excessive heat of man-made origin.

Figure 2
DEATHS FROM EXPOSURE TO EXCESSIVE NATURAL HEAT OCCURRING IN ARIZONA
BY STATE OR COUNTRY OF RESIDENCE AND YEAR, 1992-2009



From 1992 to 2009, the illegal immigrants crossing the Arizona's border with Mexico accounted for the majority of deaths (666 or 44.9 percent) from exposure to excessive natural heat. The vast majority (464, or 69.7 percent) of these deaths occurred in the eight years from 2000 to 2007.

There were 646 deaths from exposure to excessive natural heat among the residents of Arizona (43.5 percent of the total), or 36 deaths on average per year in 1992-2009.

Visitors to Arizona from other U.S. states, Europe or Canada experienced 95 deaths from exposure to heat due to weather conditions during the 1992-2009 period.

There was no dramatic climate change, which could explain this unprecedented increase in the number of Arizona deaths from natural heat among illegal immigrants (from no fatalities in 1992, to 13 deaths reported in 1998 and 116 deaths in 2005). Rather, the increase in mortality was likely to be linked to an increase in illegal immigrant traffic across Arizona's part of the U.S. - Mexico border. It is not unreasonable to assume, that it may have been to some extent the result of a rather successful crackdown on illegal immigrants in Texas, New Mexico and California. By 1998, the success³ of several border operations (Operation Gatekeeper in San Diego, Operation Hold the Line in El Paso, Operation Rio Grande in McAllen) effected a substantial decline in the number of arrests in the traditional illegal immigration corridors of these three states, while the Tucson sector of Arizona's border was to become "the busiest illegal-crossing corridor along the Southwest border"⁴. Prior to 1998, the average annual mortality from exposure to heat among the illegal immigrants crossing the State's southern border did not exceed three deaths per year.

*The underlying cause of death was classified as E900.0 by ICD-9 (1992-1999) or as X30 by ICD-10 (beginning in 2000). Included are deaths occurring in Arizona from excessive heat due to weather conditions as the cause of heatstroke or sunstroke among both residents of Arizona and non-residents. Excluded are deaths due to excessive heat of man-made origin.

³ http://en.wikipedia.org/wiki/Operation_Gatekeeper

http://en.wikipedia.org/wiki/United_States_Border_Patrol#El_Paso_Sector.27s_Operation_Hold_the_Line

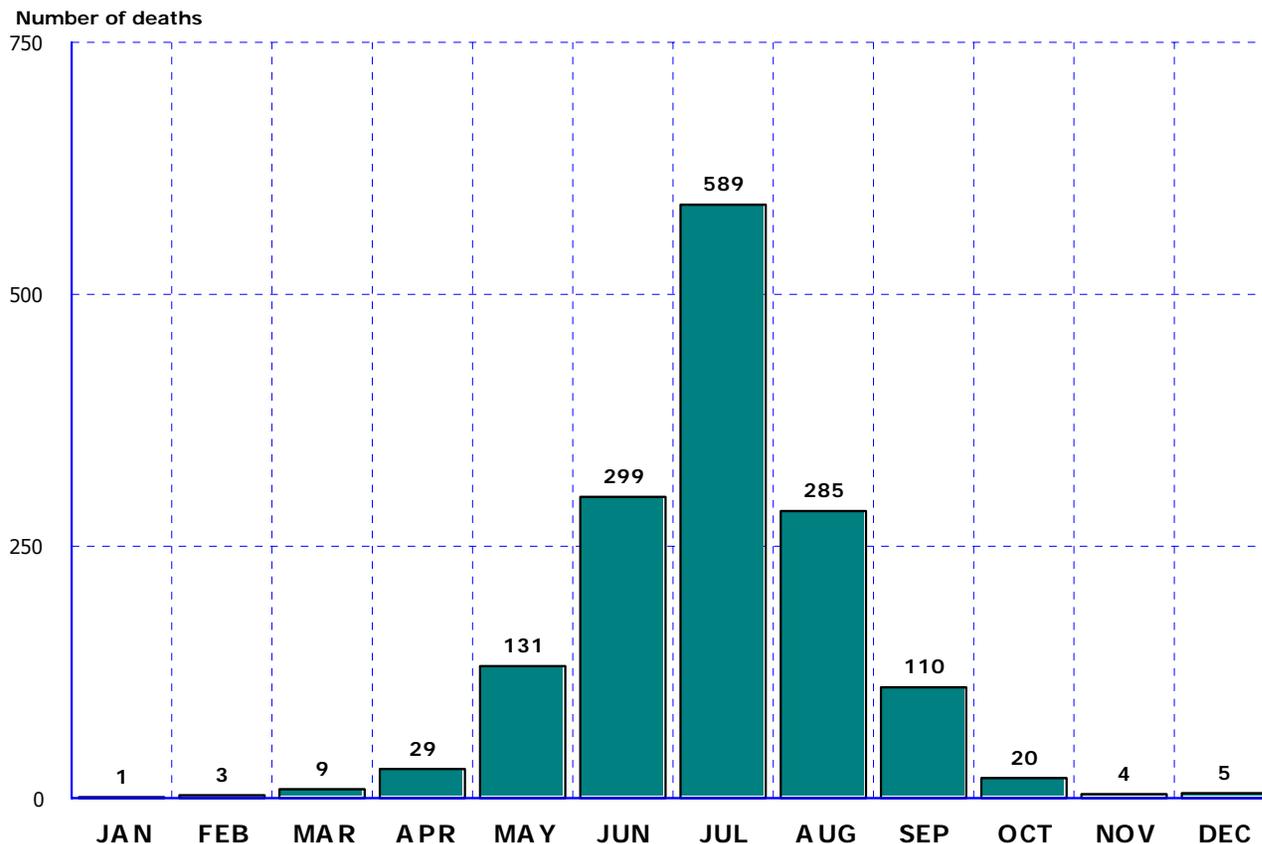
⁴ http://www.customs.gov/linkhandler/cgov/newsroom/congressional_test/bs_future/gilbert_testimony.ctt/gilbert_testimony.pdf

Figure 3
DEATHS FROM EXPOSURE TO EXCESSIVE NATURAL HEAT* OCCURRING IN ARIZONA
BY MONTH IN THE EIGHTEEN-YEAR PERIOD, 1992-2009

In Phoenix, Arizona, normal daily maximum temperature reaches $\geq 100^{\circ}$ F in early June and can remain at that level until mid-September. The historical data collected by the Western Regional Climate Center demonstrate that the temperature of 100° can be reached as early as March and continue through October.⁵ Temperatures exceeding 125° F have been observed in the desert area.

The authors of "*Impact of Excess Heat Events in Maricopa County, Arizona, 2000-2005*"⁶ rightly point out that in a desert environment such as Maricopa County where summer temperatures average 98° F – 107° F, a heat wave⁷ is a summer-long experience.

Not surprisingly, most deaths from excessive natural heat occurred during summer and late spring (Figure 3, Table 2, Table 3), with the highest number of deaths occurring during the month of July (589 in 1992-2009), followed by June (298), then August (285), May (131) and September (110). In 1992-2009, ninety-five percent of all deaths from exposure to heat to weather conditions occurred during the five months from May through September.



⁵ <http://www.wrcc.dri.edu/cgi-bin/cliicd.pl?az23183>

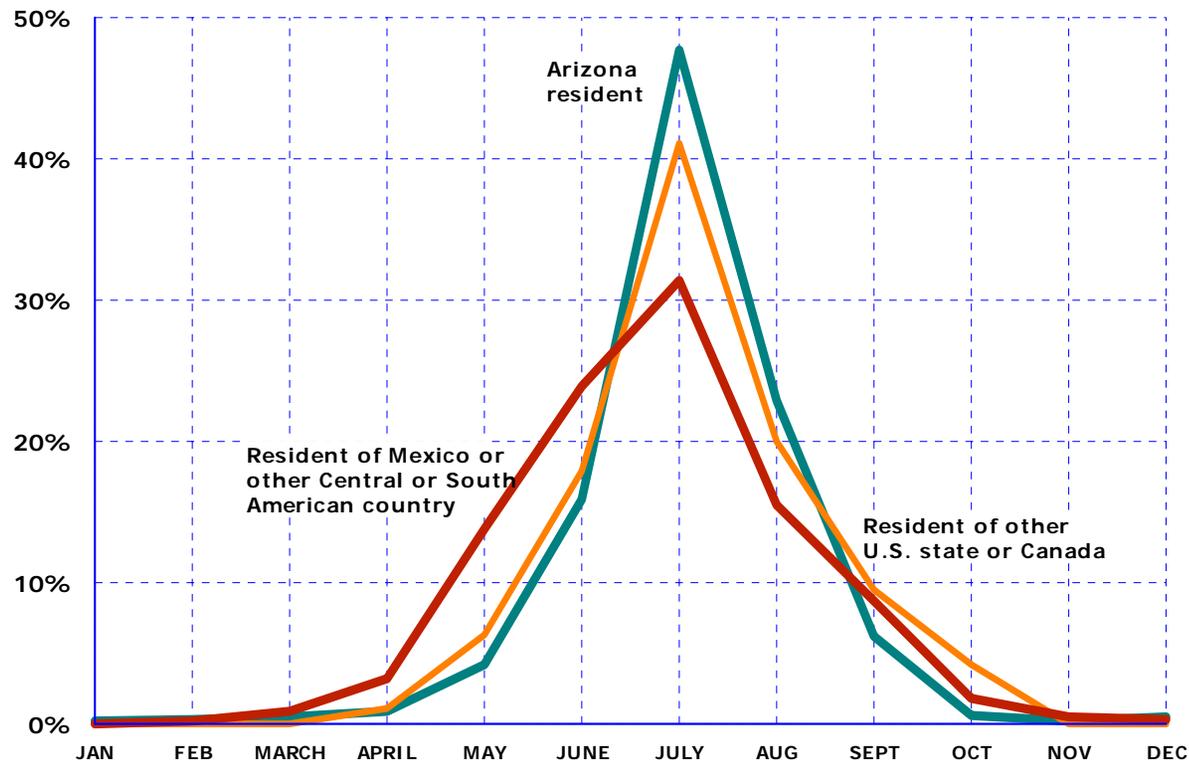
⁶ Fuyuen Yip, W.D Flanders, A. Wolkin, D. Engelthaler, W. Humble, A. Neri, L. Lewis, L. Backer, C. Rubin. CDC: National Center for Environmental Health, Health Studies Branch, 2006

⁷ Defined by the National Weather Service as three or more consecutive days of maximum temperatures $>90^{\circ}$ F

*The underlying cause of death was classified as E900.0 by ICD-9 (1992-1999) or as X30 by ICD-10 (beginning in 2000). Included are deaths occurring in Arizona from excessive heat due to weather conditions as the cause of heatstroke or sunstroke among both residents of Arizona and non-residents. Excluded are deaths due to excessive heat of man-made origin.

Figure 4
PERCENT DISTRIBUTION OF DEATHS FROM EXPOSURE TO EXCESSIVE NATURAL HEAT*
OCCURRING IN ARIZONA BY MONTH AND RESIDENCE STATUS IN THE EIGHTEEN-YEAR
PERIOD, 1992-2009

Percent of deaths in specified group:



*The underlying cause of death was classified as E900.0 by ICD-9 (1992-1999) or as X30 by ICD-10 (beginning in 2000).

Regardless of the residence status, most deaths from excessive natural heat occurred during the month of July (**Figure 4, Table 2**). Compared to the residents of Arizona there were substantially more deaths among migrants to Arizona in March–June, and September–October from 1992 through 2009. In contrast, the number of deaths from excessive natural heat among Arizona residents exceeded the number of deaths among illegal border crossers both in July and August.

The difference in the seasonal pattern of mortality may mean that fewer migrants attempted to cross the border in July and August, the two summer months with the highest temperatures (**Table 2**).

Figure 5
PERCENT DISTRIBUTION OF DEATHS FROM EXPOSURE TO EXCESSIVE NATURAL HEAT* OCCURRING IN ARIZONA BY AGE GROUP AND RESIDENCE STATUS IN THE EIGHTEEN-YEAR PERIOD, 1992-2009

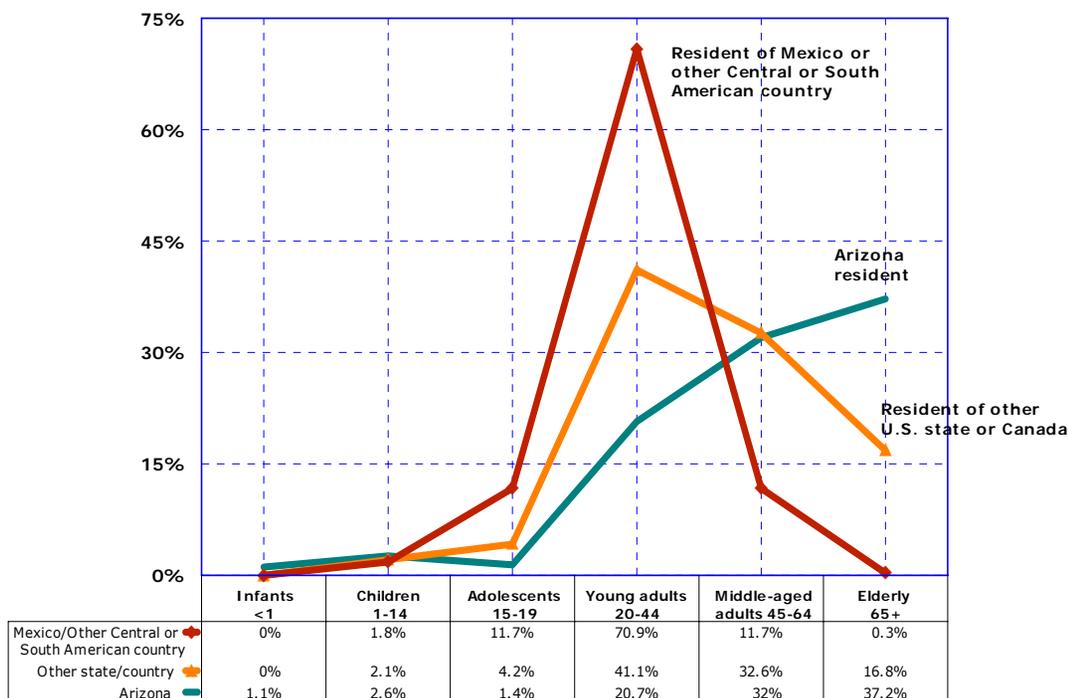
In 1992-2009, deaths from exposure to excessive natural heat among migrants to Arizona occurred at younger ages compared to deaths from natural heat among the State's residents (**Figure 5**). In fact, young adults 20-44 years old during 1992-2009 accounted for 71 percent of deaths from exposure to excessive natural heat among the migrants from Mexico and other Central/South American countries.

In contrast, older adults 65 years or older have been at the highest risk of heatstroke or sunstroke among the age groups of Arizona residents. Less than one percent of all deaths from natural heat among migrants were 65 years and older, while 37.2 percent of fatalities due to exposure to heat among Arizona residents were this old. In fact, deaths from excessive heat ranked sixth among the leading causes of accidental death for Arizona elderly 65 years or older in 1998-2008 (<http://www.azdhs.gov/plan/report/im/im08/2/pdf/2-9.pdf>).

Out of 646 death certificates of Arizona residents who died from exposure to excessive natural heat in 1992-2009, 554 provided injury location (e.g. home, parking lot, or desert).

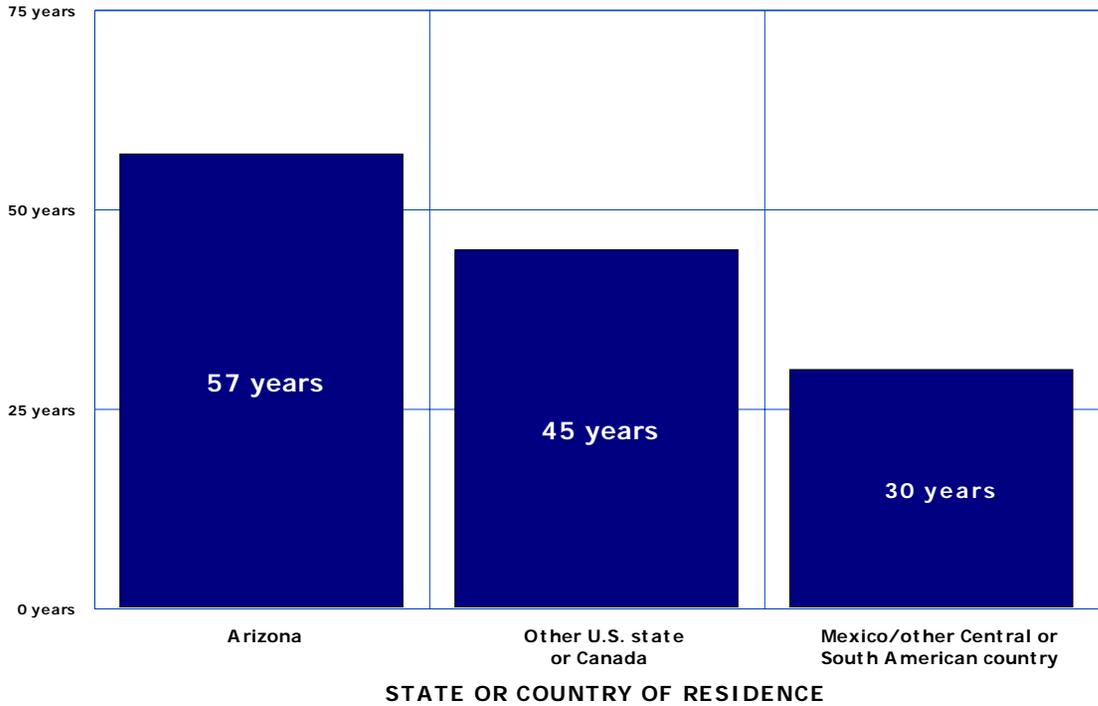
The number of death that occurred outdoors was 2.2 times greater than number of deaths indoors (381 vs. 173) The majority (75.1 percent) of outdoor deaths were <65 years of age. In contrast, 66.5 percent of at home deaths were among decedents 65 years or older.

Percent of deaths in specified group:



*The underlying cause of death was classified as E900.0 by ICD-9 (1992-1999) or as X30 by ICD-10 (beginning in 2000).

Figure 6
MEDIAN AGE AT DEATH FROM EXPOSURE TO EXCESSIVE NATURAL HEAT*
BY RESIDENCE STATUS, EIGHTEEN-YEAR SUMMARY FOR 1992-2009

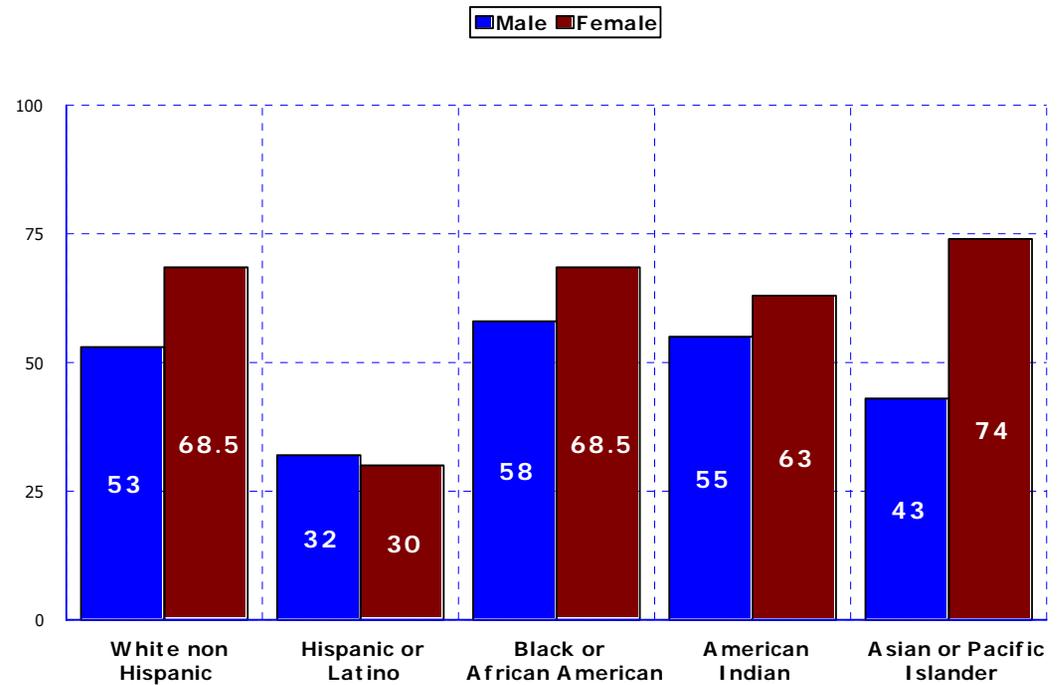


One out of two Arizonans who died from exposure to excessive natural heat in 1992-2009 was older than 57 years of age (**Figure 6, Table 5**).

In 1992-2009, compared to the residents of Arizona, on average visitors from other states were 12 years younger at the time of death, while illegal immigrants from Mexico/other Central or South American country were 27 years younger.

*The underlying cause of death was classified as E900.0 by ICD-9 (1992-1999) or as X30 by ICD-10 (beginning in 2000).

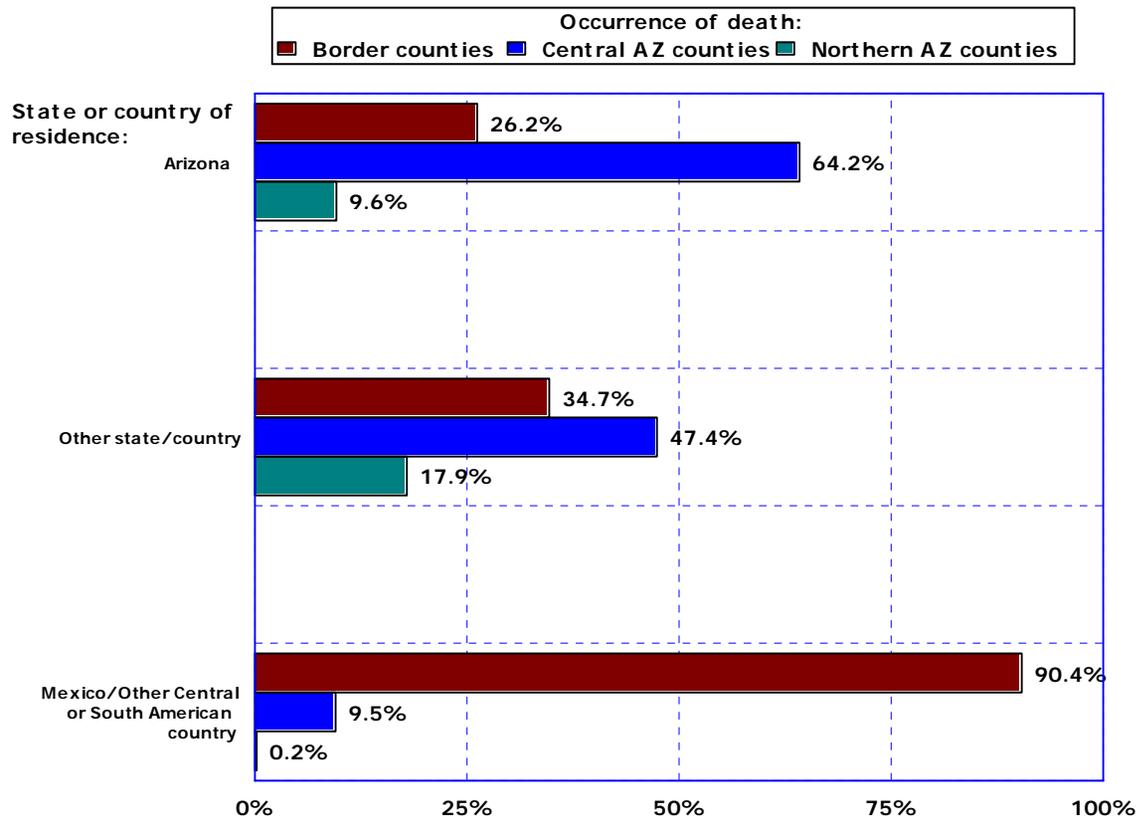
Figure 7
MEDIAN AGE AT DEATH FROM EXPOSURE TO EXCESSIVE NATURAL HEAT*
BY GENDER AND RACE/ETHNIC GROUP, EIGHTEEN-YEAR SUMMARY
FOR 1992-2009



In 1992-2009, Asian or Pacific Islander females ranked highest with median age at death from exposure to excessive natural heat at 74 years, exceeding by 44 years the median age at death for Hispanic or Latino females (Figure 7, Table 6).

*The underlying cause of death was classified as E900.0 by ICD-9 (1992-1999) or as X30 by ICD-10 (beginning in 2000).

Figure 8
PERCENT DISTRIBUTION OF DEATHS FROM EXPOSURE TO EXCESSIVE NATURAL HEAT*
BY RESIDENCE STATUS AND AREA OF OCCURRENCE IN ARIZONA
IN THE EIGHTEEN-YEAR PERIOD, 1992-2009



*The underlying cause of death was classified as E900.0 by ICD-9 (1992-1999) or as X30 by ICD-10 (beginning in 2000).

In 1992-2009, the four counties along the southern border of Arizona (Cochise, Pima, Santa Cruz, and Yuma) accounted for 90.4 percent of deaths from excessive heat due to weather conditions among the illegal immigrants (**Figure 8, Table 3**). In contrast, the centrally situated counties, primarily Maricopa, accounted for the majority of deaths from heat due to weather conditions among both the residents of Arizona (64.2 percent) and visitors from other States (47.4 percent).

The recent peak in mortality from exposure to excessive natural heat was in 2005. Among the 116 deaths of migrants, 104 occurred in Pima and Yuma counties, most of them in the remote desert areas of the Tohono O’Odham Nation (**Figure 9, next page**).

Case summaries of the 116 deaths of migrants to Arizona in 2005, including the geographic location of injury, the underlying cause of death, age, and gender of the deceased, are shown in **Table 7**.

Another map (**Figure 10**) reveals the spatial pattern of mortality from exposure to excessive natural heat among the 77 Arizona residents who died from this cause in 2005. Their case summaries are shown in **Table 8**. It is not surprising that the majority (66.2 percent) of resident deaths from exposure to excessive natural heat occurred in the Metropolitan Area of Phoenix-Scottsdale-Mesa, the largest population center in the State.

On five records shown in **Table 8** (72, 74-77) the state/country of the decedent’s residence was, most likely, misclassified as Arizona.

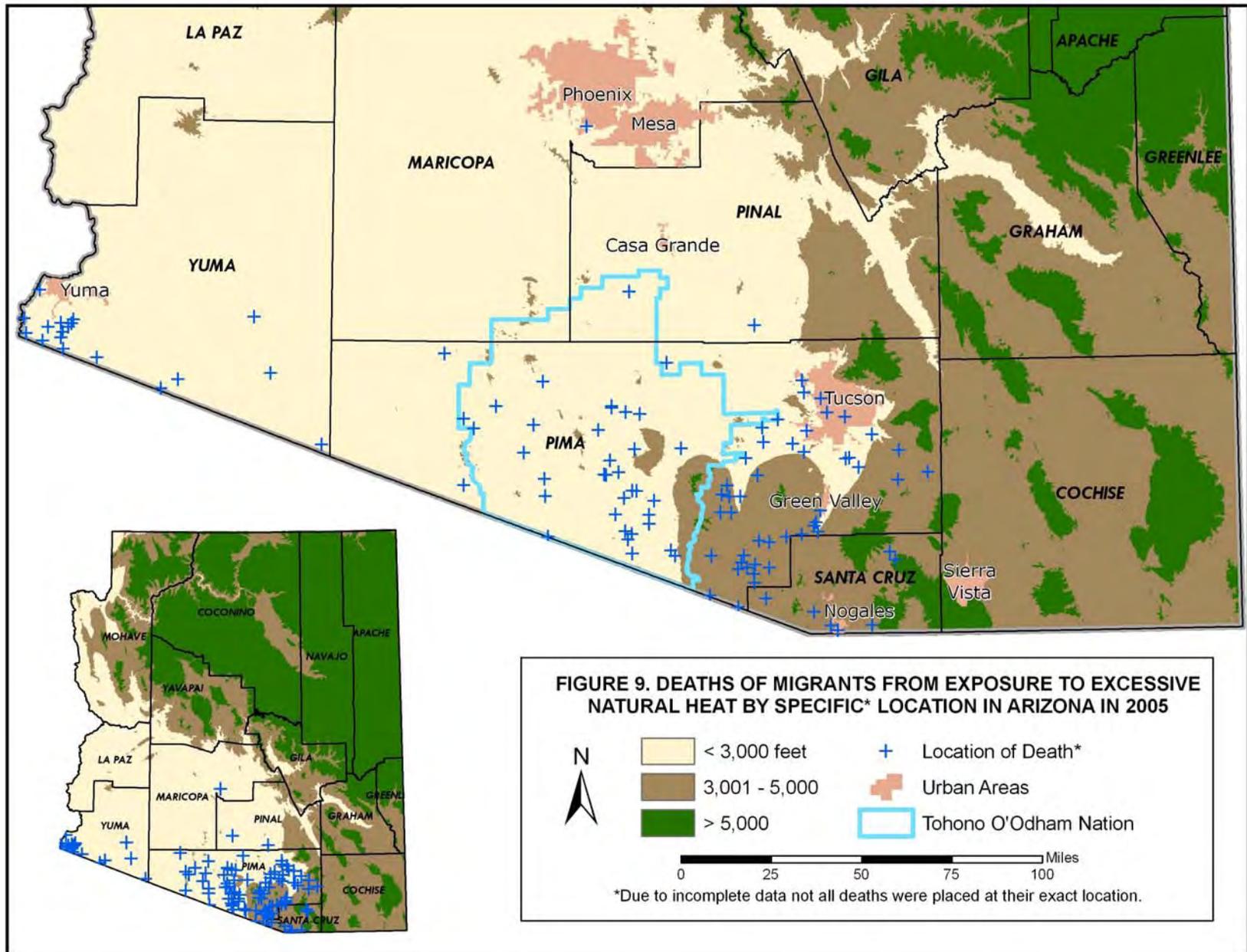
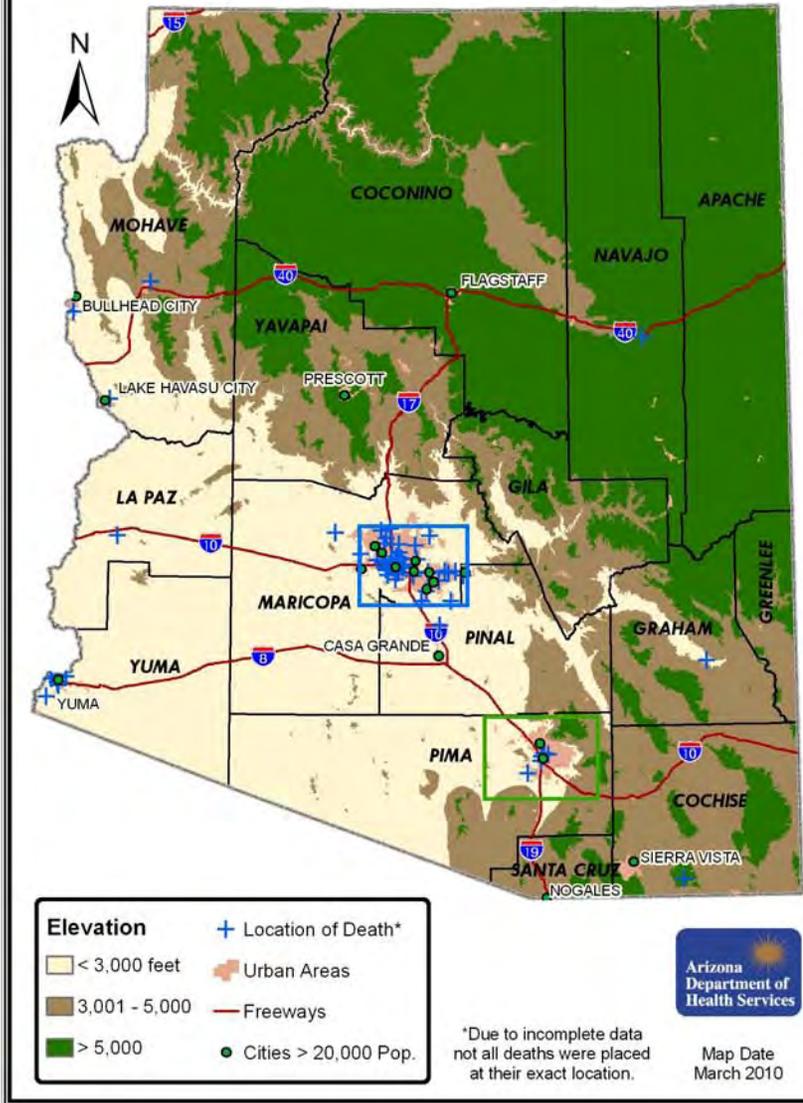
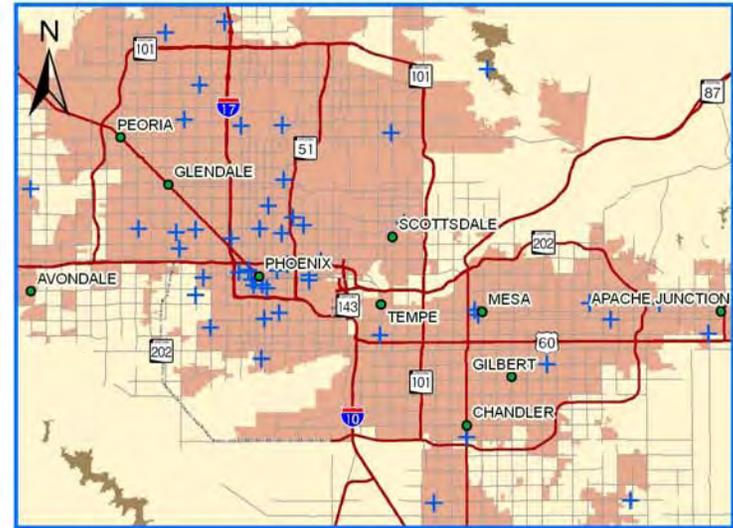


FIGURE 10. DEATHS OF ARIZONA RESIDENTS FROM EXPOSURE TO EXCESSIVE NATURAL HEAT BY SPECIFIC* LOCATION IN ARIZONA IN 2005



Metro Phoenix



Metro Tucson



Table 1
Characteristics of deaths from exposure to excessive natural heat occurring in Arizona by year, 1992-2009

		Total	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
Total		1,485	10	19	45	50	54	23	74	57	56	63	119	129	118	225	137	111	85	110	
State or country of residence	Arizona	646	8	15	40	47	35	19	49	30	21	17	34	50	37	77	63	34	33	37	
	Other U.S. State or Canada	95	2	3	4	1	9	0	12	4	0	1	5	6	8	9	15	6	3	7	
	Mexico/Other Central or South American country	666	0	1	1	2	10	4	13	23	35	45	80	72	72	116	49	67	30	46	
	Other	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9	0
	Unknown	68	0	0	0	0	0	0	0	0	0	0	0	0	1	1	23	10	3	10	20
Geographic region of occurrence	Border counties	855	5	6	13	22	16	9	24	28	38	48	86	89	77	153	72	67	42	60	
	Central Arizona counties	548	4	12	24	25	27	13	40	25	12	12	30	35	38	66	62	40	39	44	
	Northern Arizona counties	82	1	1	8	3	11	1	10	4	6	3	3	5	3	6	3	4	4	6	
Gender	Male	1,090	4	15	36	38	41	17	62	38	37	40	84	90	85	170	104	76	68	85	
	Female	394	6	4	9	12	13	6	12	19	19	23	35	39	33	55	33	35	17	24	
	Unknown	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Race/Ethnicity	White non-Hispanic	503	6	9	33	33	32	11	40	23	15	13	31	25	28	61	52	30	29	32	
	Hispanic or Latino	811	3	6	4	11	14	8	29	23	37	44	80	85	83	136	70	72	48	58	
	Black or African American	38	1	1	3	4	3	0	2	1	1	1	0	5	0	7	6	1	1	1	
	American Indian or Alaska Native	55	0	2	4	1	5	4	2	5	2	1	2	5	1	6	3	2	6	4	
	Asian or Pacific Islander	4	0	0	0	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	
	Unknown	74	0	1	1	0	0	0	0	1	5	1	4	5	8	6	14	6	6	1	15
Age group	0-4	21	0	1	1	0	1	1	1	0	0	0	0	0	4	3	3	1	2	3	0
	5-9	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	10-14	15	0	1	0	0	1	0	0	0	0	0	3	1	0	3	3	1	0	2	
	15-19	92	1	0	0	1	2	0	8	2	4	3	9	8	8	17	8	9	8	4	
	20-24	136	0	1	1	2	3	1	5	1	6	10	13	16	21	21	10	7	8	10	
	25-29	146	0	1	1	1	2	0	5	5	8	9	16	17	18	20	9	16	7	11	
	30-34	132	1	0	1	4	3	1	1	6	5	8	18	9	7	22	12	15	9	10	
	35-39	121	0	1	3	2	4	3	9	4	6	3	9	14	6	21	12	9	3	12	
	40-44	130	0	1	3	6	1	4	6	4	6	6	11	11	14	13	11	14	11	8	
	45-49	104	0	2	2	1	6	3	7	4	4	3	11	6	10	16	13	2	8	6	
	50-54	103	1	4	4	4	1	2	4	6	1	5	5	4	5	17	12	10	8	10	
	55-59	65	2	1	5	2	6	0	4	1	1	1	5	7	2	7	10	5	2	4	
	60-64	53	0	1	2	6	3	0	2	3	3	2	0	4	2	6	10	3	3	3	
	65-69	51	1	0	3	4	2	0	4	1	5	2	2	3	3	5	4	3	3	6	
	70-74	51	1	2	7	4	3	3	5	1	2	2	3	4	2	8	2	0	2	0	
	75-79	59	2	1	7	3	5	3	4	8	1	0	3	2	1	4	5	2	2	6	
	80-84	47	0	0	2	2	3	1	1	4	2	2	1	4	3	8	4	4	4	2	
85+	55	1	1	2	8	6	0	4	2	1	1	4	2	3	7	4	4	3	2		
Unknown	102	0	1	1	0	2	1	4	5	1	5	6	13	10	27	7	5	0	14		

Table 1
Characteristics of deaths from exposure to excessive natural heat occurring in Arizona by year, 1992-2009

		Total	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
County of occurrence	Apache	6	0	0	0	0	3	0	0	0	0	0	1	1	0	0	1	0	0	0
	Cochise	28	0	0	0	0	3	2	1	0	3	4	2	9	0	0	1	0	0	3
	Coconino	18	0	0	1	1	3	0	0	2	1	0	0	1	1	1	0	2	0	5
	Gila	2	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
	Graham	3	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0
	Maricopa	444	3	9	13	17	18	11	37	23	11	10	27	25	32	56	53	30	32	37
	Mohave	51	1	1	6	2	5	1	10	0	5	3	2	3	2	4	1	1	3	1
	Navajo	7	0	0	1	0	0	0	0	2	0	0	0	0	0	1	1	1	1	0
	Pima	624	2	5	10	12	7	4	11	11	26	37	75	65	57	116	50	54	34	48
	Pinal	67	1	2	7	5	1	1	0	0	1	2	3	9	5	8	4	8	6	4
	Santa Cruz	51	0	0	0	1	0	0	1	0	2	1	1	5	4	8	7	10	5	6
	Yavapai	11	0	0	1	1	4	0	0	1	0	0	0	1	0	0	1	0	0	2
	Yuma	152	3	1	3	9	6	3	11	17	7	6	8	10	16	29	14	3	3	3
La Paz	21	0	1	3	1	3	1	3	1	0	0	0	0	0	1	4	1	1	1	
Month of death	January	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	February	3	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0
	March	9	0	0	0	0	0	0	0	1	1	0	0	0	2	1	1	0	2	1
	April	29	1	0	1	0	0	0	0	2	0	5	1	3	7	2	3	2	2	2
	May	131	0	1	4	1	4	1	0	1	11	14	6	22	9	23	10	9	3	12
	June	299	0	6	13	2	15	2	7	17	15	17	37	18	20	20	35	31	35	9
	July	589	5	5	18	24	22	8	33	18	16	16	30	48	38	120	77	35	25	51
	August	285	4	7	6	19	8	8	26	10	7	7	22	29	30	30	11	23	13	25
	September	110	0	0	3	2	3	4	8	5	3	8	17	8	15	16	1	7	3	7
	October	20	0	0	0	2	0	0	0	4	0	0	0	3	0	4	0	3	1	3
	November	4	0	0	0	0	0	0	0	0	1	1	0	0	0	2	0	0	0	0
	December	5	0	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	1	0
Autopsy performed	No	492	3	5	18	25	27	6	24	23	18	13	27	33	29	131	51	20	15	24
	Yes	992	7	14	27	25	27	17	50	34	38	50	92	96	89	94	86	90	70	86

Table 2
Characteristics of Arizona Deaths from Exposure to Excessive Natural Heat by Residence Status,
Eighteen-year Summary for 1992-2009

		Total	State or country of residence				
			Arizona	Other U.S. State or Canada	Mexico/Other Central or South American country	Other	Unknown
Total		1,485	646	95	666	10	68
Year of death	1992	10	8	2	0	0	0
	1993	19	15	3	1	0	0
	1994	45	40	4	1	0	0
	1995	50	47	1	2	0	0
	1996	54	35	9	10	0	0
	1997	23	19	0	4	0	0
	1998	74	49	12	13	0	0
	1999	57	30	4	23	0	0
	2000	56	21	0	35	0	0
	2001	63	17	1	45	0	0
	2002	119	34	5	80	0	0
	2003	129	50	6	72	0	1
	2004	118	37	8	72	0	1
	2005	225	77	9	116	0	23
	2006	137	63	15	49	0	10
	2007	111	34	6	67	1	3
	2008	85	33	3	30	9	10
	2009	110	37	7	46	0	20
Gender	Male	1,090	487	68	474	8	53
	Female	394	159	27	192	2	14
	Unknown	1	0	0	0	0	1
Race/Ethnicity	White non-Hispanic	503	409	53	12	6	23
	Hispanic or Latino	811	129	27	637	2	16
	Black or African American	38	29	8	0	1	0
	American Indian or Alaska Native	55	51	4	0	0	0
	Asian or Pacific Islander	4	3	1	0	0	0
	Unknown	74	25	2	17	1	29
Age group	0-4	21	20	0	1	0	0
	5-9	2	2	0	0	0	0
	10-14	15	2	2	11	0	0
	15-19	92	9	4	78	1	0
	20-24	136	13	4	114	0	5

Table 2
Characteristics of Arizona Deaths from Exposure to Excessive Natural Heat by Residence Status,
Eighteen-year Summary for 1992-2009

		Total	State or country of residence				
			Arizona	Other U.S. State or Canada	Mexico/Other Central or South American country	Other	Unknown
	25-29	146	15	11	114	0	6
	30-34	132	22	11	97	1	1
	35-39	121	34	6	77	1	3
	40-44	130	50	7	70	1	2
	45-49	104	57	9	35	1	2
	50-54	103	65	7	28	1	2
	55-59	65	42	11	10	0	2
	60-64	53	43	4	5	0	1
	65-69	51	48	2	0	1	0
	70-74	51	46	3	1	0	1
	75-79	59	51	7	0	1	0
	80-84	47	43	3	0	1	0
	85+	55	52	1	1	1	0
	Unknown	102	32	3	24	0	43
Geographic region of occurrence	Border counties	855	169	33	602	0	51
	Central Arizona counties	548	415	45	63	9	16
	Northern Arizona counties	82	62	17	1	1	1
Month of death	January	1	1	0	0	0	0
	February	3	2	0	1	0	0
	March	9	3	0	6	0	0
	April	29	6	1	21	0	1
	May	131	27	6	92	0	6
	June	299	103	17	159	8	12
	July	589	308	39	209	0	33
	August	285	148	19	103	2	13
	September	110	40	9	58	0	3
	October	20	4	4	12	0	0
	November	4	1	0	3	0	0
	December	5	3	0	2	0	0
Autopsy performed	No	492	301	32	141	4	14
	Yes	992	345	63	524	6	54

Table 3
Characteristics of Arizona Deaths from Exposure to Excessive Natural Heat by Region,
Eighteen-year Summary for 1992-2009

		Total	Geographic region of occurrence		
			Border counties	Central Arizona counties	Northern Arizona counties
Total		1,485	855	548	82
Year of death	1992	10	5	4	1
	1993	19	6	12	1
	1994	45	13	24	8
	1995	50	22	25	3
	1996	54	16	27	11
	1997	23	9	13	1
	1998	74	24	40	10
	1999	57	28	25	4
	2000	56	38	12	6
	2001	63	48	12	3
	2002	119	86	30	3
	2003	129	89	35	5
	2004	118	77	38	3
	2005	225	153	66	6
	2006	137	72	62	3
	2007	111	67	40	4
	2008	85	42	39	4
	2009	110	60	44	6
Gender	Male	1,090	611	423	56
	Female	394	243	125	26
	Unknown	1	1	0	0
Race/Ethnicity	White non-Hispanic	503	124	323	56
	Hispanic or Latino	811	652	152	7
	Black or African American	38	9	29	0
	American Indian or Alaska Native	55	10	26	19
	Asian or Pacific Islander	4	1	3	0
	Unknown	74	59	15	0
Age group	0-4	21	3	18	0
	5-9	2	1	1	0
	10-14	15	12	2	1
	15-19	92	76	13	3
	20-24	136	114	17	5
	25-29	146	113	31	2
	30-34	132	101	27	4
	35-39	121	85	29	7
	40-44	130	72	55	3
	45-49	104	48	46	10
	50-54	103	41	57	5
	55-59	65	18	40	7

Table 3
Characteristics of Arizona Deaths from Exposure to Excessive Natural Heat by Region,
Eighteen-year Summary for 1992-2009

		Total	Geographic region of occurrence		
			Border counties	Central Arizona counties	Northern Arizona counties
	60-64	53	20	28	5
	65-69	51	12	34	5
	70-74	51	15	28	8
	75-79	59	10	41	8
	80-84	47	13	30	4
	85+	55	13	37	5
	Unknown	102	88	14	0
State or country of residence	Arizona	646	169	415	62
	Other U.S. State or Canada	95	33	45	17
	Mexico/Other Central or South American country	666	602	63	1
	Other	10	0	9	1
	Unknown	68	51	16	1
County of occurrence	Apache	6	0	0	6
	Cochise	28	28	0	0
	Coconino	18	0	0	18
	Gila	2	0	2	0
	Graham	3	0	3	0
	Maricopa	444	0	444	0
	Mohave	51	0	0	51
	Navajo	7	0	0	7
	Pima	624	624	0	0
	Pinal	67	0	67	0
	Santa Cruz	51	51	0	0
	Yavapai	11	0	11	0
	Yuma	152	152	0	0
	La Paz	21	0	21	0
Month of death	January	1	0	0	1
	February	3	2	0	1
	March	9	6	1	2
	April	29	23	6	0
	May	131	106	19	6
	June	299	198	85	16
	July	589	294	272	23
	August	285	139	122	24
	September	110	72	32	6
	October	20	11	7	2
	November	4	2	2	0
	December	5	2	2	1
Autopsy performed	No	492	230	215	47
	Yes	992	624	333	35

Table 4
Deaths from Exposure to Excessive Natural Heat by Geographic Region of Occurrence
in Arizona and Residence Status, Eighteen-Year Summary for 1992-2009

		Geographic region of occurrence			Total
		Border counties	Central Arizona counties	Northern Arizona counties	
State or country of residence	Arizona	169	415	62	646
	Other U.S. State or Canada	33	45	17	95
	Mexico/Other Central or South American country	602	63	1	666
	Other	0	9	1	10
	Unknown	51	16	1	68
Total		855	548	82	1,485

Table 5
Median Age at Death from Exposure to Excessive Natural Heat by Geographic Region of
Occurrence in Arizona and Residence Status, Eighteen-Year Summary for 1992-2009

		Geographic region of occurrence			Total
		Border counties	Central Arizona counties	Northern Arizona counties	
State or country of residence	Arizona	60.5	55.0	59.5	57.0
	Other U.S. State or Canada	33.0	49.0	49.0	45.0
	Mexico/Other Central or South American country	30.0	28.0	24.0	30.0
	Total	33.0	52.0	55.0	41.0

Table 6
Median Age at Death from Exposure to Excessive Natural Heat by Race/Ethnicity and Gender,
Eighteen-Year Summary for 1992-2009

Race/Ethnicity	Gender	Median age at death
White non-Hispanic	Male	53.0
	Female	68.5
	Total	57.0
Hispanic or Latino	Male	32.0
	Female	30.0
	Total	31.0
Black or African American	Male	58.0
	Female	68.5
	Total	59.0
American Indian or Alaska Native	Male	55.0
	Female	63.0
	Total	55.0
Asian or Pacific Islander	Male	43.0
	Female	74.0
	Total	58.0
Total	Male	41.0
	Female	39.0
	Total	41.0

Table 7
Deaths from Exposure to Excessive Natural Heat of the 116 Migrants to Arizona in 2005: Case Summaries

	Gender	Age	Place of injury as entered on the death certificate	Injury place description	City of death	Descriptive cause of death	Underlying cause of death ICD-10 code	Month of death
1	Female	16	N 32 24 674 W 112 54 868, AJO, AZ	DESERT	AJO	PROBABLE HYPERTHERMIA	X30	FEB
2	Male	35	N31.38.501 / W111.42.034, CHOULIC VILLAGE, AZ	DESERT	CHOULIC VILLAGE	HEAT STROKE	X30	MAR
3	Male	20	UNKNOWN	UNKNOWN	TUCSON	PROBABLE HYPERTHERMIA	X30	APR
4	Male	27	I-10 AND EMPIRITA RD, TUCSON, AZ	DESERT AREA	TUCSON	PROBABLE HYPERTHERMIA	X30	MAY
5	Female	32	AVE 1 1/2 E COUNTY 25TH, YUMA, AZ	DESERT	YUMA	HEAT EXPOSURE	X30	APR
6	Male	34	N 32 51 691 W 114 604.02, YUMA, AZ	DESERT	YUMA	EXPOSURE TO ENVIRONMENT HEAT	X30	APR
7	Female	39	N 32 27.923 W 114 36.515, YUMA, AZ	DESERT	YUMA	EXPOSURE TO ELEMENTS / HEAT	X30	APR
8	Male	27	SR 86 MP 107, SELLS, AZ	DESERT	SELLS	PROBABLE HYPERTHERMIA	X30	MAY
9	Male	39	.6 MILES SO HERMANS RD AND 1 MILE W/O, VAHALLARD, AZ	DESERT	TUCSON	HYPERTHERMIA	X30	MAY
10	Male	30	3 MI W/O MP 25, SR 286, ROBLES JUNCTION AZ	DESERT	ROBLES JUNCTION	HYPERTHERMIA	X30	MAY
11	Male	34	FR 34, MP 50, VAYA CHIN VILLAGE, AZ	DESERT	VAYA CHIN VILLAGE	HYPERTHERMIA	X30	MAY
12	Male	15	1/2M S/O HERMANS RD 1M W/O VAHALLA RD, TUCSON, AZ	UNKNOWN	TUCSON	HYPERTHERMIA	X30	MAY
13	Male	18	UNKNOWN	UNKNOWN	TUCSON	HYPERTHERMIA	X30	MAY
14	Female	32	3.7 MILES S/O FR 5 1/2 MILE W/O VILLAGE GUNSIGHT VILLAGE	DESERT	GUNSIGHT VILLAGE	HYPERTHERMIA	X30	MAY
15	Female	21	I-19, MP 34 1000 YDS W, GREEN VALLEY, AZ	DESERT	GREEN VALLEY	PROBABLE HYPERTHERMIA	X30	APR
16	Male	40	25 MS OF I8 29 E, YUMA, AZ	DESERT	YUMA	HEAT EXPOSURE	X30	MAY
17	Male	40	UNKNOWN	DESERT	TUCSON	COMPLICATIONS OF SEVERE HEAT STROKE	X30	JUN
18	Male	20	UNKNOWN	UNKNOWN	TUCSON	HYPERTHERMIA	X30	MAY
19	Male	37	2 M S/O SR 86,MP147, ROBLES JUNCTION, AZ	DESERT	ROBLES JUNCTION	HYPERTHERMIA	X30	MAY
20	Female	48	AVE 1E & COUNTY 23, YUMA, AZ	DESERT	YUMA	EXPOSURE TO THE ELEMENTS	X30	MAY
21	Male	19	ARIVACA RD 3 MI N/O MP 15, ARIVACA, AZ	DESERT	ARIVACA	HYPERTHERMIA	X30	MAY
22	Male	31	3/10 MILE W/O FR 30, MP1 CROW HANG VILLAGE, AZ	DESERT	CROW HANG VILLAGE	PROBABLE HYPERTHERMIA	X30	JUN
23	Female	61	COUNTY 10TH AVE F, YUMA, AZ	DESERT	YUMA	EXPOSURE TO THE ELEMENTS	X30	MAY
24	Male	42	UNKNOWN	DESERT AREA	KUKATEL VILLAGE	HYPERTHERMIA	X30	JUN
25	Male	31	UNKNOWN	DESERT AREA	TOPAWA VILLAGE	PROBABLE HYPERTHERMIA	X30	JUN
26	Male	33	3/4 MILE W/O 1-19 KM 53, GREEN VALLEY, AZ	DESERT	GREEN VALLEY	PROBABLE HYPERTHERMIA	X30	JUN
27	Male	38	7 MILES W/O MP8, ARIVACA RD, GREEN VALLEY, AZ	DESERT	GREEN VALLEY	PROBABLE HYPERTHERMIA	X30	JUN
28	Male	18	UNKNOWN	UNKNOWN	TUCSON	HYPERTHERMIA	X30	MAY
29	Male	37	N 32.25.174/W111.44.320, TUCSON, AZ	DESERT	TUCSON	HYPERTHERMIA	X30	MAY
30	Female	23	UNKNOWN	DESERT	TUCSON	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
31	Male	13	N 31.53.153/W 111.47.223, AL CHUKSON VILLAGE, AZ	DESERT	AL CHUKSON	HYPERTHERMIA	X30	JUL
32	Female	17	6 MI S/O PISINOMO VILLAGE, PISINOMO VILLAGE, AZ	DESERT	TUCSON	PROBABLE HYPERTHERMIA	X30	JUL
33	Female	18	2.1 MILES S/O VILLAGE, AK CHIN VILLAGE, AZ	DESERT	AK CHIN VILLAGE	PROBABLE HYPERTHERMIA	X30	JUL
34	Male	48	3 M NW/O VILLAGE, VAMORI VILLAGE, AZ	DESERT	VAMORI VILLAGE	PROBABLE HYPERTHERMIA	X30	JUL
35	Female	39	N 31.48.474/W 111.59.630, COWLIC VILLAGE, AZ	DESERT	SELLS	PROBABLE HYPERTHERMIA	X30	JUL
36	Male	28	HWY 86 MP 103, SELLS, AZ	DESERT WASH	SELLS	PROBABLE HYPERTHERMIA	X30	JUN
37	Male	39	1.2 MILE W/O VILLAGE, VAMORI VLG, AZ	DESERT	VAMORI VILLAGE	PROBABLE HYPERTHERMIA	X30	JUL
38	Male	32	6/5 MILES W/O SANDARIO RD AND GARCIA STRIP, TUCSON,AZ	DESERT	TUCSON	PROBABLE HYPERTHERMIA	X30	JUL
39	Female	21	4 MILES S/O VILLAGE, VAMORI VILLAGE, AZ	DESERT	VAMORI VILLAGE	PROBABLE HYPERTHERMIA	X30	JUL

Table 7
Deaths from Exposure to Excessive Natural Heat of the 116 Migrants to Arizona in 2005: Case Summaries

	Gender	Age	Place of injury as entered on the death certificate	Injury place description	City of death	Descriptive cause of death	Underlying cause of death ICD-10 code	Month of death
40	Male	26	N.31.55.729/W 111.28.026, SASABE, AZ	DESERT	SASABE	PROBABLE HYPERTHERMIA	X30	JUL
41	Male	45	UNKNOWN	UNKNOWN	ARIVACA	HYPERTHERMIA	X30	JUN
42	Female	35	N 31.89.105/W 111.48.734, ROBLES JUNCTION, AZ	DESERT	ROBLES JUNCTION	PROBABLE HYPERTHERMIA	X30	JUL
43	Female	14			SELLS	HYPERTHERMIA	X30	JUL
44	Male	24	UNKNOWN	DESERT	TUCSON	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
45	Female	26	N 31.28.317 W 111.16.369, NOGALES, AZ	DESERT	NOGALES	PROBABLE HYPERTHERMIA	X30	JUL
46	Female	37	N 31.39646/W 111.43.223, SELLS, AZ	DESERT	SELLS	PROBABLE HYPERTHERMIA	X30	JUL
47	Female	24	I-10 W/B MP 254, TUCSON, AZ	ROADWAY	TUCSON	HYPERTHERMIA	X30	JUL
48	Female	20	250 DUQUESNE RD, NOGALES, AZ	DESERT	NOGALES	PROBABLE HYPERTHERMIA	X30	JUL
49	Female	20	UNKNOWN	DESERT	TUCSON	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
50	Female	21	9.1 MILES E/O FR 19, MP 10, FRESNAL VILLAGE, AZ	DESERT	FRESNAL VILLAGE	PROBABLE HYPERTHERMIA	X30	JUL
51	Male	39	7850 N SILVERBELL RD, TUCSON, AZ	DESERT	TUCSON	HYPERTHERMIA	X30	JUL
52	Male	20	3000 W CAMINO KINO, GREEN VALLEY, AZ	DESERT	GREEN VALLEY	PROBABLE HYPERTHERMIA	X30	JUL
53	Female	18	5.2 MILES S/O PAPAGO FARMS, PAPAGO FARMS, AZ	DESERT	PAPAGO FARMS	HYPERTHERMIA	X30	JUL
54	Male	23	N31.44.075/W 111.4.079, ARIVACA, AZ	DESERT	ARIVACA	PROBABLE HYPERTHERMIA	X30	JUL
55	Male	55	N 32.05.916 W 113.22.169, YUMA, AZ	DESERT	YUMA	HEAT EXPOSURE AND DEHYDRATION	X30	JUL
56	Male	25	5.3 MILES SE/O VILLAGE, AK CHIN VILLAGE, AZ	DESERT	AK CHIN VILLAGE	PROBABLE HYPERTHERMIA	X30	JUN
57	Female	42	7 MILES E/O HWY 286 MP 8, ROBLES JUNCTION, AZ	DESERT	ROBLES JUNCTION	PROBABLE HYPERTHERMIA	X30	JUL
58	Male	32	1.9 MILES S/O VILLAGE, AK CHIN VILLAGE, AZ	DESERT	AK CHIN VILLAGE	HYPERTHERMIA	X30	JUL
59	Male	50	3 MILES S/O MP 8 ON ARIVACA RD, ARIVACA, AZ	DESERT	ARIVACA	PROBABLE HYPERTHERMIA	X30	JUL
60	Male	25	2.5 MILES E/O TEST 2, AJO WELL RD, AJO, AZ	DESERT	AJO	PROBABLE HYPERTHERMIA	X30	AUG
61	Male	31	UNKNOWN	UNKNOWN	RED ROCK	PROBABLE HYPERTHERMIA	X30	MAY
62	Male	27	16901 S OLD SONOITA HWY, VAIL, AZ	DESERT	VAIL	HYPERTHERMIA	X30	JUL
63	Male	46	FR 5, 6 MILES S/O SR 86, GUNSIGHT, AZ	DESERT	GUNSIGHT	PROBABLE HYPERTHERMIA	X30	AUG
64	Male	16	3E AND COUNTY 24, YUMA, AZ	DESERT	YUMA	HEAT EXPOSURE, DEHYDRATION	X30	JUL
65	Male	23	5.2 MILES NW/O SANDARIO RD, SR 86, ROBLES JUNCTION, AZ	DESERT	ROBLES JUNCTION	PROBABLE HYPERTHERMIA	X30	JUL
66	Male	16	5.6 MILES S/O SR 86 MP 101, SELLS, AZ	DESERT	SELLS	PROBABLE HYPERTHERMIA	X30	AUG
67	Male	38	32 35.405 N 113 41.522 W, YUMA, AZ	DESERT	YUMA	EXPOSURE TO ELEMENTS, HEAT	X30	JUL
68	Male	23	SR 286, MP 25, THREE POINTS, AZ	DESERT AREA	THREE POINTS	HYPERTHERMIA	X30	JUL
69	Male	14	5.6 MILES S/O SR 86, MP 101, SELLS, AZ	DESERT	SELLS	PROBABLE HYPERTHERMIA	X30	AUG
70	Male	24	N 31 42 072 W 111 05 349, NOGALES, AZ	DESERT AREA	NOGALES	HYPERTHERMIA	X30	JUL
71	Male	45	14500 W HERMAN'S RD, ROBLES JUNCTION, AZ	DESERT	ROBLES JUNCTION	PROBABLE HYPERTHERMIA	X30	JUL
72	Male	38			ARIVACA	PROBABLE HYPERTHERMIA	X30	JUL
73	Male	17	CD 18 1/2 & LEVY RD, YUMA, AZ	DESERT	YUMA	HEAT EXPOSURE	X30	JUL
74	Male	27	UNKNOWN	DESERT AREA	CUCKELBUR VILLAGE	HYPERTHERMIA	X30	JUL
75	Male	54	2.5 MILES S/O VILLAGE, TOPAWSA VILLAGE, AZ	DESERT	TOPAWA VILLAGE	HYPERTHERMIA	X30	SEP
76	Male	19	6 MILES E/O SR, MP 77, AJO, AZ	DESERT	AJO	PROBABLE HYPERTHERMIA	X30	SEP
77	Male	52	UNKNOWN	UNKNOWN	NOLK VILLAGE	HYPERTHERMIA	X30	SEP
78	Male	50	3 MILES W/O SR 286, MP 31, ROBLES JUNCTION, AZ	DESERT	ROBLES JUNCTION	PROBABLE HYPERTHERMIA	X30	JUL

Table 7
Deaths from Exposure to Excessive Natural Heat of the 116 Migrants to Arizona in 2005: Case Summaries

	Gender	Age	Place of injury as entered on the death certificate	Injury place description	City of death	Descriptive cause of death	Underlying cause of death ICD-10 code	Month of death
79	Male	23	4 MILES W/O SR 286, MP 34, ROBLES JUNCTION, AZ	DESERT	ROBLES JUNCTION	PROBABLE HYPERTHERMIA	X30	JUL
80	Female	25	4E & CO 19TH ST, YUMA, AZ	DESERT	YUMA	EXPOSURE TO THE ELEMENTS	X30	AUG
81	Male	30	32 34 847 N 114 33.25, YUMA, AZ	DESERT	YUMA	HEAT EXPOSURE	X30	AUG
82	Male	30	GPS 32 22.94 N 113 37.635 OUTSIDE YUMA CITY BY WELLTON	DESERT	YUMA	HEAT EXPOSURE	X30	AUG
83	Female	31	SR 86, MP 31, ROBLES JUNCTION, AZ	DESERT	ROBLES JUNCTION	PROBABLE HYPERTHERMIA	X30	JUL
84	Male	18	N 31.44.72 W 11.54.25, VAMORI VILLAGE, AZ	DESERT	VAMORI VILLAGE	PROBABLE HYPERTHERMIA	X30	SEP
85	Female	23	UNKNOWN	UNKNOWN	PHOENIX	MULTIORGAN FAILURE	X30	OCT
86	Male	18	UNKNOWN	UNKNOWN	NOGALES	HYPERTHERMIA	X30	SEP
87	Male	45	AVE 25E NEAR MEX US BORDER, WELLTON, AZ	DESERT	WELLTON	EXPOSURE TO ELEMENTS & HEAT	X30	AUG
88	Male	36	N 32.12.579 / W 111.52.705, SIL NAKYA VILLAGE, AZ	DESERT	SIL NAKYA VILLAGE	PROBABLE HYPERTHERMIA	X30	AUG
89	Male	23	3/4 MILE S/O SUNSHINE AND CURTIS RDS, SILVERBELL, AZ	DESERT	SILVER BELL	HYPERTHERMIA	X30	SEP
90	Male	29	2.5 MILES N/O ARIVACA RD MP 13, ARIVACA, AZ	DESERT	ARIVACA	HYPERTHERMIA	X30	JUL
91	Male	28	GPS N32.25.612 W 114.26.276, YUMA, AZ	DESERT	YUMA	EXPOSURE TO THE ELEMENTS (HEAT)	X30	AUG
92	Male	21	1E AND 19TH, YUMA, AZ	DESERT	YUMA	EXPOSURE TO THE ELEMENTS (HEAT)	X30	AUG
93	Male	37	1/2 M N/O MP 5.5 ARIVACA RD, ARIVACA, AZ	DESERT	ARIVACA	HYPERTHERMIA	X30	MAY
94	Male	35	2961 HIGHWAY 82, SONOITA, AZ	DESERT	SONOITA	PROBABLE HYPERTHERMIA	X30	SEP
95	Female	34	UNKNOWN	DESERT	TUCSON	PROBABLE HYPERTHERMIA	X30	JUL
96	Male	15	SR 30, 1/2 MILE S/O VILLAGE, COBABI VILLAGE, AZ	UNKNOWN	COBABI VILLAGE	PROBABLE HYPERTHERMIA	X30	JUL
97	Male	28	2 M W/O MP 12, SR 286, SASABE, AZ	DESERT	SASABE	EXPOSED TO HOSTILE ENVIRONMENT	X30	OCT
98	Female	41	SR 286 MP 25 SABABE, AZ	DESERT AREA	SASABE	PROBABLE HYPERTHERMIA	X30	MAY
99	Female	32	1.5 MILE W/O FR 20, MP 9, SELLS, AZ	DESERT	SELLS	PROBABLE HYPERTHERMIA	X30	JUL
100	Male	37	4 MILES E/O HWY 286, MP 37, ROBLES JUNCTION, AZ	DESERT	ROBLES JUNCTION	PROBABLE HYPERTHERMIA	X30	SEP
101	Male	53	ELEPHANT HEAD ROAD W/O I-19, GREEN VALLEY, AZ	DESERT	GREEN VALLEY	HYPERTHERMIA	X30	MAY
102	Male	42	N 32 32.8 W 114 40.35, YUMA, AZ	ALFALFA FIELD	YUMA	ENVIRONMENTAL HEAT EXPOSURE	X30	SEP
103	Male	27	1/2 MILE W/O FR 19, MP 26, SAN SIMON VILLAGE, AZ	DESERT	SAN SIMON VILLAGE	PROBABLE HYPERTHERMIA	X30	JUL
104	Male	57	UNKNOWN	DESERT AREA	AZ CITY	PROBABLE HYPERTHERMIA	X30	NOV
105	Male	46	N 31.54.279/W 111.53.740, SELLS, AZ	DESERT	SELLS	PROBABLE HYPERTHERMIA	X30	SEP
106	Male	34	5 MI W/O ARIVACA AND UNIVERSAL RANCH RDS, ARIVACA, AZ	DESERT	ARIVACA	HYPERTHERMIA	X30	AUG
107	Male	21	3.5 MILES SW/O SR 86, MP 105, BIG FIELDS, AZ	DESERT	BIG FIELDS	PROBABLE HYPERTHERMIA	X30	JUL
108	Male	27	UNKNOWN	DESERT AREA	NOGALES	HYPERTHERMIA	X30	JUL
109	Male	17	20TH ST AND AVE 3E, YUMA, AZ	DESERT	YUMA	PROBABLE HYPERTHERMIA	X30	AUG
110	Male	27	N 31.52.66 W 111.48.66, LITTLE TUCSON VILLAGE, AZ	DESERT	LITTLE TUCSSON VILLAGE	PROBABLY HYPERTHERMIA	X30	JUL
111	Male	50	N 32.09.892 W 112.03.556, COVERED WELLS VILLAGE, AZ	DESERT	COVERED WELLS VILLAGE	PROBABLE HYPERTHERMIA	X30	JUN
112	Female	32	1 MILE W/O MP 19 ARIVACA RD, AMADO, AZ	DESERT	AMADO	PROBABLE HYPERTHERMIA	X30	JUL
113	Male	43	ARIVACA RD MP 16.5, ARIVACA, AZ	DESERT	ARIVACA	PROBABLE HYPERTHERMIA	X30	JUL
114	Female	29	4 MILES NW/O MP 6 ON ARIVACA RD, ARIVACA, AZ	DESERT	ARIVACA	PROBABLE HYPERTHERMIA	X30	JUL
115	Male	32	N 31 37.308/W 110 40.989 DEGREES, SONITA, AZ	DESERT	SONOITA	PROBABLE HYPERTHERMIA	X30	SEP
116	Male	20	UNKNOWN	UNKNOWN	TUCSON	PROBABLE HYPERTHERMIA	X30	JUN

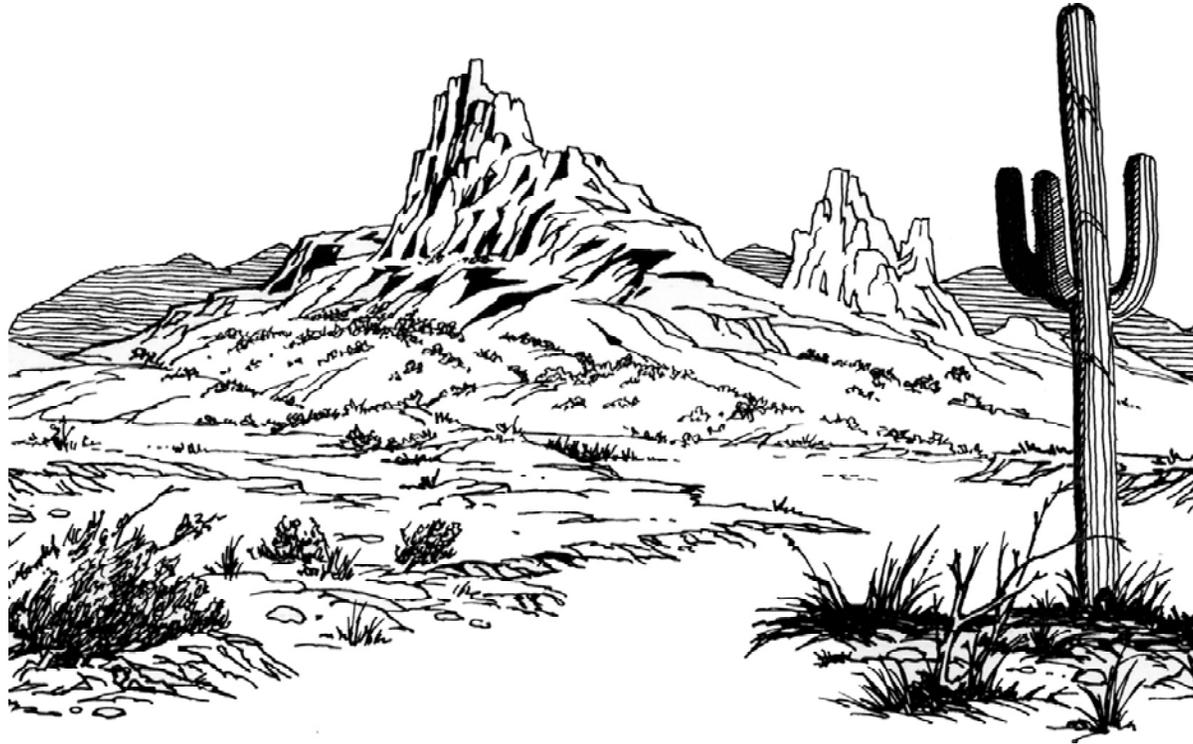
Table 8
Deaths from Exposure to Excessive Natural Heat of the 77 Arizona Residents in 2005: Case Summaries

	Gender	Age	Injury place description	City of death	Descriptive cause of death	Underlying cause of death ICD-10 code	Month of death
1	Female	61	HOME	TUCSON	COMPLICATIONS OF SEVERE HYPERTHERMIA	X30	APR
2	Male	43	PARK	GLENDALE	HYPERTHERMIA	X30	MAY
3	Female	76	DESERT AREA	PHOENIX	COMPLICATIONS OF ENVIRONMENTAL HEAT EXPOSURE	X30	JUN
4	Male	81	YARD	PHOENIX	COMPLICATIONS OF HYPERTHERMIA	X30	JUN
5	Male	32	FIELD	MESA	COMPLICATION OF HYPERTHERMIA	X30	JUN
6	Male	76	RESIDENCE	PHOENIX	HYPERTHERMIA	X30	JUL
7	Female	89	PARKING LOT	MESA	COMPLICATIONS ASSOCIATED WITH HYPERTHERMIA	X30	JUL
8	Female	90	UNKNOWN	PHOENIX	COMPLICATIONS ASSOCIATED WITH HYPERTHERMIA AND	X30	JUL
9	Female	1	PARKING LOT	PHOENIX	HYPERTHERMIA	X30	JUL
10	Male	51	SIDEWALK	PHOENIX	COMPLICATIONS OF HYPERTHERMIA AND THERMAL INJURIES	X30	JUL
11	Male	54	UNKNOWN	PHOENIX	COMPLICATIONS OF ACUTE LOBAR	X30	JUN
12	Male	50	SIDEWALK	PHOENIX	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
13	Male	66	RESIDENCE	PHOENIX	HYPERTHERMIA	X30	JUL
14	Male	64		TUCSON	HEAT STROKE	X30	JUL
15	Female	42	STREET	TUCSON	HYPERTHERMIA	X30	JUL
16	Female	68	RESIDENCE	PHOENIX	HYPERTHERMIA	X30	JUL
17	Male	71	DESERT AREA	SURPRISE	COMPLICATIONS OF HYPERTHERMIA AND DEHYDRATION	X30	JUL
18	Male	53	YARD	CHANDLER	HYPERTHERMIA	X30	JUL
19	Male	50	UNKNOWN	PHOENIX	ENVIRONMENTAL EXPOSURE	X30	JUL
20	Male	71	RESIDENCE	GLENDALE	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
21	Male	92	RESIDENCE	MESA	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
22	Male	81	YARD	SCOTTSDALE	HEAT EXPOSURE AND UNDERLYING ARTERIOSCLEROTIC	X30	JUL
23	Female	71	RESIDENCE	PHOENIX	COMPLICATIONS OF ENVIRONMENTAL HEAT EXPOSURE	X30	JUL
24	Male	86	ROOF OF A RESIDENCE	HOLBROOK	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
25	Male	51	CARPORT	MESA	HYPERTHERMIA	X30	JUL
26	Female	83	RESIDENCE	SUN LAKES	HYPERTHERMIA	X30	JUL
27	Female	35	RESIDENCE	PHOENIX	HYPERTHERMIA AND DEHYDRATION	X30	JUL
28	Male	89	RESIDENCE	GLENDALE	OLD AGE	X30	JUL
29	Male	52	YARD	PHOENIX	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
30	Male	90	RESIDENCE	PHOENIX	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
31	Male	35	ALLEY	PHOENIX	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
32	Male	52	FIELD	PHOENIX	HYPERTHERMIA AND NARCOTIC INTOXICATION	X30	JUL
33	Male	25	RESIDENCE	PHOENIX	HYPERTHERMIA AND METHAMPHETAMINE	X30	JUL
34	Male	88	DESERT	QUARTZSITE	EXPOSURE	X30	JUL
35	Male	50	FIELD	TUCSON	PROBABLE HYPERTHERMIA	X30	JUL
36	Male	66	PARK	PHOENIX	HYPERTHERMIA	X30	JUL
37	Male	45	STREET	PHOENIX	COMPLICATIONS OF ENVIRONMENTAL HEAT	X30	JUL
38	Male	41	PARKING LOT	PHOENIX	HYPERTHERMIA	X30	JUL
39	Female	1	PARKING LOT	SAFFORD	HYPERTHERMIA	X30	JUL

Table 8
Deaths from Exposure to Excessive Natural Heat of the 77 Arizona Residents in 2005: Case Summaries

	Gender	Age	Injury place description	City of death	Descriptive cause of death	Underlying cause of death ICD-10 code	Month of death
40	Male	42	STREET	PHOENIX	HYPERTHERMIA	X30	JUL
41	Male	70	PARK	PHOENIX	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
42	Male	38	UNKNOWN	PHOENIX	COMPLICATIONS OF HYPERTHERMIA	X30	AUG
43	Female	83	AT HOME	LAKE HAVASU CITY	HYPERTHERMIA	X30	JUL
44	Female	78	SIDEWALK	MESA	COMPLICATIONS ASSOCIATED WITH HEAT STROKE	X30	AUG
45	Male	57	FIELD	PHOENIX	COMPLICATIONS OF ENVIRONMENTAL HEAT	X30	JUL
46	Male	72	RESIDENCE	MESA	COMPLICATIONS OF ENVIRONMENTAL HEAT EXPOSURE	X30	JUL
47	Male	45	ALLEY	PHOENIX	COMPLICATIONS OF HYPERTHERMIA AND SUN EXPOSURE	X30	AUG
48	Female	68	HOME	KINGMAN	HYPERTHERMIA	X30	JUL
49	Male	66	BUSINESS	TEMPE	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
50	Male	49	YARD	PHOENIX	COMPLICATIONS OF HYPERTHERMIA	X30	JUL
51	Male	45	PARKING LOT	PHOENIX	HYPERTHERMIA	X30	JUL
52	Male	50	STREET	PHOENIX	COMPLICATIONS OF HYPERTHERMIA	X30	AUG
53	Male	48	WORK SITE	PHOENIX	ENVIRONMENTAL EXPOSURE	X30	AUG
54	Male	41		BULLHEAD CITY	HEAT STROKE	X30	AUG
55	Male	31	DESERT AREA	SCOTTSDALE	HYPERTHERMIA AND DEHYDRATION	X30	JUL
56	Male	70	HOME	YUMA	HEAT EXPOSURE	X30	JUL
57	Female	83	HOME	YUMA	HEAT RELATED DEATH	X30	JUL
58	Female	82	RESIDENCE	PHOENIX	HEAT EXPOSURE COMPLICATING UNDERLYING ARTERIOSCLEROTIC	X30	AUG
59	Male	59	OUTSIDE CONVENIENT STORE	TUCSON	HYPERTHERMIA	X30	AUG
60	Male	55	RESIDENCE	MESA	ENVIRONMENTAL HEAT EXPOSURE	X30	AUG
61	Male	59	HOUSE	SOMERTON	PROBABLE HEAT RELATED DEATH	X30	JUL
62	Male	63	HOME	YUMA	HEAT RELATED DEATH	X30	JUL
63	Male	83	HOME	YUMA	CARDIOPULMONARY FAILURE	X30	JUL
64	Male	51	UNKNOWN	PHOENIX	ENVIRONMENTAL EXPOSURE	X30	AUG
65	Female	4	PARKING LOT	PHOENIX	COMPLICATIONS OF ENVIRONMENTAL HEAT EXPOSURE	X30	SEP
66	Female	75	PARKING LOT	TUCSON	COMPLICATIONS OF ANOXIA ENCEPHALOPATHY	X30	SEP
67	Male	64	TENT CAMP	YUMA	HEAT EXPOSURE	X30	JUL
68	Male	40	CITY PARK	MESA	SEQUELAE OF HEAT STROKE	X30	OCT
69	Male	61	ROAD	YUMA	CARDIOPULMONARY ARREST	X30	AUG
70	Male	48	SIDEWALK	PHOENIX	HYPOXIC ENCEPHALOPATHY	X30	AUG
71	Male	71	STREET	PHOENIX	COMPLICATIONS OF HYPERTHERMIA	X30	NOV
72	Male	35	DESERT	ARIVACA	HYPERTHERMIA	X30	JUL
73	Male	83	NURSING HOME	YUMA	PNEUMONIA	X30	DEC
74	Male	NA	3 MI W/O ST, RT 286, MP 32, ROBLES JUNCTION, AZ	ROBLES JUNCTION	EXPOSURE TO HOSTILE ENVIRONMENT	X30	SEP
75	Male	NA	UNKNOWN	ARIVACA	PROBABLE HYPERTHERMIA	X30	JUL
76	Male	NA	DESERT	ARIVACA	HYPERTHERMIA	X30	JUN
77	Male	NA	DESERT	GREEN VALLEY	HYPERTHERMIA	X30	JUN

Our Web site at <http://www.azdhs.gov/plan> provides instantaneous access to a wide range of statistical information about health status of Arizonans. The *Arizona Health Status and Vital Statistics* annual report examines trends in natality, mortality, and morbidity towards established health objectives. Additional reports and studies include *Differences in the Health Status Among Race/Ethnic Groups*, *Advance Vital Statistics by County of Residence*, *Mortality from Alzheimer's Disease*, *Injury Mortality among Arizona Residents* (accidents, suicides, homicides, legal intervention, firearm-related fatalities, drug-related deaths, drowning deaths, falls among Arizonans 65 years or older), hospital inpatient and emergency room statistics for *mental disorders*, *asthma*, *diabetes*, *influenza and pneumonia* and *substance abuse*, *Community Vital Statistics*, *Teenage Pregnancy*, *Selected Characteristics of Newborns and Mothers Giving Birth by Census Tract* in Maricopa County, Pima County and South Phoenix Area, *Health Status Profile of American Indians in Arizona*, *Deaths from Exposure to Excessive Natural Heat Occurring in Arizona*, *Obesity in Arizona: Prevalence, Hospital Care Utilization, Mortality, and Marital Status and Health*.



**Health Status and Vital Statistics Section
Bureau of Public Health Statistics
PUBLIC HEALTH SERVICES
ARIZONA DEPARTMENT OF HEALTH SERVICES**