MARICOPA COUNTY DEPARTMENT OF PUBLIC HEALTH
DIVISION OF DISEASE CONTROL
OFFICE OF EPIDEMIOLOGY

HEAT-ASSOCIATED DEATHS IN MARICOPA COUNTY, AZ REPORT FOR 2011

July 2012

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- Maricopa County Office of the Medical Examiner (OME)
- Maricopa County Office of Vital Registration
- Arizona Department of Health Service, Office of Vital Registration
- National Weather Service (NWS)
- Maricopa Association of Governments (MAG)
- Local hospitals (infection preventionists, emergency departments, social worker staff)

Background

In July 2005, Maricopa County (MC) experienced exceptionally high temperatures that contributed to 45 deaths, 35 occurring over 9 consecutive days. Temperatures reached 116° F and three excessive heat warnings were issued during this month. To track these deaths, the Maricopa County Department of Public Health (MCDPH) created a novel and effective approach for surveillance of heat-associated deaths and has continued to use this system annually. The enhanced heat surveillance season begins in May and ends in October.

Method

Surveillance data is obtained from the following sources:

1. The Maricopa County Office of the Medical Examiner (OME) forwards suspected heat-related deaths to the MCDPH and provides data including demographics, preliminary information regarding how the death occurred, and the circumstances of death.

2. The Arizona Department of Health Services has a vital records database containing death certificates. MCDPH searches this database looking for causes of death associated with environmental heat. A Statistical Analysis Software (SAS) program looks for the key phrases and International Classification of Disease-10 (ICD-10) codes listed below.

Key Phrases
HEAT EXPOSURE
ENVIRON
EXHAUSTION
SUN
HEAT STRESS
HEAT STROKE
HYPERTHERMIA

ICD 10 Code	**Corresponding Definition**
X30	Exposure to excessive natural heat
T67.X	Effects of heat and light
P810	Environmental hyperthermia of newborn

3. Hospital and media reports can sometimes initiate a heat death investigation, for example, if a child is reportedly left in a hot car.

Once data are received, analysis of the information is required to identify only those deaths caused as a result of environmental heat. Environmental heat is heat generated by the climate (sun, humidity, etc.) rather than heat from man-made sources such as ovens or manufacturing equipment. Heat-associated deaths are categorized based on the classification criteria listed below:

> **Heat-caused (HC) deaths** are those in which environmental heat was directly involved in the sequence of conditions causing deaths. These are deaths where environmental heat terms were mentioned in Part I of the death certificate causes of death (diseases or conditions in the direct sequence causing death), for cause of death variables (*cod_a, cod_b, cod_c, or cod_d).* County of death: Maricopa.
>
> **Heat-related (HR) deaths** are those in which environmental heat contributed to the deaths but was not in the sequence of conditions causing these deaths. These are cases where environmental heat terms were mentioned in Part II of the death certificate causes of death (diseases and conditions contributing but not directly resulting in the death sequence), but not in any of the Part I death variables (*cod_a, cod_b, cod_c, or cod_d*). County of death: Maricopa.

Part I and Part II of the death certificate are as follows:

> **Part I of the death certificate:** *cod a* – is the immediate cause (final disease or condition resulting in death) *cod b, cod c, cod d* – are sequentially listed conditions leading to the cause listed on cod a.
>
> **Part II of the death certificate:** Other significant conditions contributing to death but not resulting in the underlying cause given in Part I.

For the purposes of this report, heat-caused and heat-related deaths are combined and referred to as "heat-associated deaths." Please note that most jurisdictions report only heat-caused deaths. This should be considered when comparing Maricopa County data with data from other locations.

Death certificate data, in combination with the OME notes, are used to produce the information that is contained in this report. Total case count, demographics, residency, drug/alcohol use, and years lived in Arizona are directly retrieved from death certificate data. Place of death, place of death occurrence, air conditioning use, and homelessness are retrieved based on explicit notations made in the death certificate and/or OME notes.

Homelessness is defined as having an address on the death certificate that matches a homeless shelter, government agency, business, or an intersection. Cases are also classified as homeless if there is an indication on the death certificate. If the address is listed as unknown on the death certificate then an examination of the medical examiner's notes is made to determine if there is a reference to an address - if none, then the person is classified as homeless. If the address is listed as out of jurisdiction then time spent in Arizona, as provided by the death certificate, is taken into consideration.

Once classification is completed, the data are summarized for the production and dissemination of reports. Reports are generated weekly during the season and posted to the MCDPH website which can be found at:

> http://www.maricopa.gov/publichealth/Services/EPI/Reports/heat.aspx

Results

Heat-Associated Deaths by Year

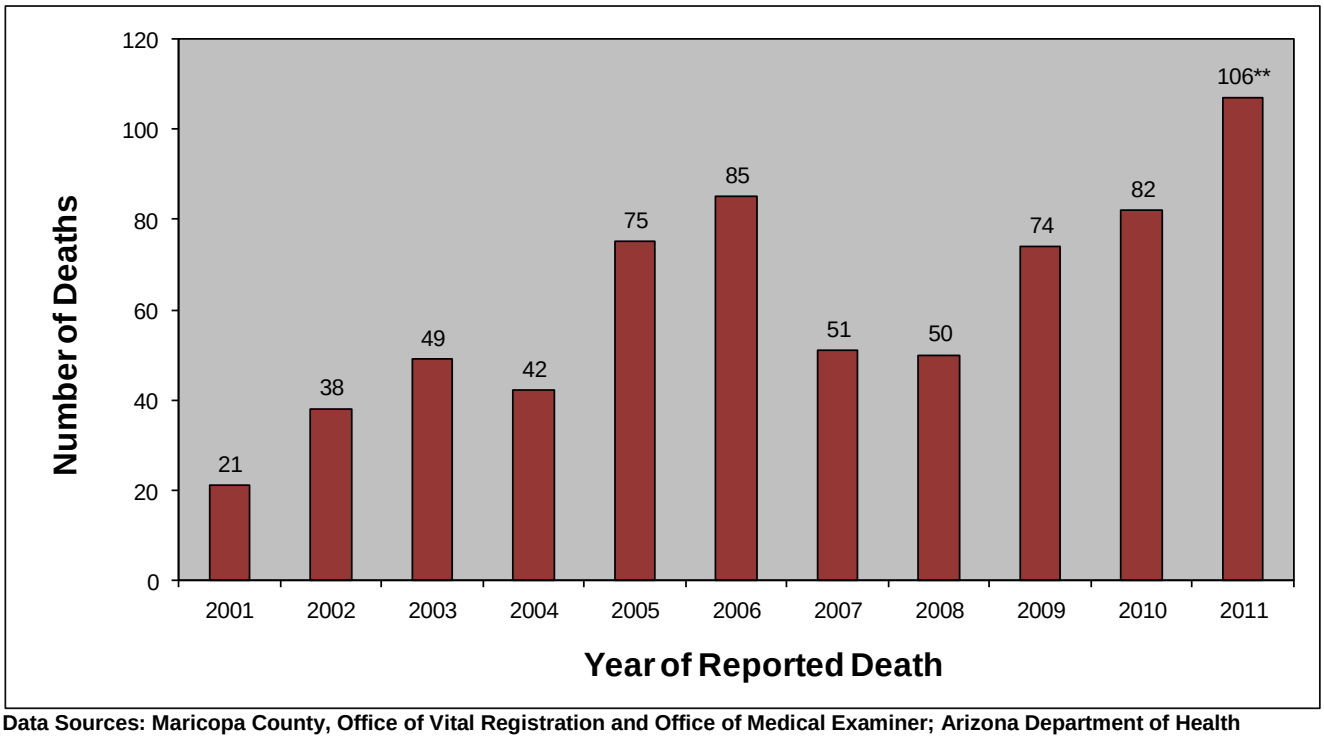
Table 1. On average, over 100 suspect heat-caused/heat-related deaths (heat-associated deaths) were investigated each year from 2006 through 2011 totaling 732 cases over the six year period. Of these cases, 61% were confirmed as being heat-associated deaths. In 2011, 74% of the investigated cases were also confirmed as heat-associated deaths.

Table 1. Heat-Associated Deaths Reported in Maricopa County: 2006-2011

Cases	2006	%	2007	%	2008	%	2009	%	2010	%	2011	%	TOTAL	%
Total Reported	104	100	131	100	97	100	114	100	142	100	144	100	732	100
Confirmed	85	83	51	39	50	52	74	65	82	58	106	74	448	61
Ruled Out	19	17	80	61	47	48	40	35	60	42	38	26	284	39

Graph 1. The number of heat-associated deaths confirmed in 2011 was 106, indicating the highest number of heat-associated deaths over ten years. The graph shows that after a decline in 2007 and 2008, heat mortality increased for three consecutive years. Cases increased from 2010 to 2011 by 29%.

Graph 1. Heat-Associated Deaths by Year, Maricopa County: 2001-2011*



Data Sources: Maricopa County, Office of Vital Registration and Office of Medical Examiner; Arizona Department of Health Services, Office of Vital Registration

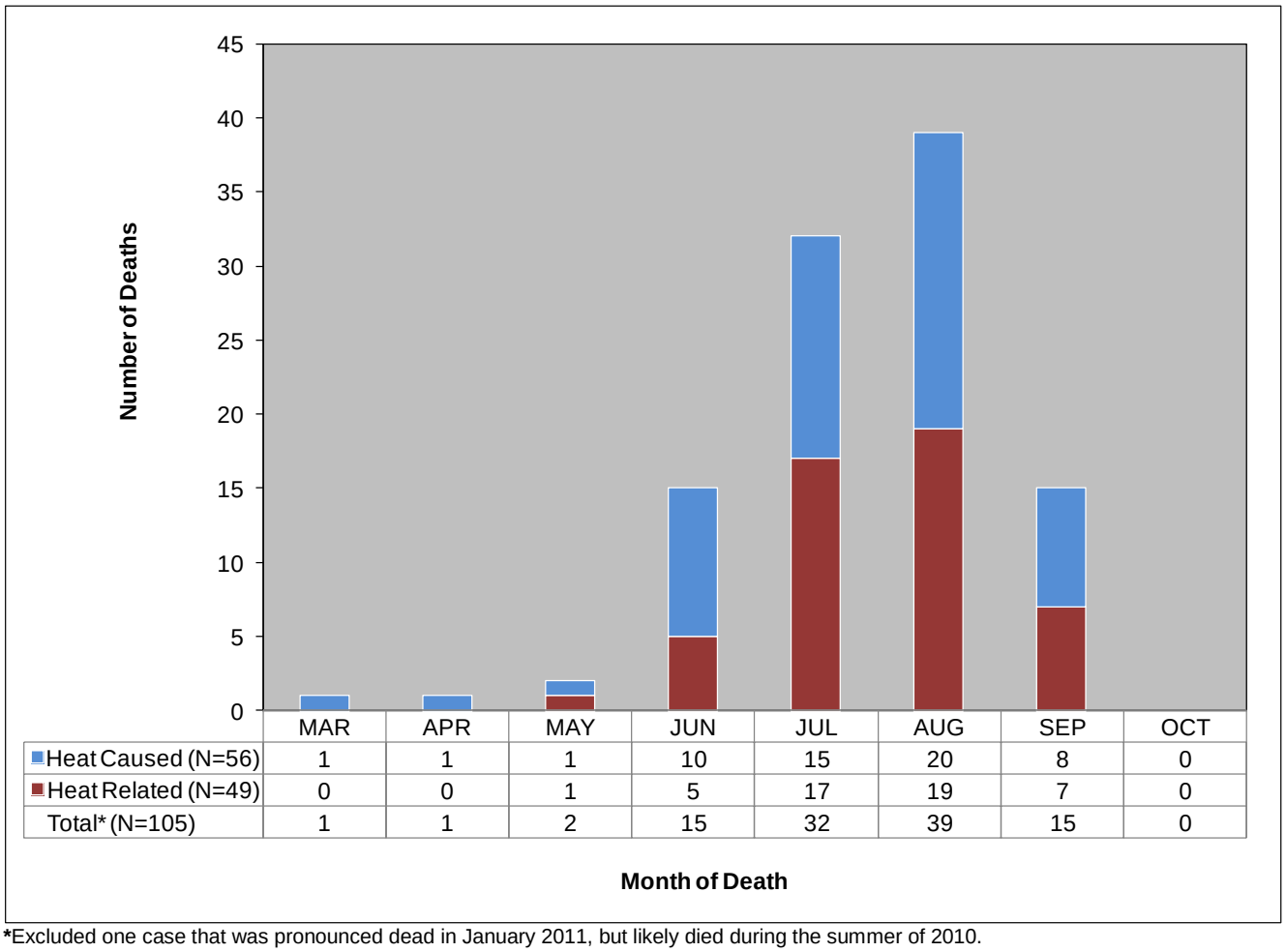
*The numbers reported here are for heat-associated deaths reported to MCDPH as of 7/18/2012

** Although included here, one case was excluded from further detailed analyses. This case was pronounced dead in January 2011, but likely died during the summer of 2010. For more information, please see the "Special Case" section at the end of this document.

Heat-Associated Deaths for Select Months, 2011

Graph 2. In 2011, August was the most deadly month for heat-associated deaths with more than a third of the year's 105 deaths occurring in this month. For the full year, the majority of deaths were classified as heat-caused (56, 53.3%), with the remainder classified as heat-related (49, 46.7%).

Graph 2. Heat-Associated Deaths by Month, Maricopa County, 2011



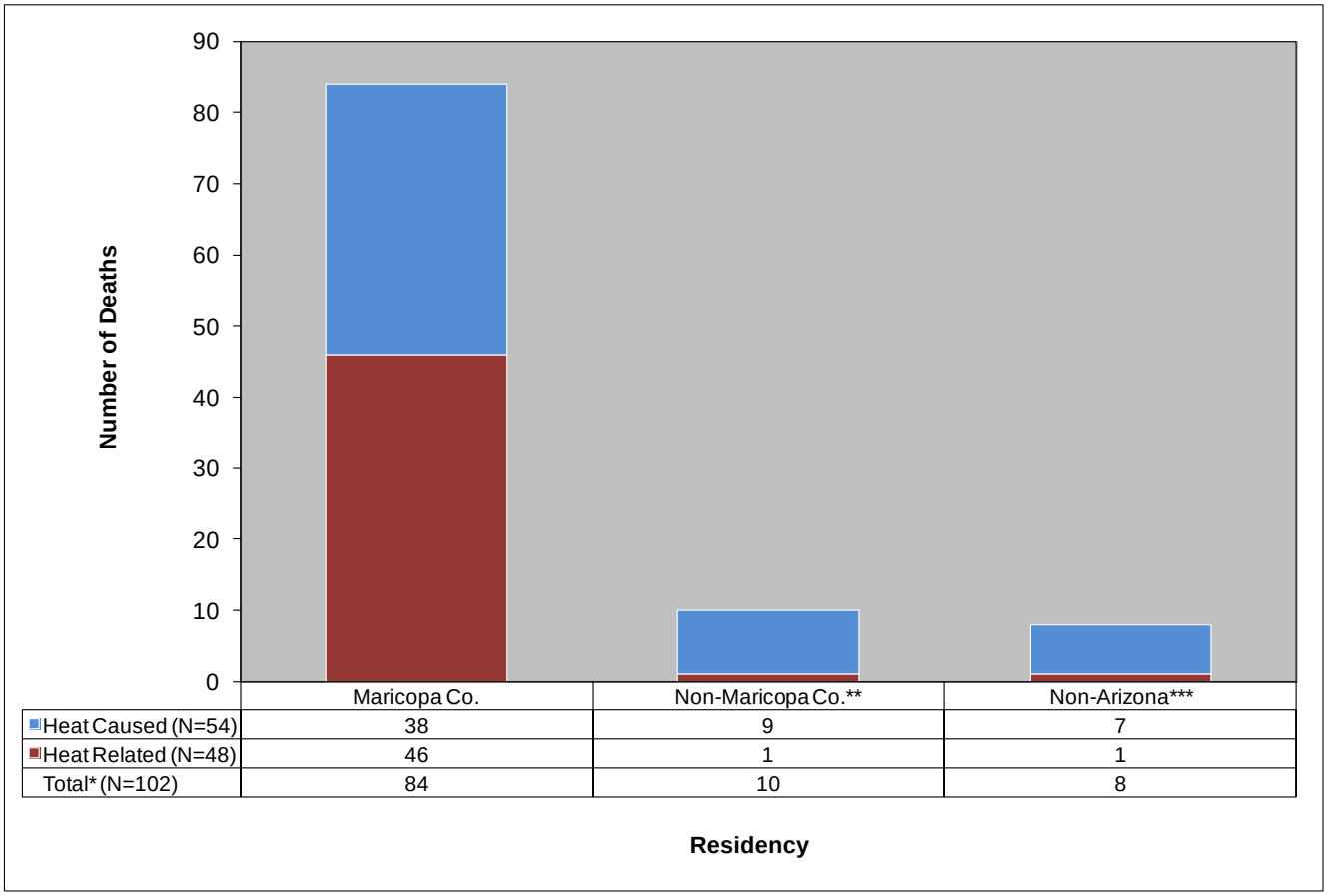
	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Heat Caused (N=56)	1	1	1	10	15	20	8	0
Heat Related (N=49)	0	0	1	5	17	19	7	0
Total* (N=105)	1	1	2	15	32	39	15	0

*Excluded one case that was pronounced dead in January 2011, but likely died during the summer of 2010.

Heat-Associated Deaths by Residency and Years Spent in Arizona

Graph 3. Residency was identified for 102 heat-associated deaths in 2011. (The three cases for which residency could not be established were excluded from this graph). Most of the cases (84, 82.4%) were Maricopa County residents. About ten percent of the 102 cases resided in an Arizona County other than Maricopa. Nearly eight percent of the 102 cases were residents of other states or countries.

Graph 3. Heat-Associated Deaths by Residency in Maricopa County, 2011

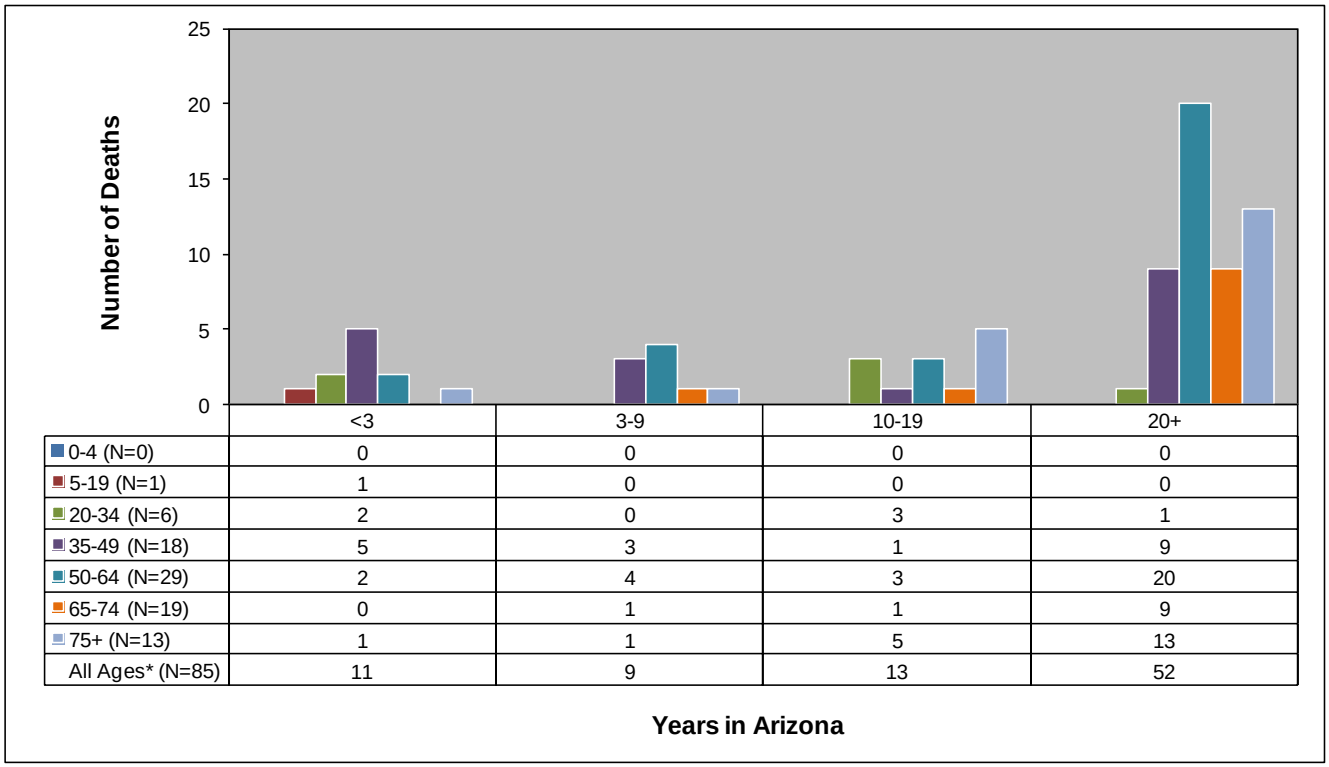


	Maricopa Co.	Non-Maricopa Co.**	Non-Arizona***
Heat Caused (N=54)	38	9	7
Heat Related (N=48)	46	1	1
Total* (N=102)	84	10	8

*Excludes three cases where residency could not be established, and one case that was pronounced dead in January 2011, but likely died during the summer of 2010.
**Non-Maricopa residents include Coconino (1) and other unidentified AZ counties (9)
***Non-Arizona residents include three US residents (KS, TX, WA) and five non-US residents (four from Mexico and one from Canada)

Graph 4. For cases where time spent in Arizona was known (85 decedents), 61% (52/85) resided in Arizona for 20 years or more. Additionally, the majority of decedents (74/85, 87%) had lived in Arizona for at least 3 years. This distribution is not directly related to age, as decedents from the various age groups can be seen in most of the "Years in Arizona" categories.

Graph 4. Heat-Associated Deaths by Years Lifetime Spent in Arizona and Age Group, Maricopa County, 2011



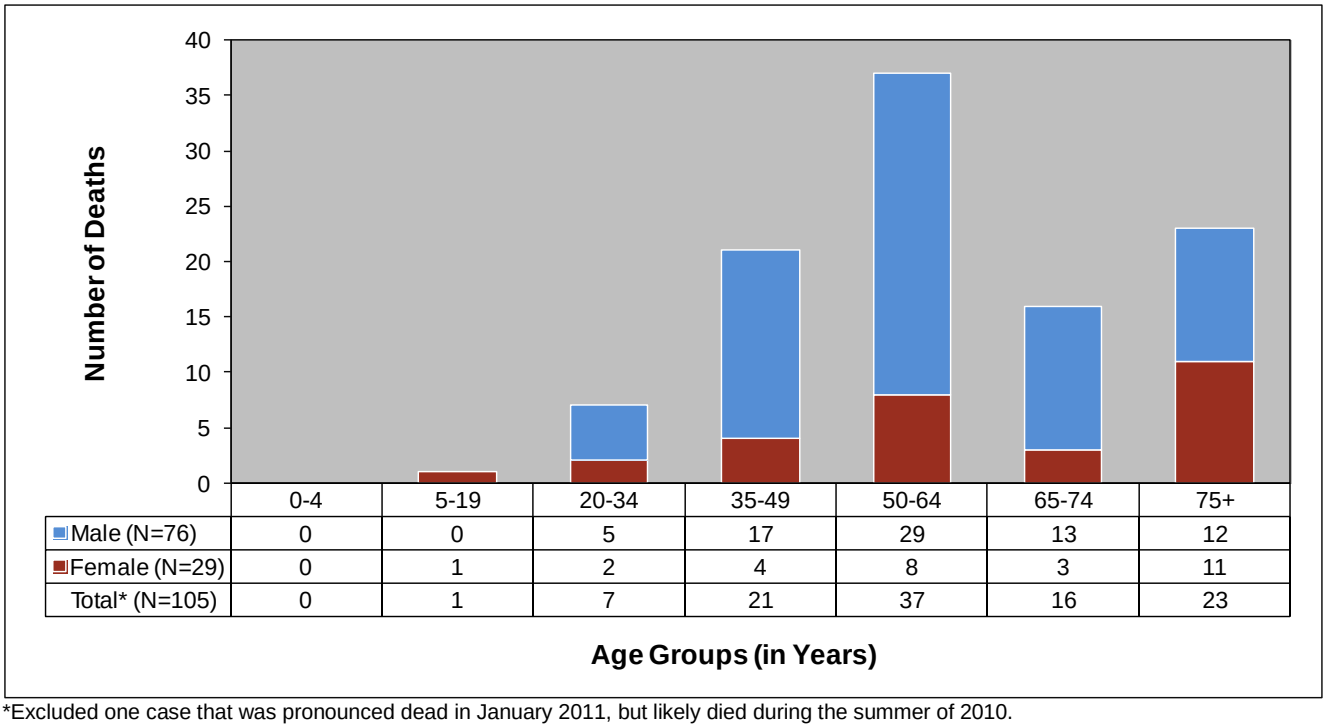
	<3	3-9	10-19	20+
0-4 (N=0)	0	0	0	0
5-19 (N=1)	1	0	0	0
20-34 (N=6)	2	0	3	1
35-49 (N=18)	5	3	1	9
50-64 (N=29)	2	4	3	20
65-74 (N=19)	0	1	1	9
75+ (N=13)	1	1	5	13
All Ages* (N=85)	11	9	13	52

*Excluded twenty cases for which time spent in Arizona was unknown at the time of analysis. Also excluded one case that was pronounced dead in January 2011, but likely died during the summer of 2010.

Heat-Associated Deaths by Gender

Graph 5. The majority of heat-associated deaths were males (76, 72.4%). Most male cases were under the age of 65 (51, 67.1% of male cases). In contrast, female cases were distributed almost equally above and below the age of 65. There was only one pediatric death in 2011 which was a female between the ages of 5 and 19. There were no heat-associated deaths among children under the age of five. [For more detailed results on age, See Appendix, Table A]

Graph 5. Age at Death, Heat-Associated Deaths by Gender and Age Group, Maricopa County, 2011

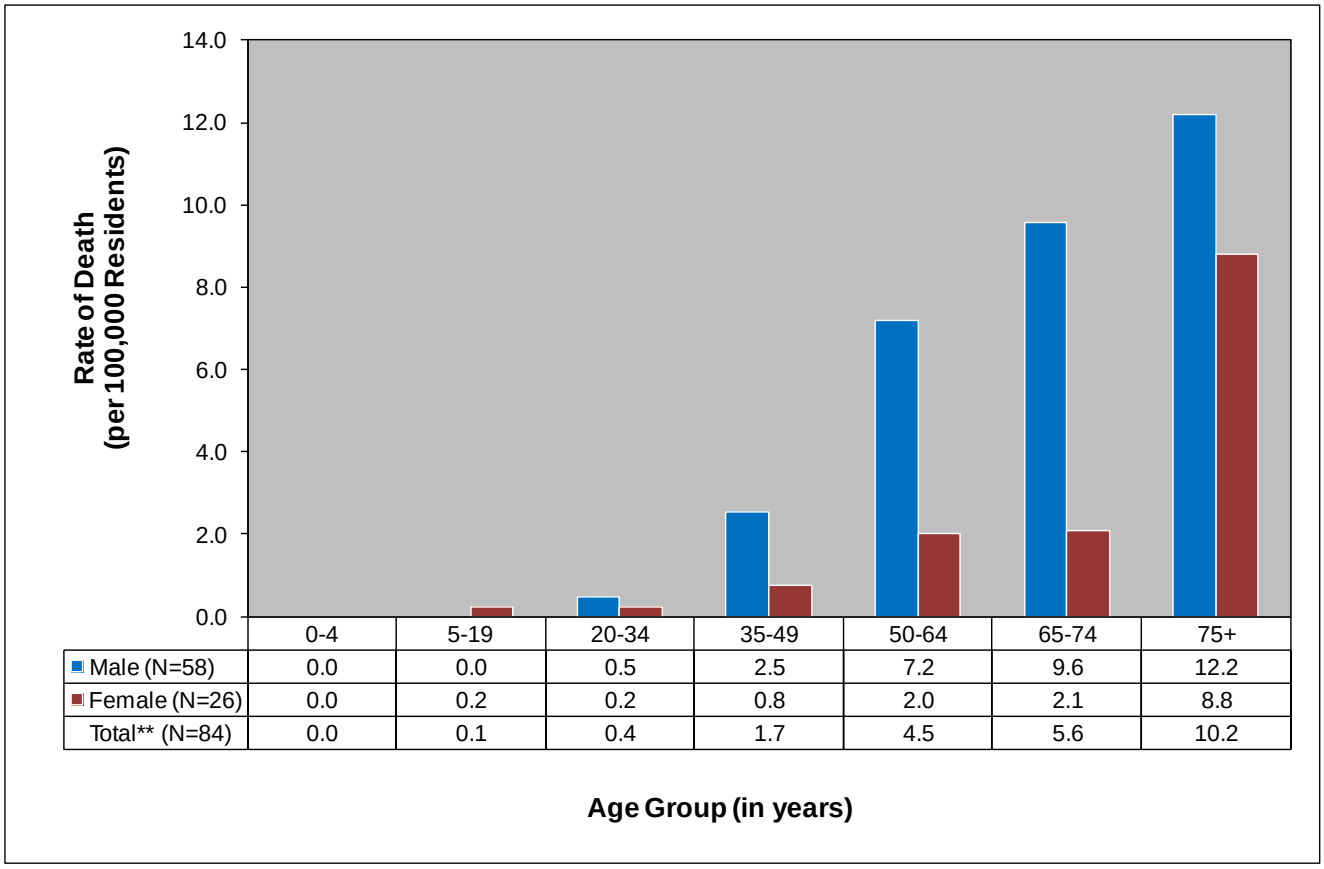


	0-4	5-19	20-34	35-49	50-64	65-74	75+
Male (N=76)	0	0	5	17	29	13	12
Female (N=29)	0	1	2	4	8	3	11
Total* (N=105)	0	1	7	21	37	16	23

*Excluded one case that was pronounced dead in January 2011, but likely died during the summer of 2010.

Graph 6. The pattern for heat-associated deaths by age is different for males and females. The data show, that for women, the rate of heat-associated deaths begins to increase in the 35-49 year-old age group, with a substantial increase among the 75+ age group. Among men, the rates for heat-associated deaths increase steadily beyond the 20-34 age group, and exceed the rates of death in women for all equivalent age groups. The highest rate of heat-associated death is 12.2, among males aged 75+, and inclusive of both genders, the 75+ age group has the highest rate of death (10.2). [See Appendix, Table B]

Graph 6. Heat-Associated Death Rates per 100,000 Maricopa County Residents* by Gender and Age Group, Maricopa County, 2011



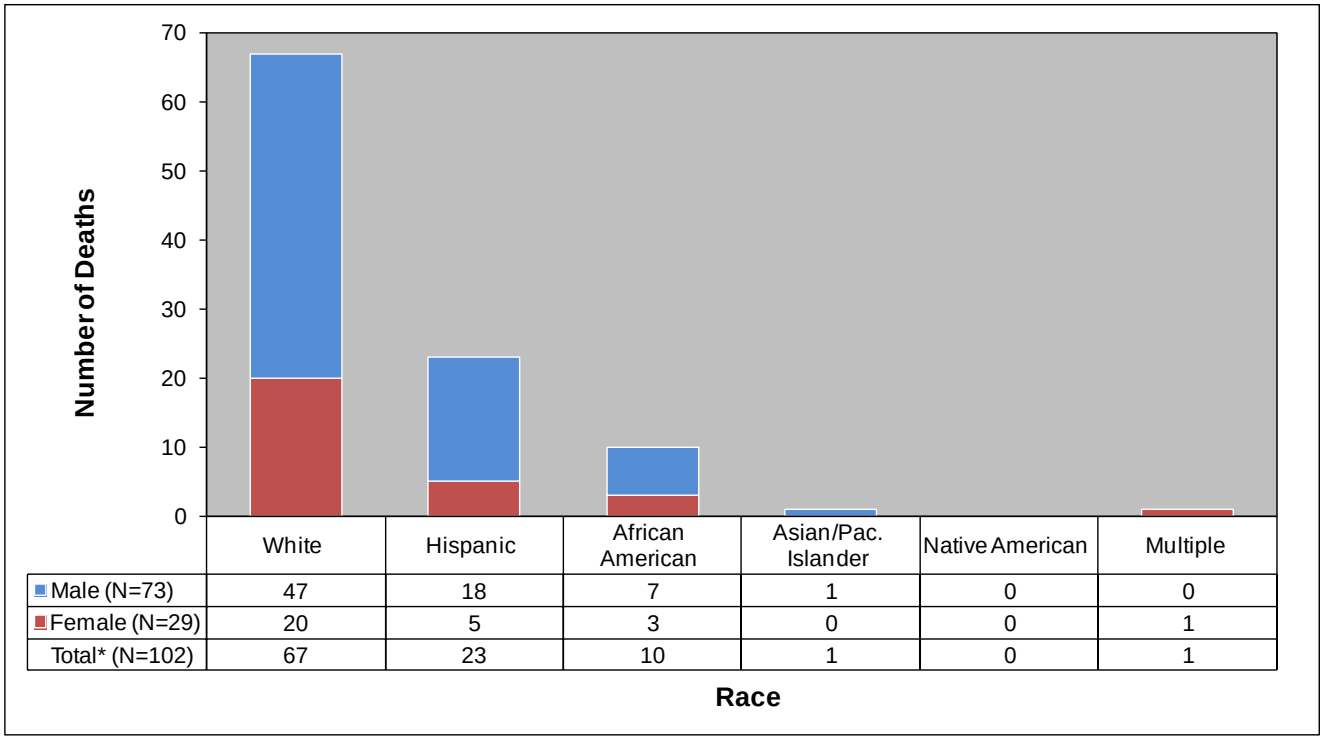
	0-4	5-19	20-34	35-49	50-64	65-74	75+
Male (N=58)	0.0	0.0	0.5	2.5	7.2	9.6	12.2
Female (N=26)	0.0	0.2	0.2	0.8	2.0	2.1	8.8
Total** (N=84)	0.0	0.1	0.4	1.7	4.5	5.6	10.2

*Based on 2011 Census population estimates for Maricopa County.
**Excluded twenty one cases that were not Maricopa County residents. Also excluded one case that was pronounced dead in January 2011, but likely died during the summer of 2010.

Heat-Associated Deaths by Race

Graph 7 – 8. Graph 7 shows that White males had the highest number of heat-associated deaths (47) of all race/gender groups. For almost all of the other race/ethnicity groups, the majority of deaths were among males (73). As shown in Graph 8, African Americans had the highest rate (4.4) of heat-associated death of all races, with African American males dying of heat-associated death at a rate of 6.5 deaths per 100,000 residents (Graph 8).

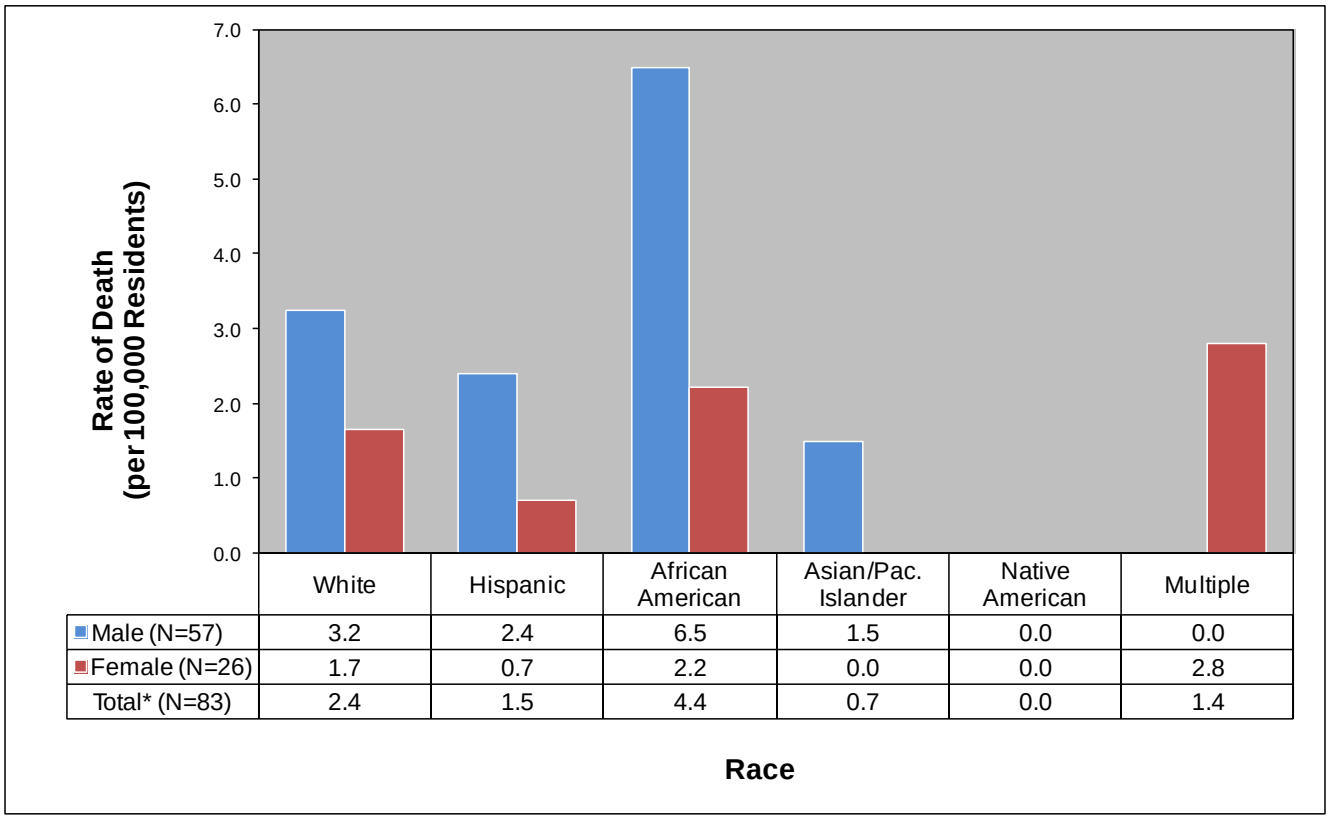
Graph 7. Heat-Associated Deaths by Race and Gender for Deaths Occurring in Maricopa County, 2011



	White	Hispanic	African American	Asian/Pac. Islander	Native American	Multiple
Male (N=73)	47	18	7	1	0	0
Female (N=29)	20	5	3	0	0	1
Total* (N=102)	67	23	10	1	0	1

*Excluded three cases where Race was Unknown, and one case that was pronounced dead in January 2011, but likely died during the summer of 2010.

Graph 8. Heat-Associated Death Rates per 100,000 Residents* by Race and Gender Group, Maricopa County, 2011

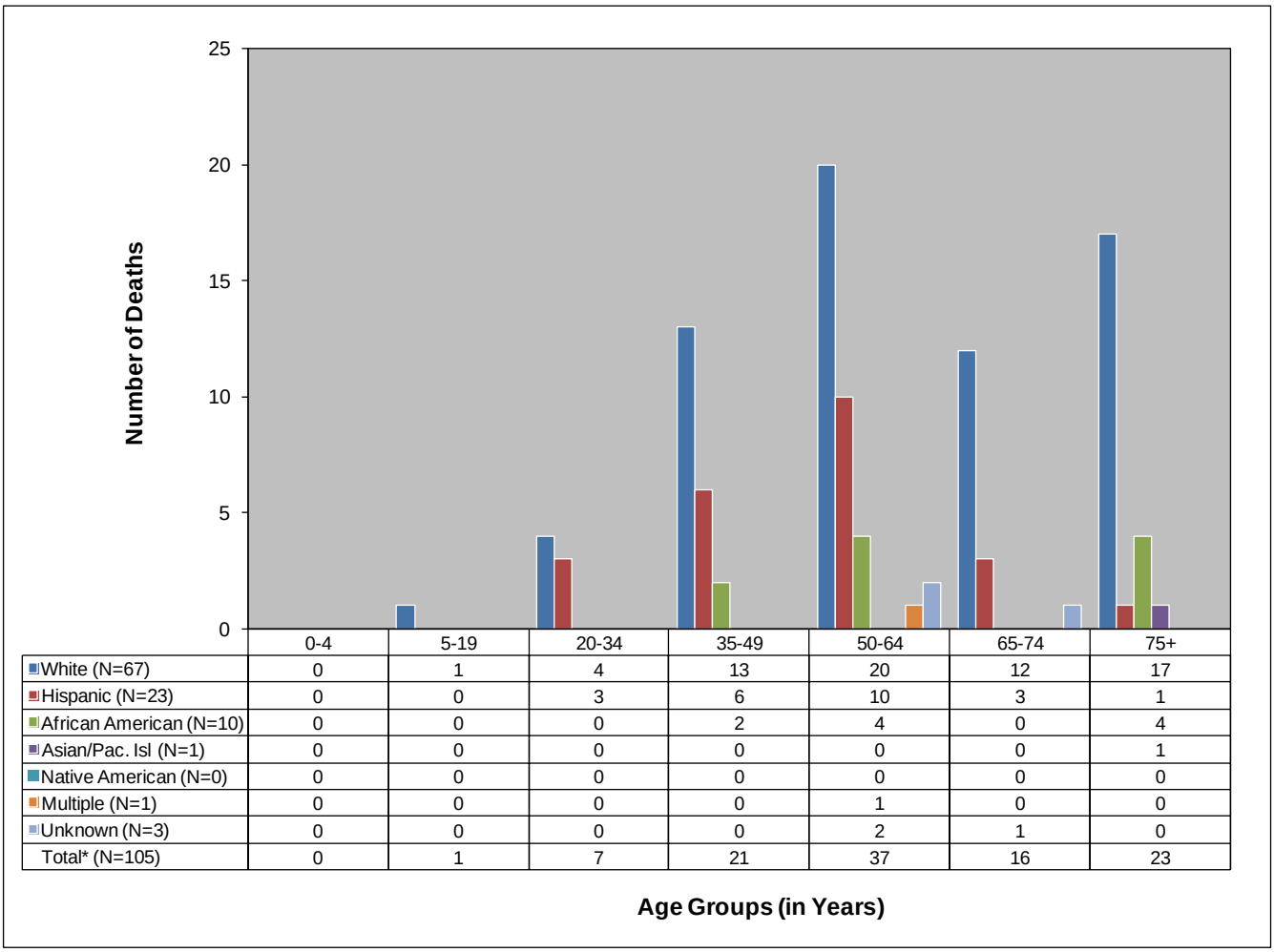


	White	Hispanic	African American	Asian/Pac. Islander	Native American	Multiple
Male (N=57)	3.2	2.4	6.5	1.5	0.0	0.0
Female (N=26)	1.7	0.7	2.2	0.0	0.0	2.8
Total* (N=83)	2.4	1.5	4.4	0.7	0.0	1.4

* Based on 2011 Census population estimates for Maricopa County.
**Excluded one Maricopa County resident where Race was Unknown.

Graph 9. As shown in Graph 9, nearly all race/ethnicities reported the highest number of heat-associated deaths among persons aged 50 and over. Whites reported the highest number of heat-associated deaths (67, 64%). Hispanics (23, 21.9%) were the second largest group for heat-associated deaths with Hispanic deaths mostly in the 35-64 age range. The remaining fifteen cases were distributed between the following race groups: African American (10, 9.5%), Asian/Pacific Islander (1, 0.01%), Multiple (1, 0.01%), and 3 cases where race was Unknown (3, 2.9%).

Graph 9. Heat-Associated Deaths by Race and Age Group for Maricopa County, 2011

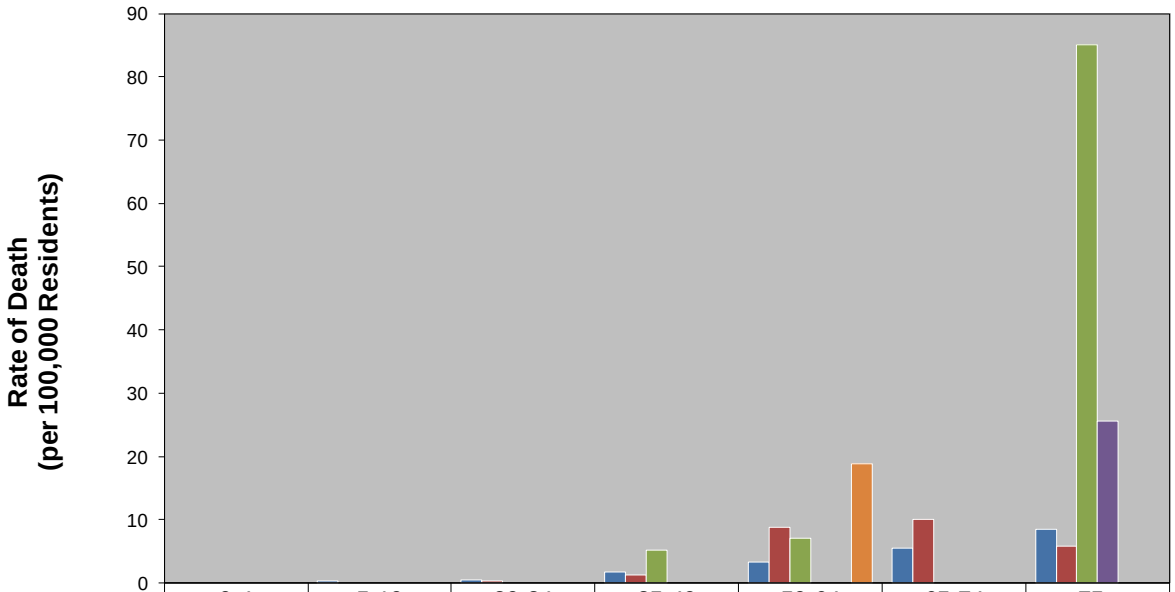


	0-4	5-19	20-34	35-49	50-64	65-74	75+
White (N=67)	0	1	4	13	20	12	17
Hispanic (N=23)	0	0	3	6	10	3	1
African American (N=10)	0	0	0	2	4	0	4
Asian/Pac. Isl (N=1)	0	0	0	0	0	0	1
Native American (N=0)	0	0	0	0	0	0	0
Multiple (N=1)	0	0	0	0	1	0	0
Unknown (N=3)	0	0	0	0	2	1	0
Total* (N=105)	0	1	7	21	37	16	23

*Excluded one case that was pronounced dead in January 2011, but likely died during the summer of 2010.

Graph 10. Graph 10 shows that the rate of heat-associated death for Whites increases with age, with the highest rate of death (8.5) in the 75+ age group. Among Hispanics, the highest death rate is 10.1 among the 65-74 age group. The highest death rate of any age or race/ethnicity group is 85.1 among African Americans, aged 75+. Relatively high rates of death are also seen in 75+ Asian/Pacific Islanders (25.6), and Multiple race, aged 50-64 (18.8). However, because there are so few heat-associated deaths in all of the race/ethnic groups other than White and Hispanic, these results will vary widely from year to year. [See Appendix, Table C-D].

Graph 10. Heat-Associated Death Rates per 100,000 Residents* by Race and Age Group, Maricopa County, 2011



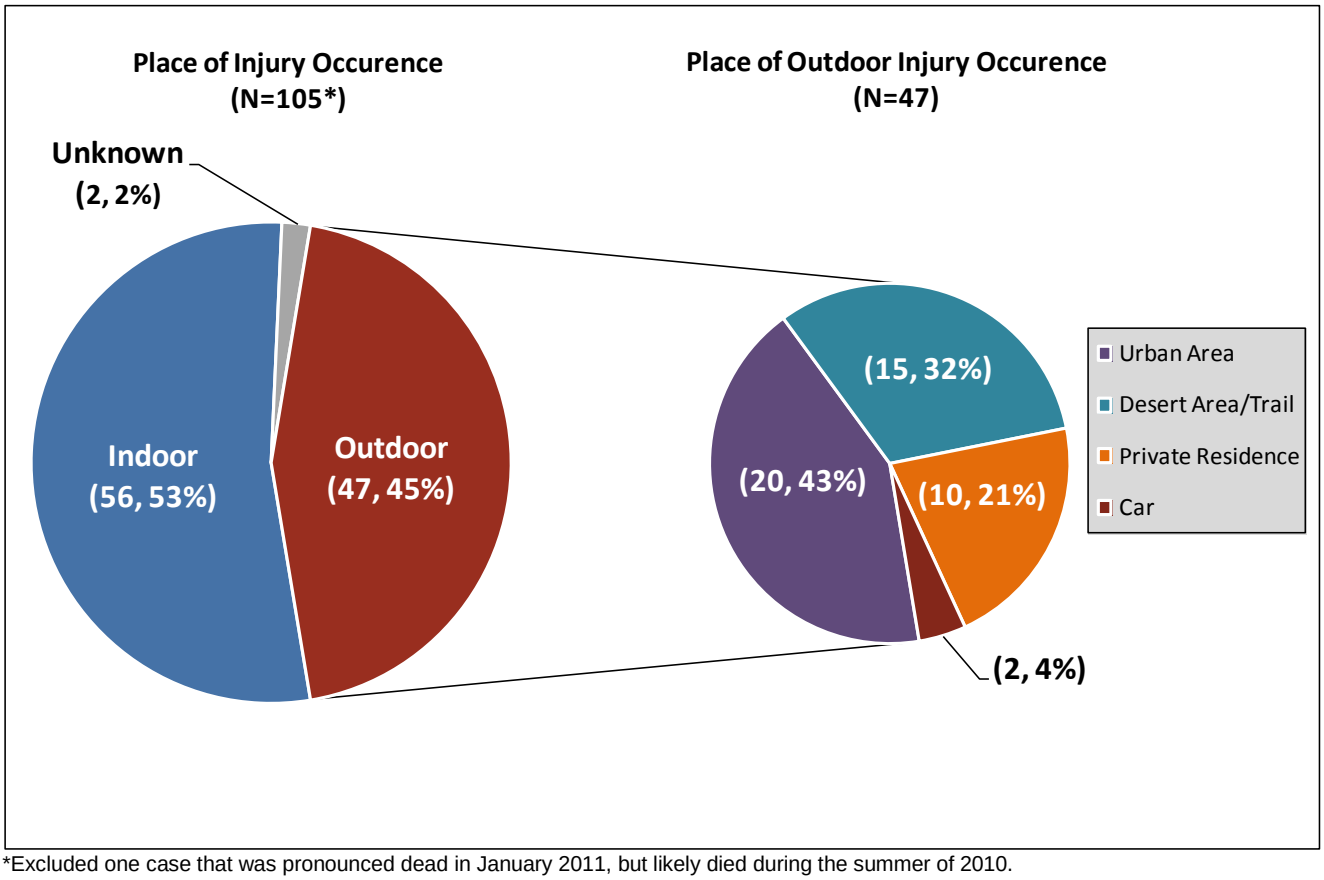
	0-4	5-19	20-34	35-49	50-64	65-74	75+
White (N=55)	0	0.3	0.5	1.7	3.3	5.4	8.5
Hispanic (N=18)	0	0.0	0.3	1.3	8.8	10.1	5.8
African American (N=8)	0	0.0	0.0	5.2	7.0	0.0	85.1
Asian/Pac. Isl (N=1)	0	0.0	0.0	0.0	0.0	0.0	25.6
Native American (N=0)	0	0.0	0.0	0.0	0.0	0.0	0.0
Multiple (N=1)	0	0.0	0.0	0.0	18.8	0.0	0.0
Total* (N=83)	0	0.1	0.4	1.7	4.3	5.6	10.2

* Based on 2011 Census population estimates for Maricopa County.
**Excluded one Maricopa County resident where Race was Unknown, twenty one cases that were not Maricopa County residents, and one case that was pronounced dead in January 2011, but likely died during the summer of 2010.

Heat-Associated Deaths by Place of Occurrence and Air Conditioning Status

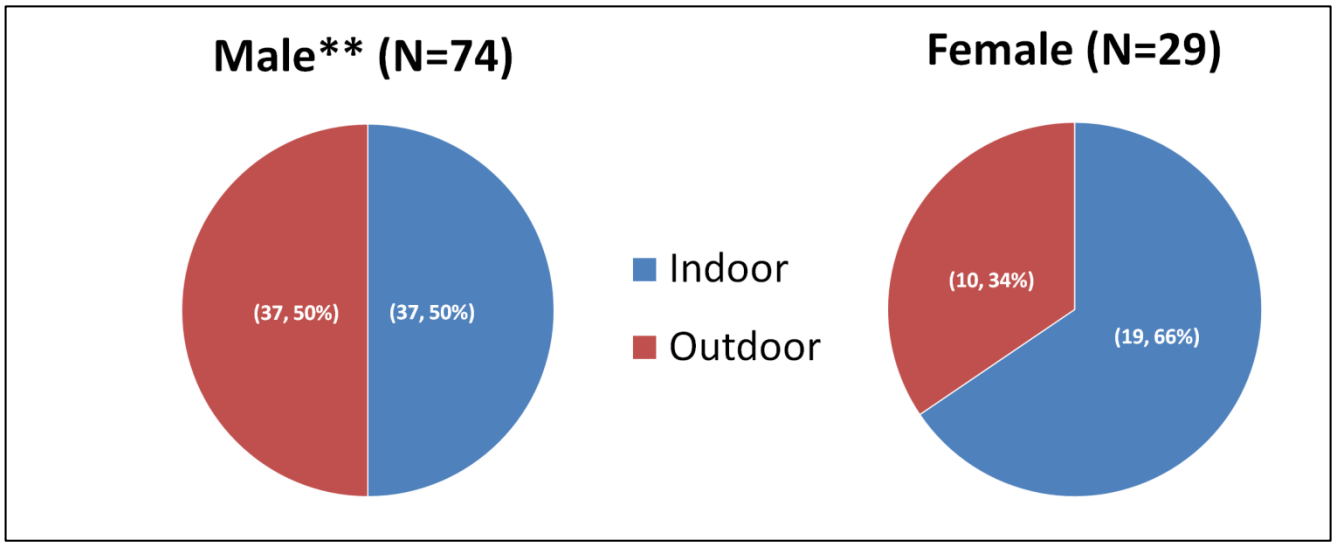
Graphs 11 – 13. Graph 11 illustrates that 45% of heat deaths in 2011 occurred outdoors. These deaths most often occurred in urban areas (43%). For men, the proportion of indoor and outdoor deaths was equivalent, while more women (66%) died indoors than outdoors (Graph 12). Fifty three percent of all deaths occurred indoors. Where deaths occurred indoors, 36% did not have air conditioning in use, 63% had an unknown air conditioning status, and 2% had functioning air conditioning that was turned on (Graph 13). Considering that 63% of deaths had an unknown air conditioning status, the percentage of indoor deaths with or without air conditioning may actually be higher. [See Appendix, Tables E-G]

Graph 11. Heat-Associated Deaths by Place of Occurrence and Place of Outdoor Injury, Maricopa County, 2011



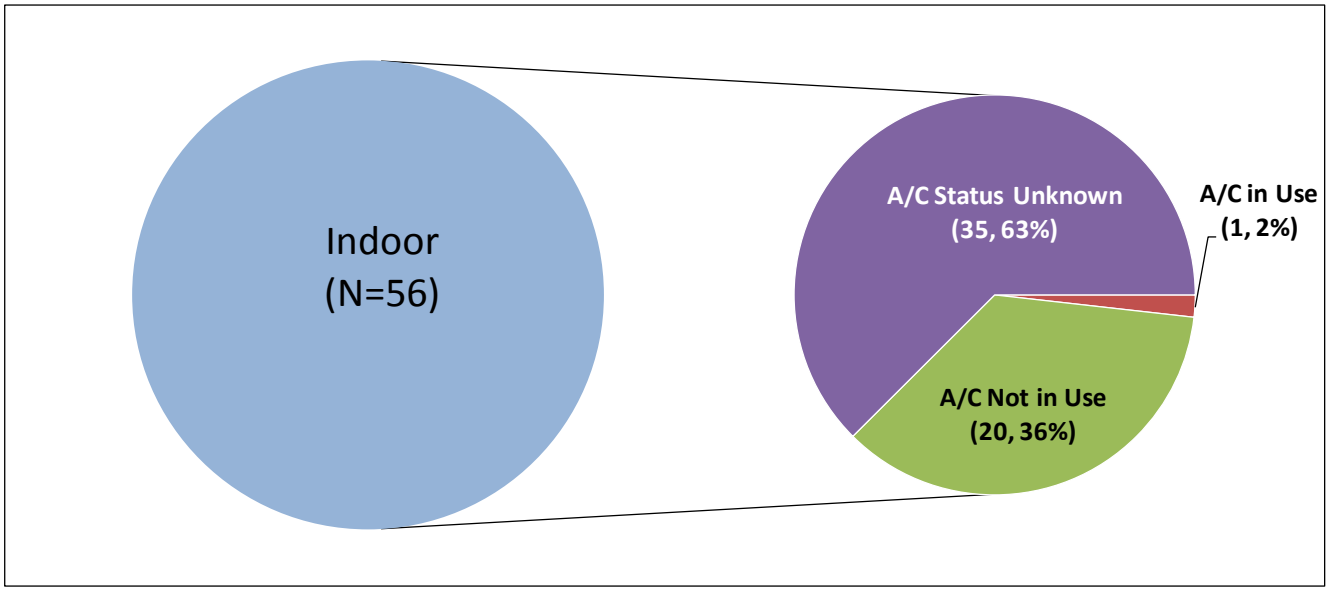
*Excluded one case that was pronounced dead in January 2011, but likely died during the summer of 2010.

Graph 12. Heat-Associated Deaths by Gender and Place of Injury Occurrence, Maricopa County, 2011*



*Excluded one case that was pronounced dead in January 2011, but likely died during the summer of 2010.
**Excluded two male cases where Place of Injury (Indoor, Outdoor) was Unknown

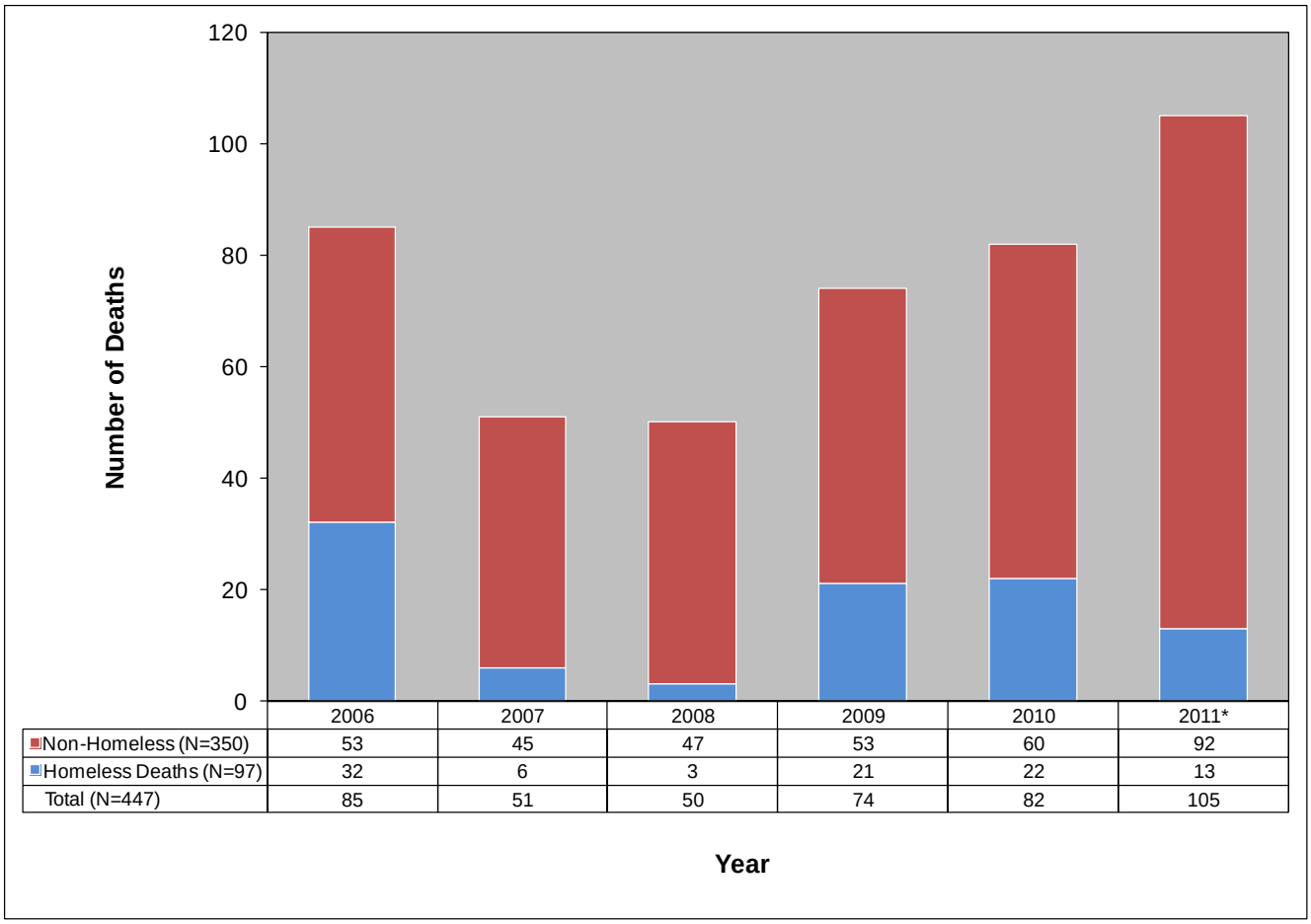
Graph 13. Heat-Associated Deaths by Use of Air Conditioning (Indoor Only), Maricopa County, 2011



Heat-Associated Deaths Among the Homeless

Graphs 14 – 15. In 2006, 32 heat-associated deaths (38% of the 2006 total) were among homeless persons. In 2007, homeless heat-associated deaths decreased to 6 (12%), and decreased again in 2008, to 3 (6%). In 2009 and 2010 the number of heat-associated deaths in homeless persons increased to 21 (28%) and 22 (27%), respectively. Heat-associated deaths in homeless persons in 2011 decreased to 13 (12%) (Graph 14). Graph 15 shows that of the 13 homeless individuals who died in 2011, 23% of the homeless persons were using drugs or alcohol upon their death, which is comparable to 23% of the non-homeless persons who were using drugs or alcohol upon their death. [See Appendix, Table H]

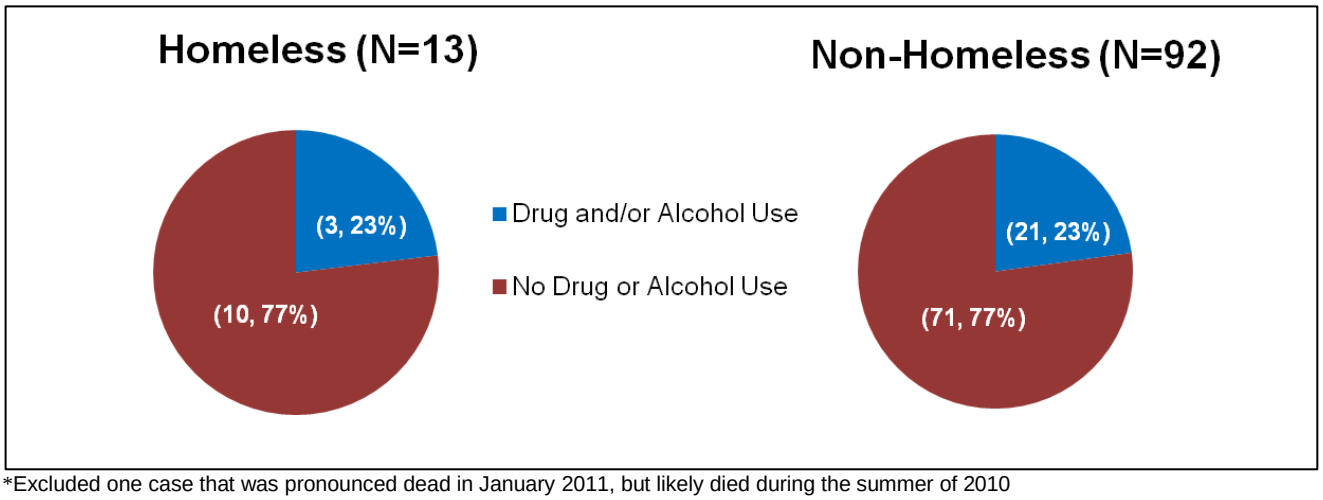
Graph 14. Homeless Heat-Associated Deaths, Maricopa County, 2006-2011



	2006	2007	2008	2009	2010	2011*
Non-Homeless (N=350)	53	45	47	53	60	92
Homeless Deaths (N=97)	32	6	3	21	22	13
Total (N=447)	85	51	50	74	82	105

*Excluded one non-homeless case that was pronounced dead in January 2011, but likely died during the summer of 2010. This case was not added to the Total cases for 2010.

Graph 15. Drug and Alcohol Use, as Mentioned on the Death Certificate for Heat-Associated Deaths by Homelessness, Maricopa County, 2011



*Excluded one case that was pronounced dead in January 2011, but likely died during the summer of 2010

Conclusions – Heat-Associated Deaths 2011

1. The number of heat-associated deaths increased in 2011 to the highest number of deaths recorded since enhanced surveillance began in 2006.

2. The majority of heat-associated deaths were heat-caused (as opposed to heat-related). This means that the majority of deaths were cases in which environmental heat was directly involved in the sequence of conditions causing death.

3. Many of the heat-associated deaths occurred during the month of August. August had fourteen days of Excessive Heat Warnings. Ten of these August Excessive Heat Warning days were consecutive, and part of a larger, eleven consecutive day interval of Excessive Heat Warnings (8/22/2011 – 9/1/2011). For comparison, July had only three days of Excessive Heat Warnings, which were consecutive.

4. Most decedents for whom residency was known were residents of Maricopa County or Arizona.

5. Most of the decedents were not newcomers – for decedents whose location and length of residency were known, only about one in eight lived in Arizona for less than three years.

6. Most heat-associated deaths occurred among males 20-64 years of age.

7. One pediatric heat-associated death occurred this year, none occurred in a child less than 5 years of age.

8. Heat-associated deaths among men tended to occur among those under 65 years old, while deaths among women were almost equally distributed above and below 65 years of age.

9. For this first time since 2006, indoor deaths exceeded outdoor deaths, all of which occurred at a private residence. Nearly half of all outdoor deaths occurred in urban areas.

10. Heat-associated deaths occurred indoors and outdoors in similar proportions among men; but among women, a larger proportion of deaths occurred indoors.

11. All heat-associated deaths that occurred indoors, occurred at a private residence or in the garage of a private residence. For over a quarter of these indoor deaths, the air conditioning unit was not in use. (For the remaining indoor deaths air conditioning status was unknown, suggesting that there may have been additional instances when the air conditioning was not in use.)

12. Homeless individuals are more vulnerable to increased environmental temperatures. Approximately one in eight heat-associated deaths in 2011 was an individual identified as homeless. After increasing since 2008, the number of homeless deaths decreased in 2011.

13. The proportion of heat-associated deaths where drug or alcohol use was indicated at the time of death was nearly equivalent for homeless and non-homeless individuals.

Special Case

In 2011, a special case was reported to the MCDPH. Details are included below:

> In January of 2011, a 49 year old male was found deceased in a desert area. The man had last been seen alive during the summer of 2010, hiking in the vicinity of where his body was found in 2011. His death was pronounced in January of 2011, however, circumstantial evidence strongly supported that the decedent actually died during the summer of 2010. In order to maintain consistency with heat-associated death definitions, this case was included in the 2011 annual total. However, this case was excluded from detailed analysis in the 2011 Annual Report in order to avoid biasing data that reflects the excessive heat of 2011.

It is important to note that although this is a striking example of a heat-associated death, it is one of the less common situations contributing to heat-associated deaths. Deaths of individuals in outdoor desert area/trail settings made up only 14% of all heat-associated deaths in 2011. This is in contrast to 19% who die outdoors in urban areas and 53% who died indoors.

Future Plans

One of the goals of the MCDPH heat surveillance program is to obtain more detailed information pertaining to the circumstances surrounding heat-associated mortality. Ideally, the program would like to obtain complete data on air conditioning status, as well as activity just prior to death (e.g. working, exercising, etc.). Program staff would also like to perform analyses on additional risk factors, temperature variation, the geographic distribution of deaths, and associated morbidity occurring through the heat season.

Finally, the primary goal of heat-associated death surveillance is to eliminate or reduce heat-associated deaths. Although the number of heat-associated deaths for 2011 increased over previous years, community partners and the MCDPH continue to respond to the needs of the community. Cooling and hydration stations were open to the public throughout the heat season, with additional stations opening during particularly long periods of excessive heat. Additionally, enhanced heat surveillance performed by the MCDPH provided timely reminders to healthcare providers and community partners regarding the dangers of excessive heat.

To learn more about services provided for cooling and hydration during the summer months, or how you can help, please visit:

http://www.maricopa.gov/publichealth/Programs/Heat/default.aspx

http://www.cir.org/

APPENDIX

Table A. Heat-Associated Deaths by Gender and Age, Maricopa County, 2011

Age Group	2011 (N=105)					
	Male		Female		Total	
	#	%	#	%	#	%
0-4	0	0%	0	0%	0	0%
5-19	0	0%	1	3%	1	1%
20-34	5	7%	2	7%	7	7%
35-49	17	22%	4	14%	21	20%
50-64	29	38%	8	28%	37	35%
65-74	13	17%	3	10%	16	15%
75+	12	16%	11	38%	23	22%
All Ages	**76**	**100%**	**29**	**100%**	**105**	**100%**

Table B. Heat-Associated Death Rates per 100,000 Residents (and Counts) by Gender and Age, Maricopa County, 2011

Age Group	2011 (N=84)		
	Male	Female	Total
0-4	0 (0)	0 (0)	0 (0)
5-19	0 (0)	0.2 (1)	0.1 (1)
20-34	0.5 (2)	0.2 (1)	0.4 (3)
35-49	2.5 (10)	0.8 (3)	1.7 (13)
50-64	7.2 (23)	2.0 (7)	4.5 (30)
65-74	9.6 (12)	2.1 (3)	5.6 (15)
75+	12.2 (11)	8.8 (11)	10.2 (22)
All Ages	**3.0** **(58)**	**1.3** **(26)**	**2.2** **(84)**

Table C. Heat-Associated Death Rates per 100,000 Residents (and Counts) by Age Group and Race/Ethnicity, Maricopa County, 2011

Race/Ethnicity	2011 (N=83)							
	0-4	5-19	20-34	35-49	50-64	65-74	75+	All Ages
White	0.0 (0)	0.3 (1)	0.5 (2)	1.7 (8)	3.3 (16)	5.4 (12)	8.5 (16)	2.4 (55)
Hispanic	0.0 (0)	0.0 (0)	0.3 (1)	1.3 (3)	8.8 (10)	10.1 (3)	5.8 (1)	1.5 (18)
African American	0.0 (0)	0.0 (0)	0.0 (10)	5.2 (2)	7.0 (2)	0.0 (0)	85.1 (4)	4.4 (8)
Asian/Pac. Islander	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	25.6 (1)	0.7 (1)
Native American	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Multiple	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	18.8 (1)	0.0 (0)	0.0 (0)	1.4 (1)
All Race/Ethnicities	**0.0 (0)**	**0.1 (1)**	**0.4 (3)**	**1.7 (13)**	**4.3 (29)**	**5.6 (15)**	**10.2 (22)**	**2.1 (83*)**

* Excluded one Maricopa County resident where Race was Unknown.

Table D. Heat-Associated Death Rates per 100,000 Residents (and Counts) by Gender and Race/Ethnicity, Maricopa County, 2011

Race/Ethnicity	2011 (N=83)		
	Male (N=57)	Female (N=26)	Total (N=83)
White	3.2 (47)	1.7 (20)	2.4 (67)
Hispanic	2.4 (18)	0.7 (5)	1.5 (23)
African American	6.5 (7)	2.2 (3)	4.4 (10)
Asian/Pac. Islander	1.5 (1)	0.0 (0)	0.7 (1)
Native American	0.0 (0)	0.0 (0)	0.0 (0)
Multiple	0.0 (0)	2.8 (1)	1.4 (1)
All Race/Ethnicities	**3.0 (57)**	**1.3 (26)**	**2.1 (83*)**

* Excluded one Maricopa County resident where Race was Unknown.

Table E. Heat-Associated Deaths by Place Injury Occurred and Age, Maricopa County, 2011

Age Group	Private Residence		Business		Desert Area	Street	Parking Lot	Car	Field/ Park	Alley	Trail	Total
	In*	Out	In	Out								
0-4	0	0	0	0	0	0	0	0	0	0	0	0
5-19	0	1	0	0	0	0	0	0	0	0	0	1
20-34	0	0	0	1	3	1	0	0	0	0	2	7
35-49	7	2	0	0	4	2	1	0	2	1	2	21
50-64	22	3	0	0	3	4	0	2	1	0	1	36
65-74	11	0	0	0	0	2	0	0	1	0	0	14
75+	16	4	0	0	0	2	1	0	0	0	0	23
Total**	**56**	**10**	**0**	**1**	**10**	**11**	**2**	**2**	**4**	**1**	**5**	**102**

*Includes one case that died in the garage of a private residence
**Excluded two cases where Place of Injury (Indoor/Outdoor) was Unknown, and one case that died Outdoors but lacked a specific Place of Injury.

Table F. Heat-Associated Deaths by Indoor or Outdoor Occurrence, Age, and Gender Maricopa County, 2011

Age Group	2011 (N=103)					
	Indoor			Outdoor		
	Male*	Female	Total	Male	Female	Total
0-4	0	0	0	0	0	0
5-19	0	0	0	0	1	1
20-34	0	0	0	5	2	7
35-49	4	3	7	13	1	14
50-64	18	4	22	10	4	14
65-74	8	3	11	4	0	4
75+	7	9	16	5	2	7
Total	**37**	**19**	**56**	**37**	**10**	**47**

*Excluded two male cases where place of injury (Indoor/Outdoor) was Unknown.

Table G. Heat-Associated Deaths by Use of Air Conditioning and Age Group, (Indoor Only) Maricopa County, 2011

Age Groups	A/C In Use	A/C Not in Use	A/C Status Unknown	Total
0-4	0	0	0	0
5-19	0	0	0	0
20-34	0	0	0	0
35-49	0	1	6	7
50-64	1	9	12	22
65-74	0	4	7	11
75+	0	6	10	16
Total	**1**	**20**	**35**	**56**

Table H. Drug and Alcohol Use, as Mentioned on the Death Certificate for Heat-Associated Deaths, by Homelessness, Maricopa County, 2011

2011		
Homeless	**Drug and/or Alcohol Use**	**No Drug or Alcohol Use**
Yes (13, 12.4%)	3 (23.1%)	10 (76.9%)
No (92, 87.6%)	21 (22.8%)	71 (77.2%)
Total (105, 100%)	**24 (22.9%)**	**81 (77.1%)**