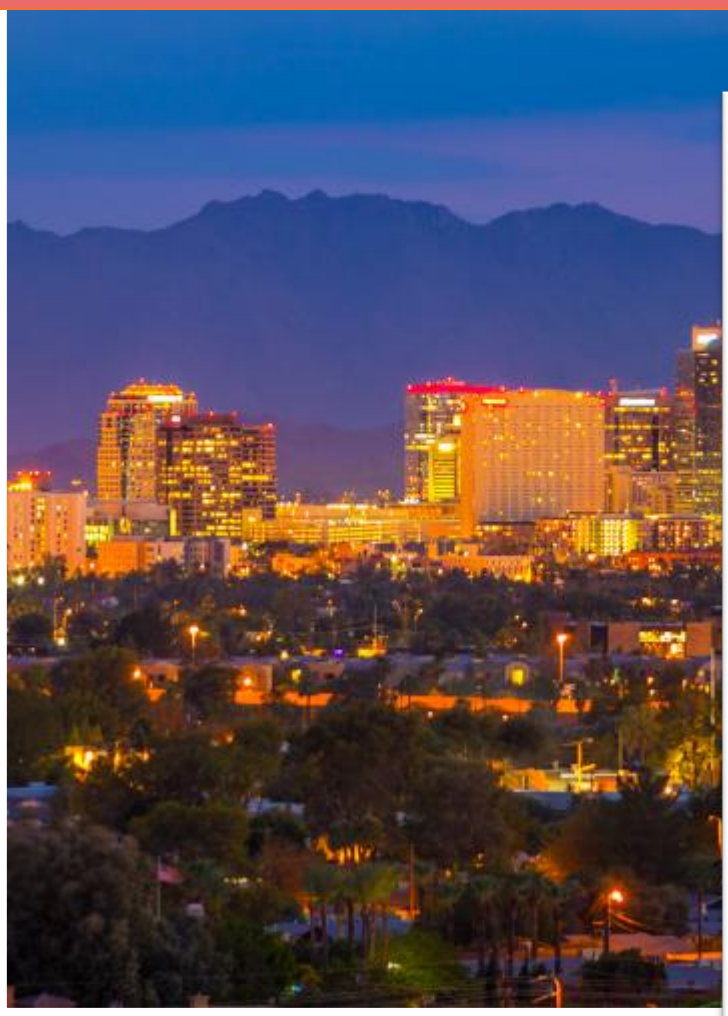
Heat-Associated Deaths in Maricopa County, AZ
Final Report for 2021



Photograph by Dan Sorensen:
http://www.dansorensenphotography.com/

Maricopa County Public Health
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Contents

Acknowledgements

The Maricopa County Department of Public Health (MCDPH), Office of Epidemiology would like to thank the following agencies for their contributions to this report:

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

To receive additional data, please submit a data request form through the Maricopa County Public Health website here. A staff member from the Climate and Health team will contact you to discuss your request.

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Introduction

Mortality from environmental heat is a significant public health problem in Maricopa County, especially because it is largely preventable. Maricopa County has conducted heat surveillance since 2006. Each year, the enhanced heat surveillance season usually begins in May and ends in October. The main goals of heat surveillance are to identify the demographic characteristics of heat-associated deaths (e.g., age and gender) and the risk factors for mortality (e.g., homelessness). Sharing this information helps community stakeholders to design interventions to prevent heat-associated deaths among vulnerable populations.

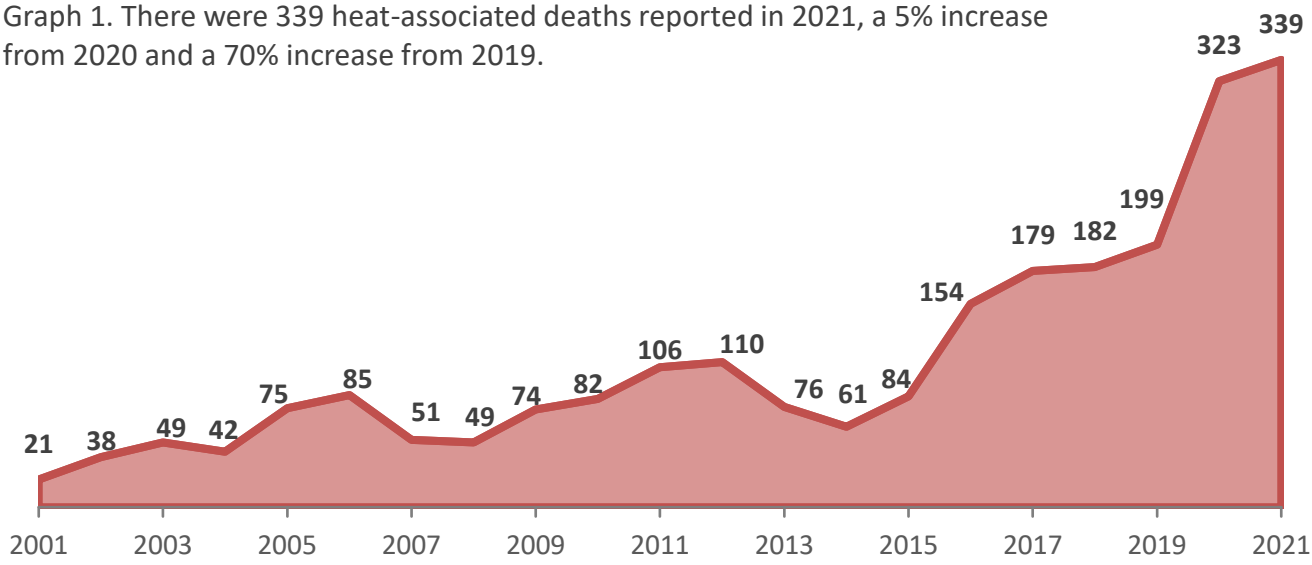
The two main sources of data for heat surveillance are preliminary reports of death (PRODs) from the Office of the Medical Examiner (OME) and death certificates from the MCDPH Office of Vital Registration.

Heat-associated deaths are classified as heat-caused or heat-related. Heat-caused deaths are those in which environmental heat was directly involved in the sequence of events causing deaths. Heat-related deaths are those in which environmental heat contributed to the deaths but was not in the sequence of events causing these deaths. For more information on how heat-associated deaths are classified, see the definitions in Appendix. For more information on MCDPH's surveillance system, see Background and Methodology.

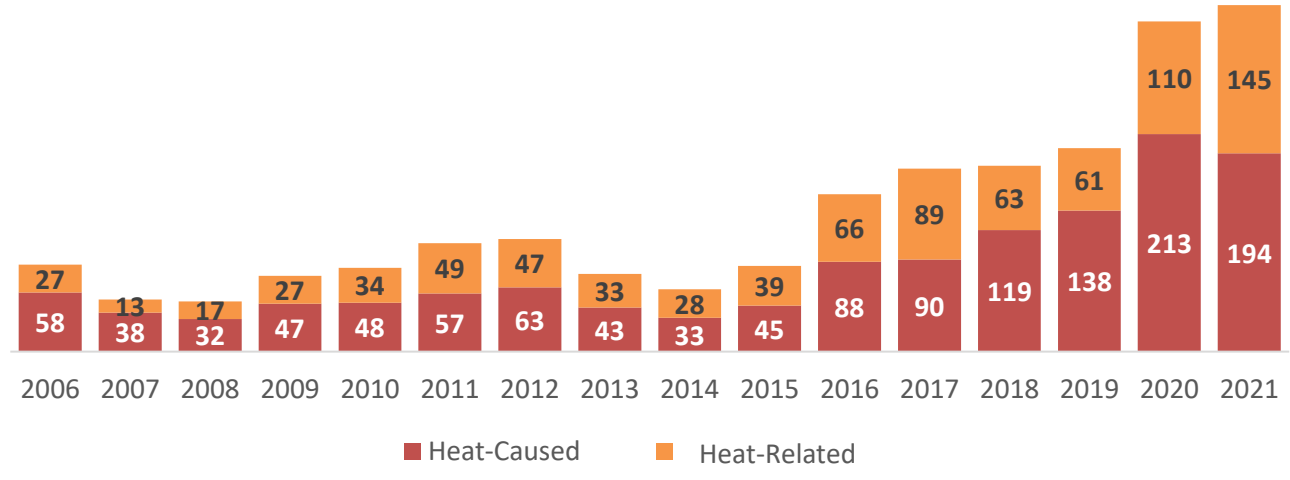
Results

Heat-Associated Deaths by Year

Graph 1. There were 339 heat-associated deaths reported in 2021, a 5% increase from 2020 and a 70% increase from 2019.



Graph 2. Fifty-seven percent of heat-associated deaths in 2021 have been classified as heat-caused which is similar to the overall trend (61%) since 2006.

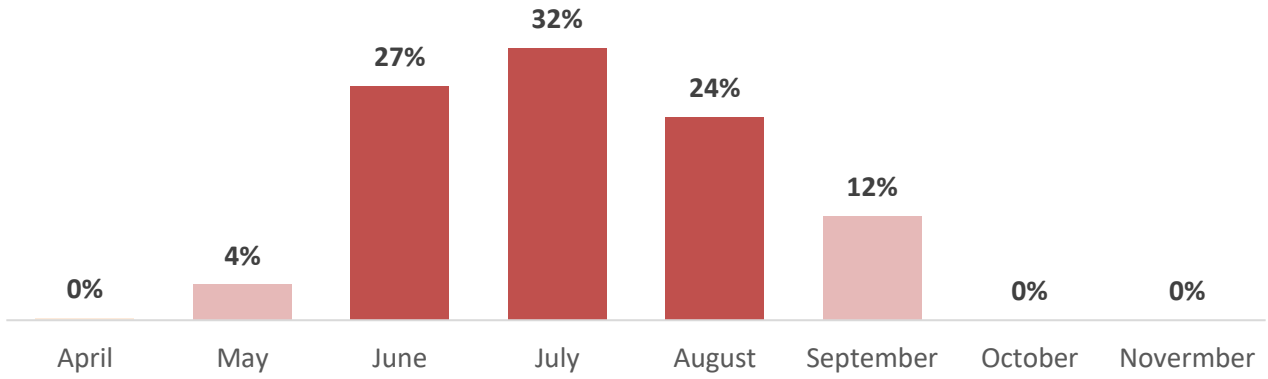


**Data Sources: Maricopa County, Office of Vital Registration and Office of Medical Examiner; Arizona Department of Health Services, Office of Vital Registration*

***See Methodology in the Appendix for more information about the number of confirmed, ruled-out, and pending cases by year*

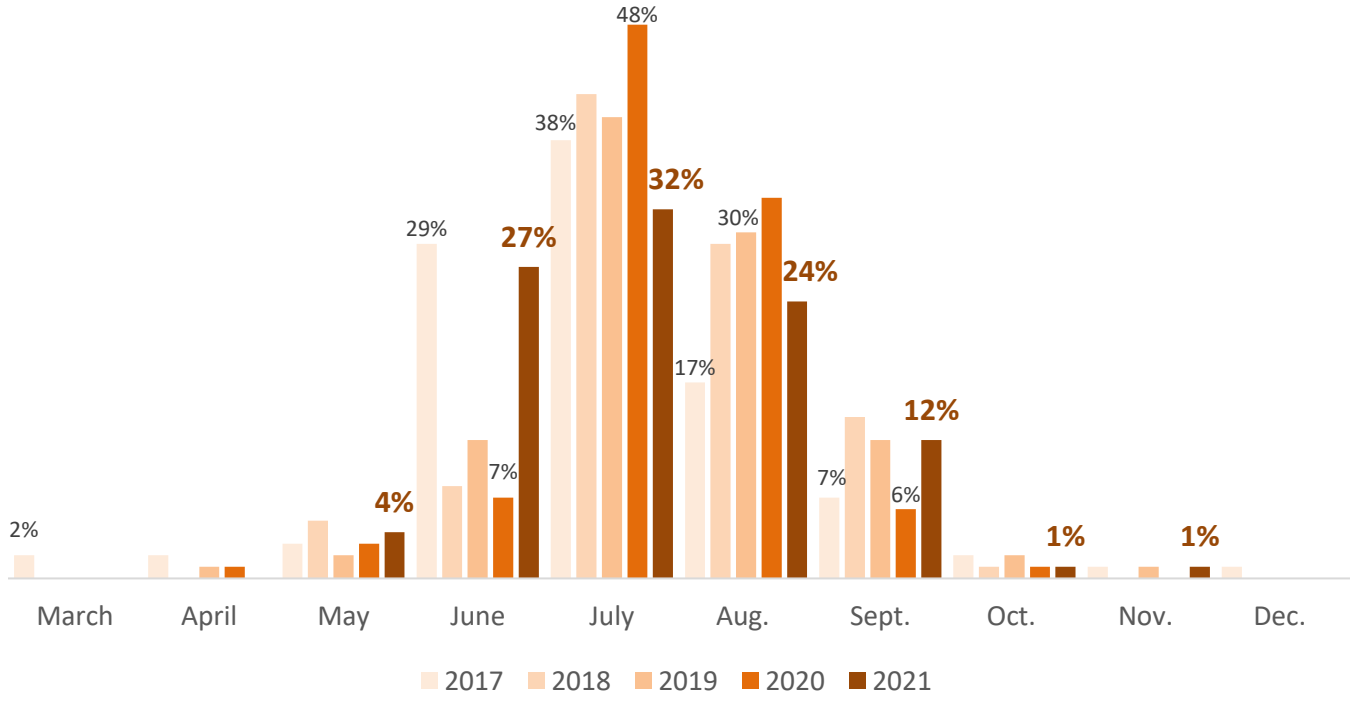
Heat-Associated Deaths by Month

Graph 3. Eighty-three percent of all heat associated deaths occured in the months of June, July, and August (N=339).



**Less than 1% of heat deaths occurred in the months of October and November*
**Some deaths that occured in October and November were cases who suffered heat injuries during the summer*

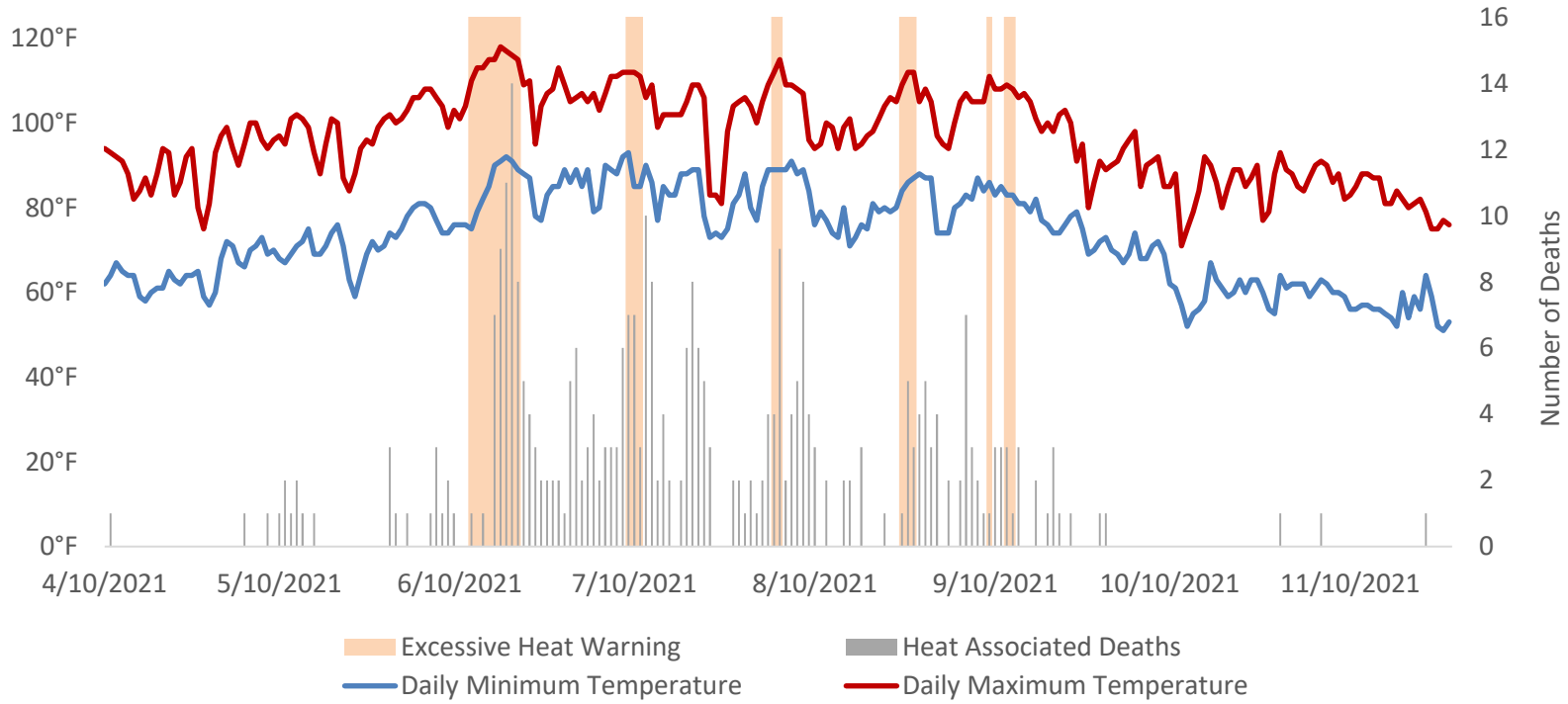
Graph 4. The highest proportion of heat-associated deaths typically occurs in July, with 2021 have a lower proportion in July compared to previous years but a higher than normal percent in June and September.



Heat-Associated Deaths and Temperatures

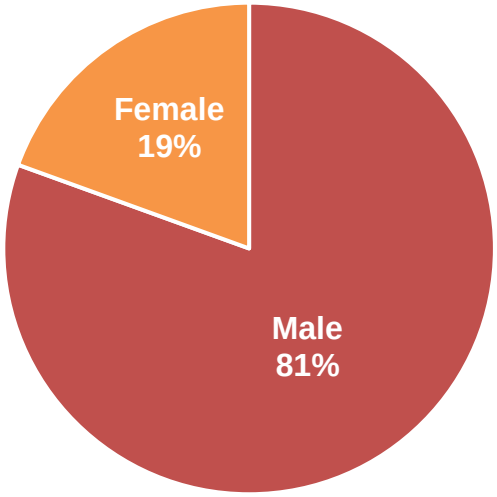
- In 2021, the National Weather Service issued six excessive heat warnings for a total of 20 days. The average number of heat warnings for the past 5 years (2016-2020) is 7 for a total of 24 days.
- The highest daily temperature in 2021 occurred on June 17th and was 118°F, with 9 deaths occurring on this day. The average highest daily temperature for the past 5 years (2016-2020) is 117°F. The highest daily temperatures ranged from 115°F to 119°F.
- For the past 5 years (2016-2020), an average of 34% of heat-associated deaths occurred on days for which an excessive heat warning had been issued. In 2020, 52% of heat-associated deaths occurred on days for which an excessive heat warning had been issued.

Graph 5. Twenty-eight percent of heat-associated deaths occurred on days for which an excessive heat warning had been issued (N=339).



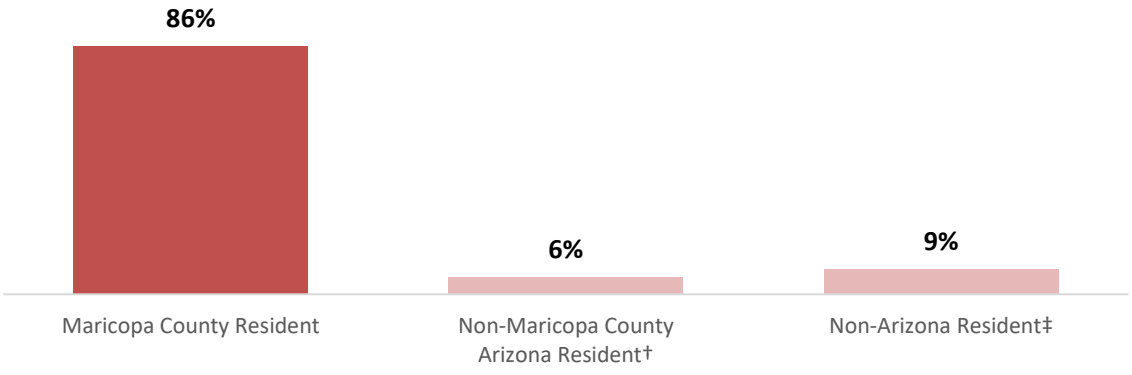
Demographic Characteristic of Heat-Associated Deaths

Graph 6. Males made up a higher proportion (81%) of all heat-associated deaths.



Heat-Associated Deaths by Residency

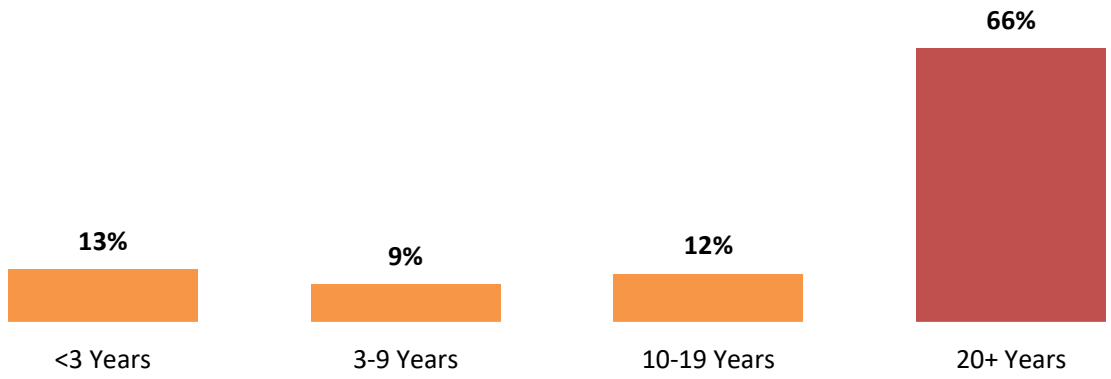
Graph 7. Maricopa County residents accounted for eighty-six percent of all heat-associated deaths amongst victims with a known county of residence.



† Non-Maricopa County Arizona resident cases include residents from Cochise, Coconino, La Paz, Navajo, Pima, Pinal, and Yavapai Counties and cases of unknown county residency in Arizona. There were 15 Arizona residents with an unknown county residence.

‡ Non-Arizona resident cases include residents of Alabama, California, Colorado, Delaware, Florida, Georgia, Guatemala, Idaho, Massachusetts, Minnesota, Mexico, Nevada, New Mexico, Ohio, Pennsylvania, Rhode Island, Tennessee, Washington. There were 12 cases with an unknown state of residence.

Graph 8. Sixty-six percent of heat-associated deaths with known residency had lived in Arizona for 20 or more years at time of death.

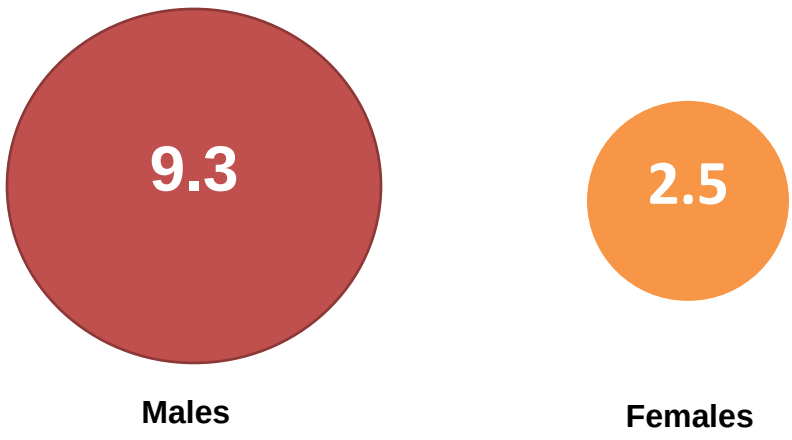


**One-hundred-forty-five cases for which time spent in Arizona was unknown were excluded from analysis*

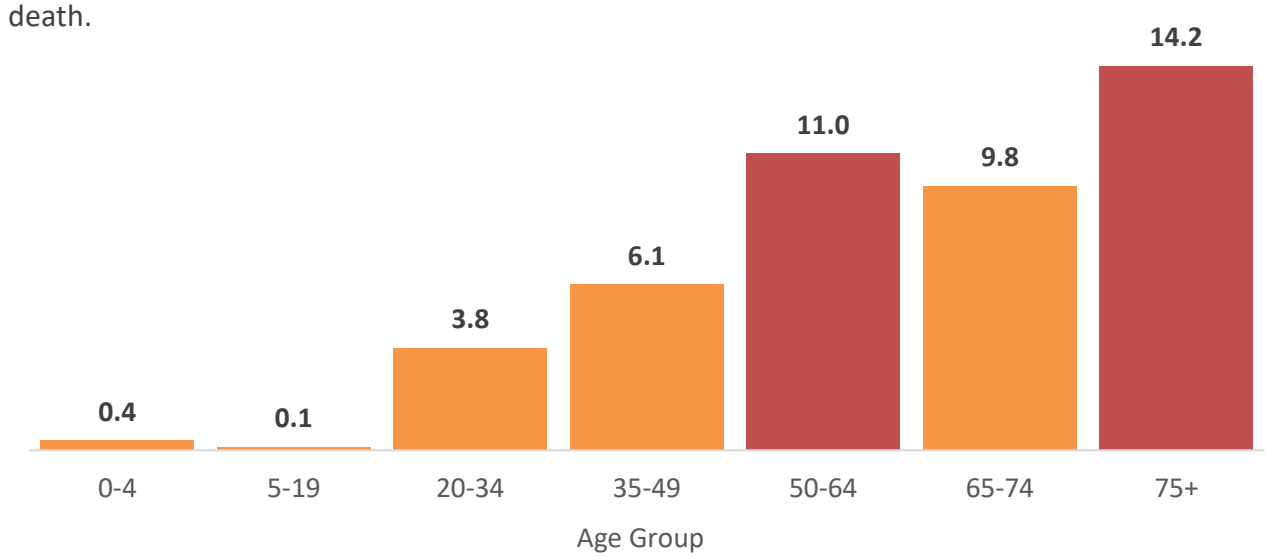
Death Rates Among Maricopa County Residents

There was a total of 267 heat-associated deaths among Maricopa County residents. Heat-associated death rate graphs below represent rates per 100,000 residents. Rates were calculated using 2020 Census demographic population estimates.

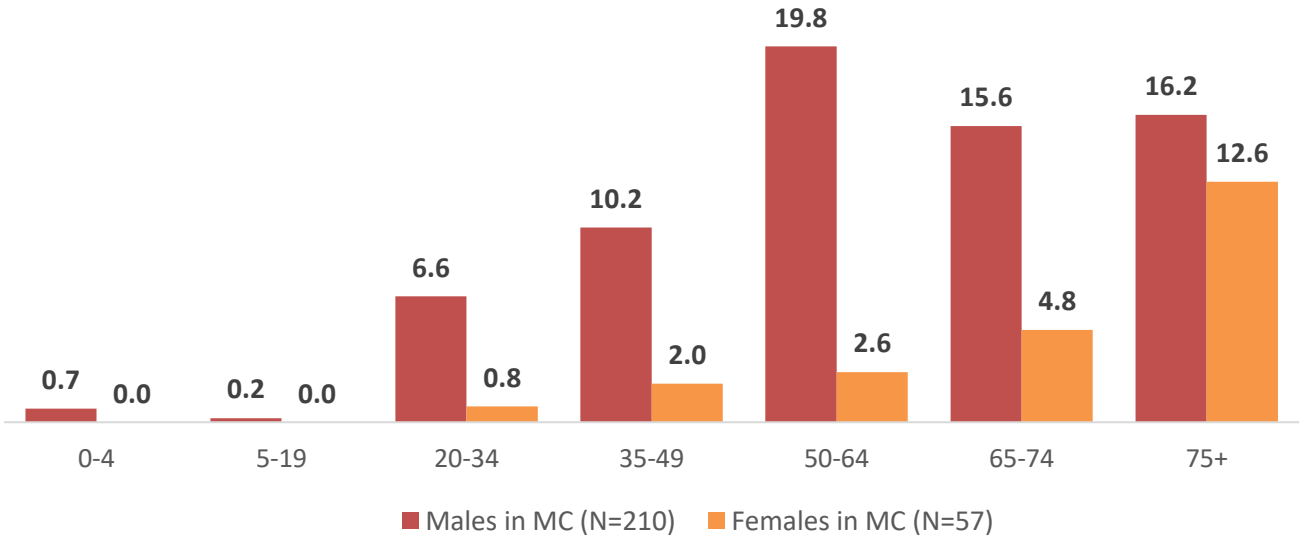
Graph 9. The heat-associated death rate for males in Maricopa County was more than three times greater than the rate for females.



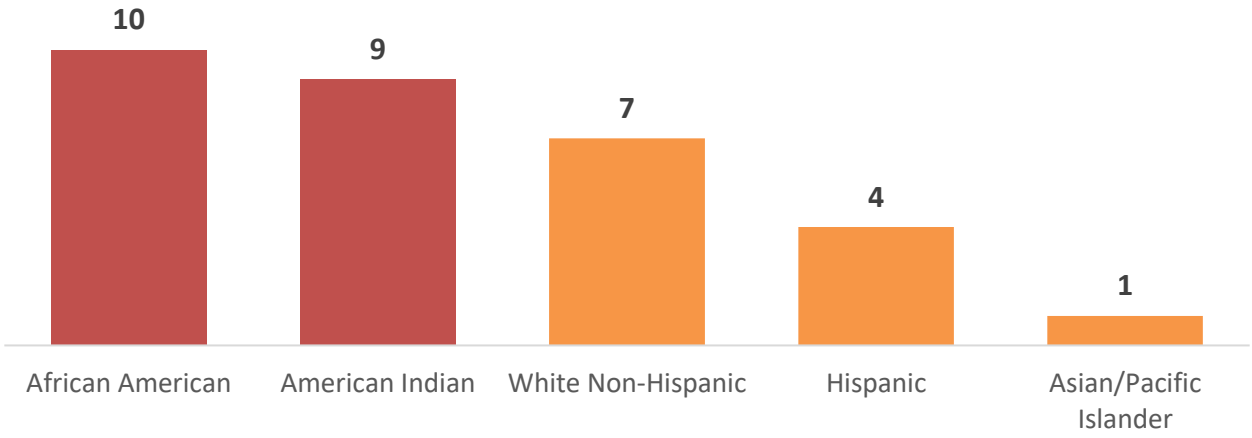
Graph 10. Those aged 50-64 and 75+ had the highest rates of heat-associated death.



Graph 11. For males, the heat-associated death rate was highest among the 50-64 year age group. For females, the heat-associated death rate was highest among the 75+ year age group.



Graph 12. African American and American Indian Maricopa County residents had the highest heat-associated death rates per 100,000 people.



**See specific profiles for more detailed information on African American, Hispanic, and American Indian heat-associated deaths.*

Heat-Associated Deaths by Place of Injury

Table 1. The top 3 cities in Maricopa County with the highest heat-associated death rate per 100,000 people.

City	Number of Deaths	Rate per 100,000
Phoenix	178	11.1
Glendale	20	8.1
Tempe	12	6.6

**Rates based on US Census Bureau 2020 population rate by city.*

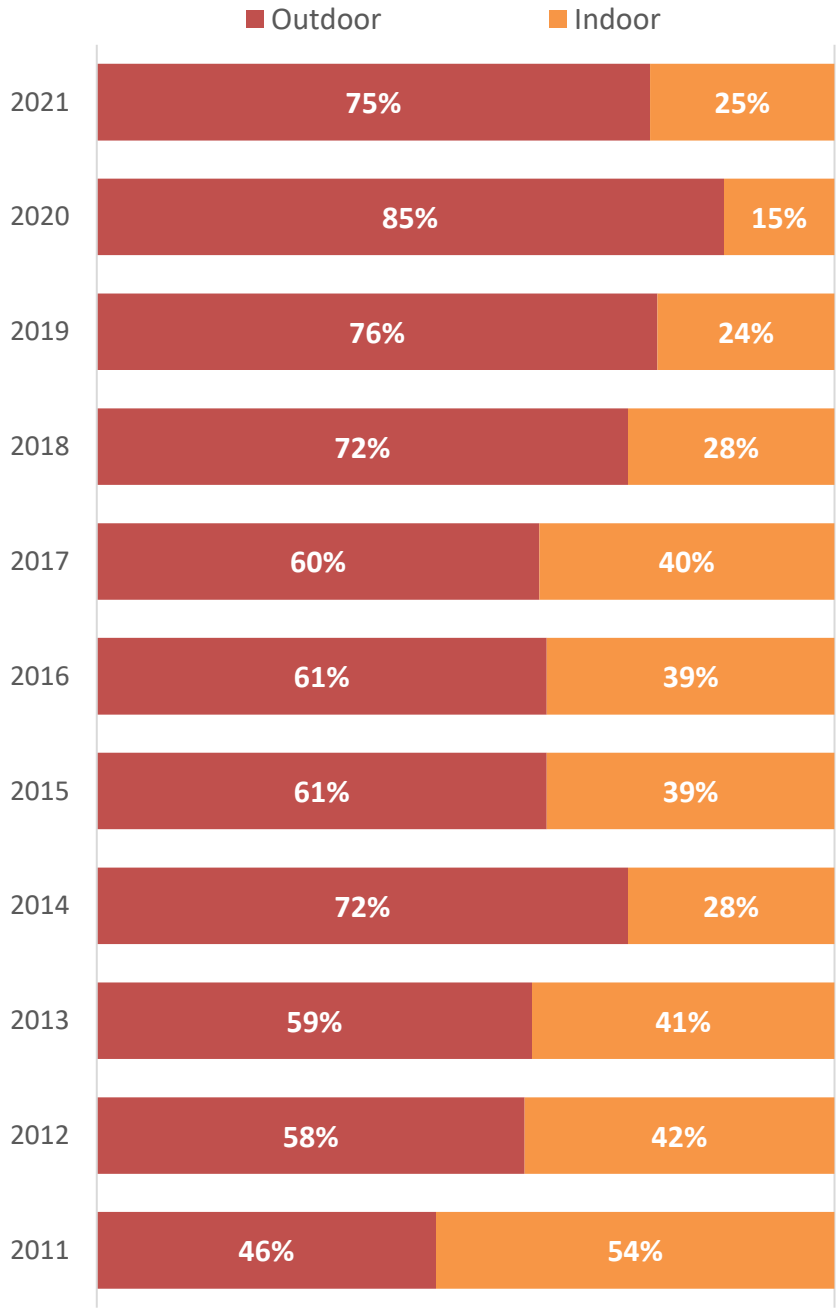
***6 cases are unknown for place of injury city.*

Table 2. Top 5 ZIP codes in Maricopa County with the highest heat-associated death rates.

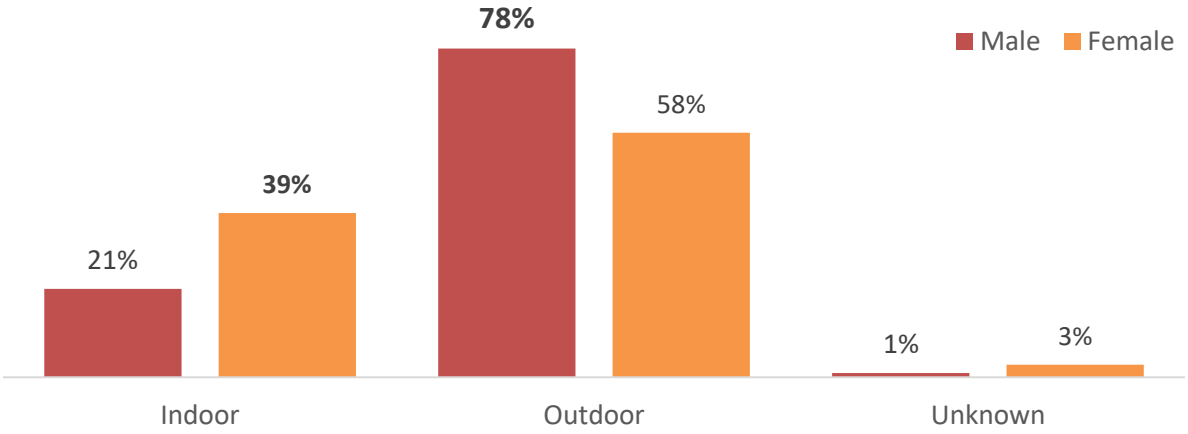
Zip Code	Number of Deaths	Rate per 100,000
85034	13	239.1
85007	15	101.2
85003	7	82.7
85009	19	35.2
85021	12	28.5

**6 cases are unknown for Zip code place of injury*

Graph 13. Since 2018, there has been a greater proportion of deaths occuring outdoors compared to years prior.



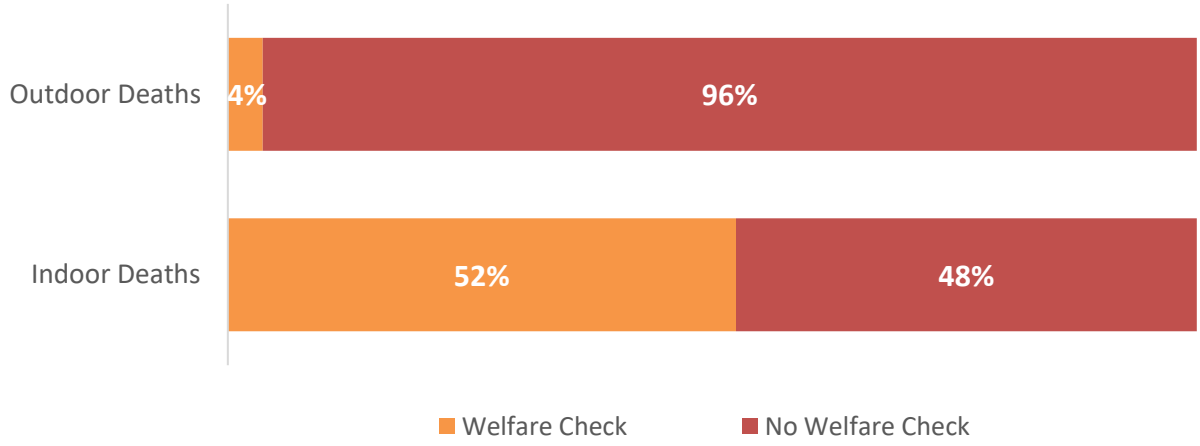
Graph 14. Males have a higher proportion of outdoors deaths compared to females, while females have a higher proportion of indoor deaths.



**5 total cases have an unknown indoor/outdoor place of injury.*

**See Indoor Heat-Associated Deaths profile and Outdoor Heat-Associated Deaths profile for more detailed information on indoor and outdoor heat-associated deaths.*

Graph 15. Fifty percent of indoor deaths were found during a welfare check compared to five percent of outdoor deaths.



Outdoor Deaths

- Fifty-one percent of male outdoor heat-associated deaths occurred in an urban area.
- Thirty-four percent of female outdoor heat-associated deaths occurred in an urban area.
- Fifty percent of male outdoor heat-associated deaths were 50 years or older.
- Sixty-six percent of female outdoor heat-associated deaths were 50 years or older.
- Forty-four percent of male heat-associated deaths were of a racial minority group.
- Twenty-four percent of female heat-associated deaths were of a racial minority group.

Outdoor Demographics

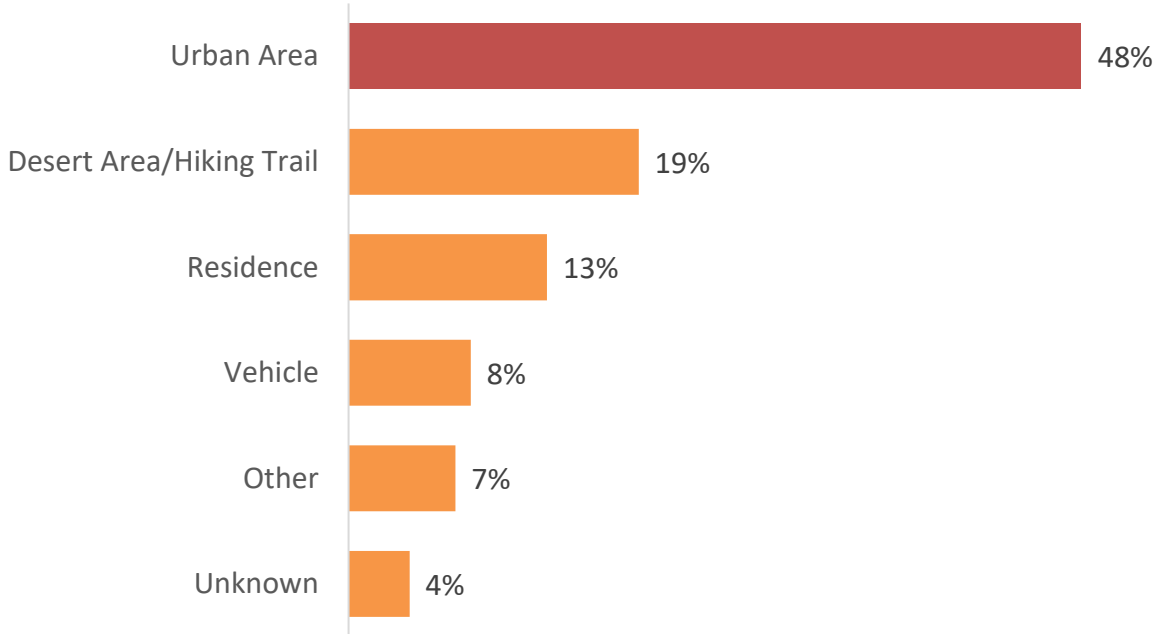
**See Outdoor Heat-Associated Deaths profile for more detailed information on outdoor heat-associated deaths.*

**Other includes park, highway, parking lot, and alley ways*

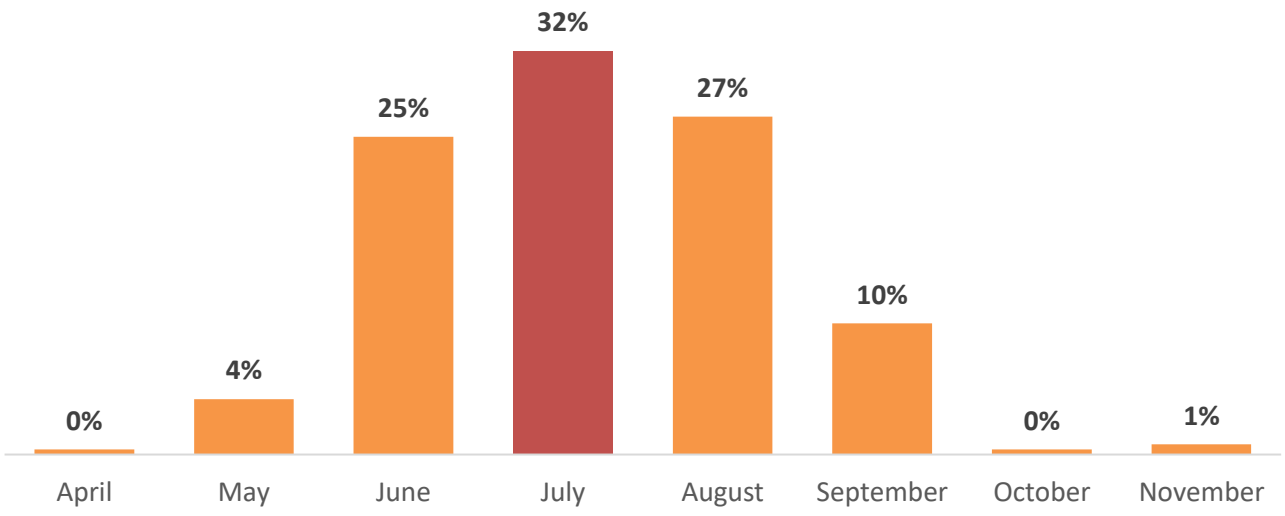
***10 cases have an unknown outdoor injury place type*

****See Vehicle Profile for more detailed information on heat-associated vehicle deaths*

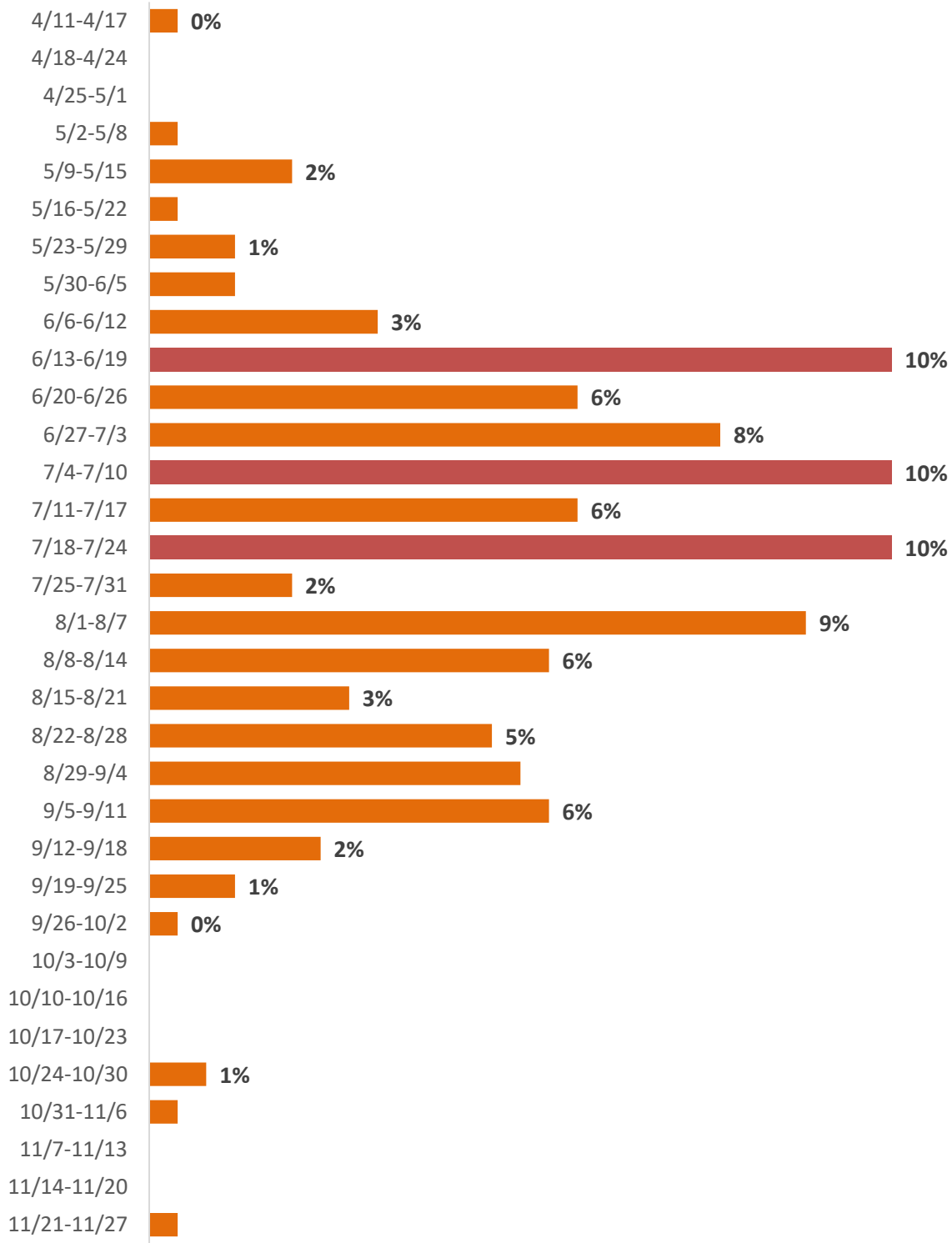
Graph 16. Forty-eight percent of outdoor injuries occurred in an urban area such as a bus-stop or on the sidewalk.



Graph 17. Outdoor heat deaths occured most often in July



Graph 18. The greatest number of deaths by week from an outdoor heat injury happened during mid-June, early July, and late July.



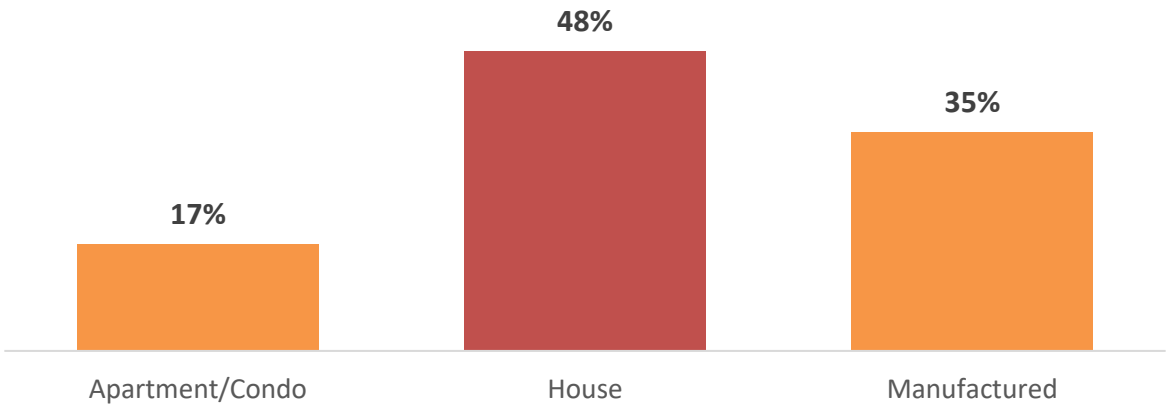
Indoor Deaths

Indoor Demographics

- Forty-six percent of indoor heat-associated deaths occurred among males aged 50-64 years old.
- Fifty-four percent of indoor heat-associated deaths occurred among females 75 years or older.
- Thirty-seven percent of male indoor deaths occurred among people who are a minority race.
- Twenty-three percent of female indoor deaths occurred among people who are a minority race.

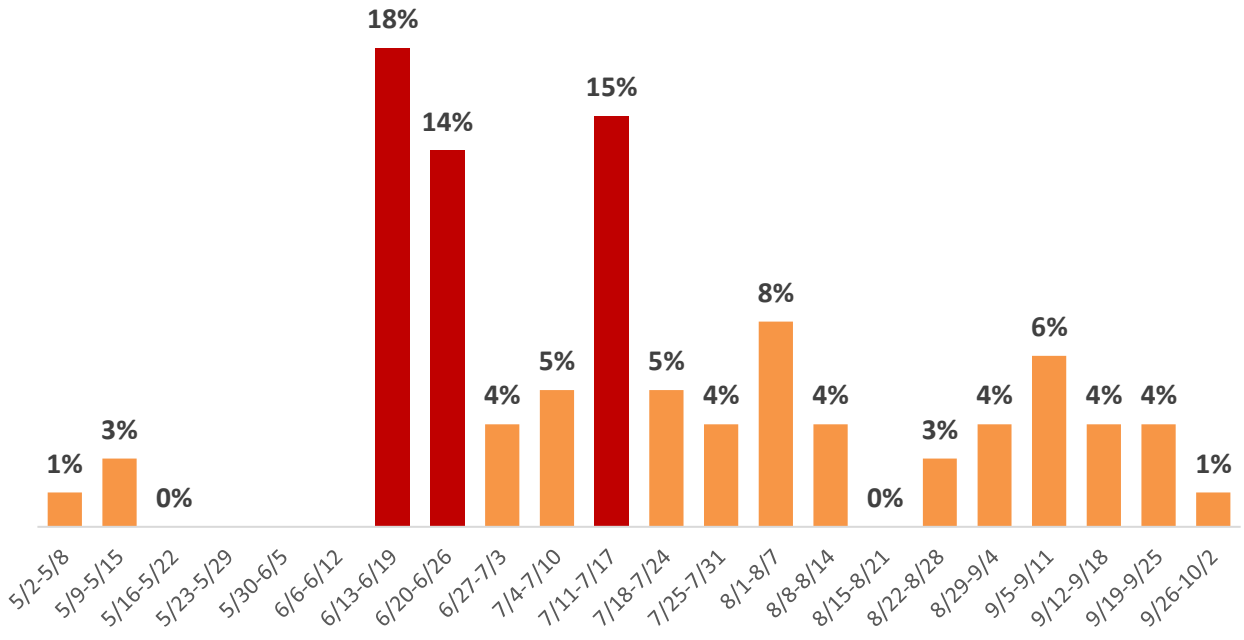
**See the Indoor Heat-Associated Death profile for more detailed information on indoor heat-associated deaths.*

Graph 19. Forty-eight percent of indoor injuries with a known location of injury occured in a house, while thirty-five percent occured in a manufactured home which makes up about 5% of Maricopa County's housing (n=82).

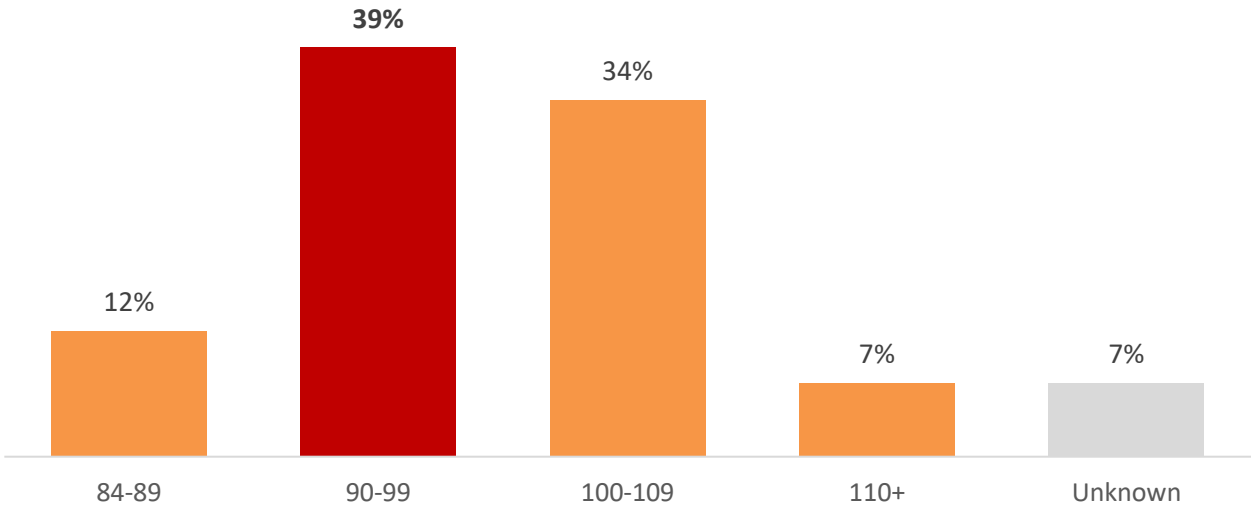


***Unknown Type of Residence is defined as an unspecified living space*
****See Manufactured Home profile for more detailed information on manufactured home heat-associated deaths*
*****Manufactured homes were named mobile homes in previous heat reports*

Graph 20. Around half of the indoor heat deaths occured in a total span of three weeks during mid to late June and mid July (n=82).



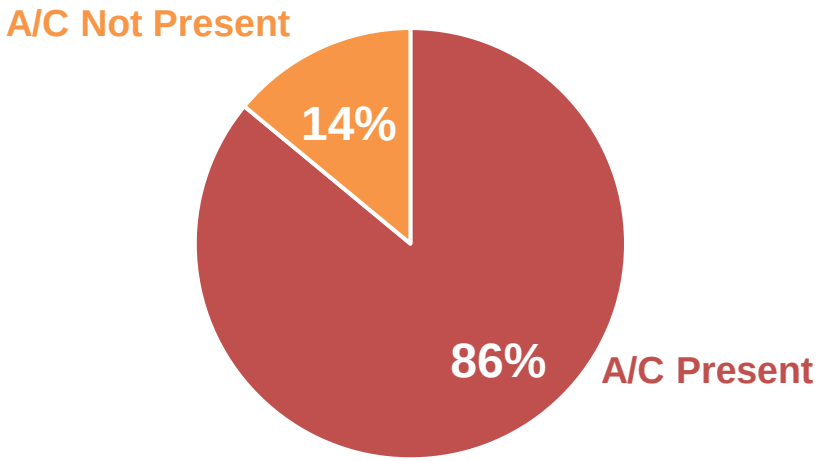
Graph 21. Most indoor heat-associated deaths occured with indoor temperatures between 90°F and 109°F, but can occur at temperatures as low as 84°F (n=82).



Air Conditioning Use for Indoor Injuries

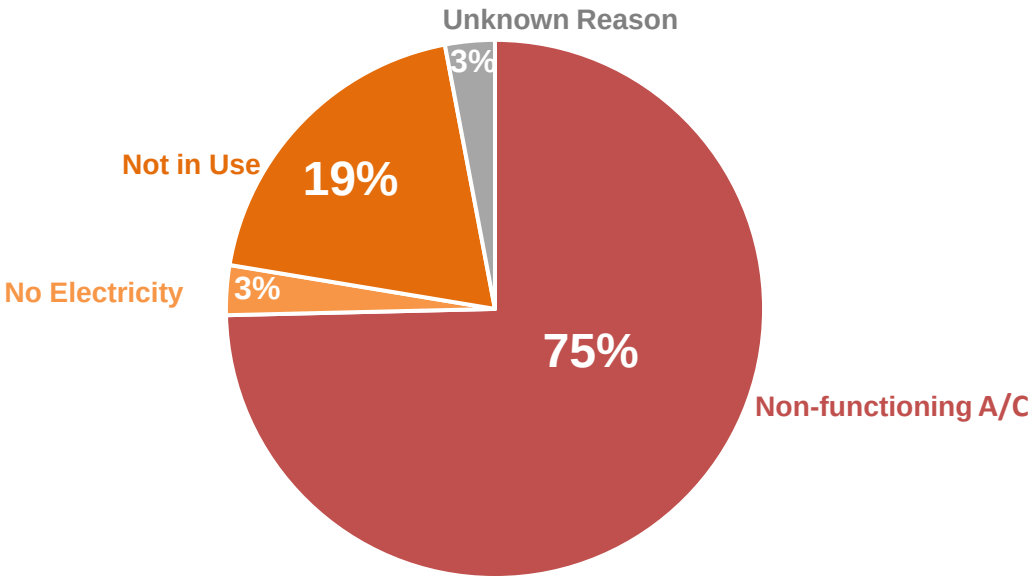
**Evaporative coolers are not considered as A/C units as their ability to cool becomes inadequate in extreme heat.*

Graph 22. Eighty-six percent of indoor heat deaths had an air conditioning unit present at the time of death (N=80)*



**Two unknown cases were not included in the percent calculation.*

Graph 23. Among deaths where an A/C unit was present, a non-functioning A/C unit was the most common reason for not having a cooled environment at the time of death (N=69)* .

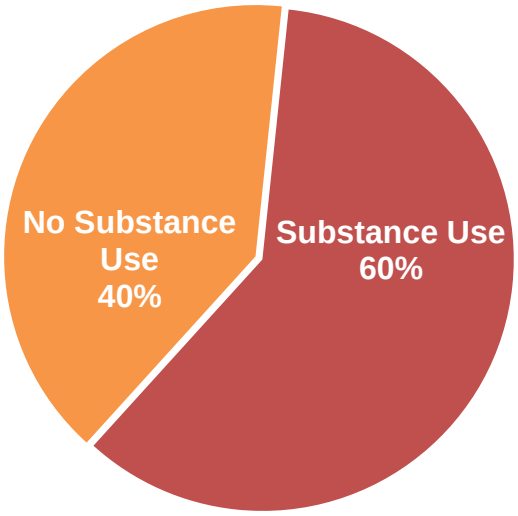


**Two indoor heat deaths with no electricity occurred at the same*

Substance Use among Heat-Associated Deaths

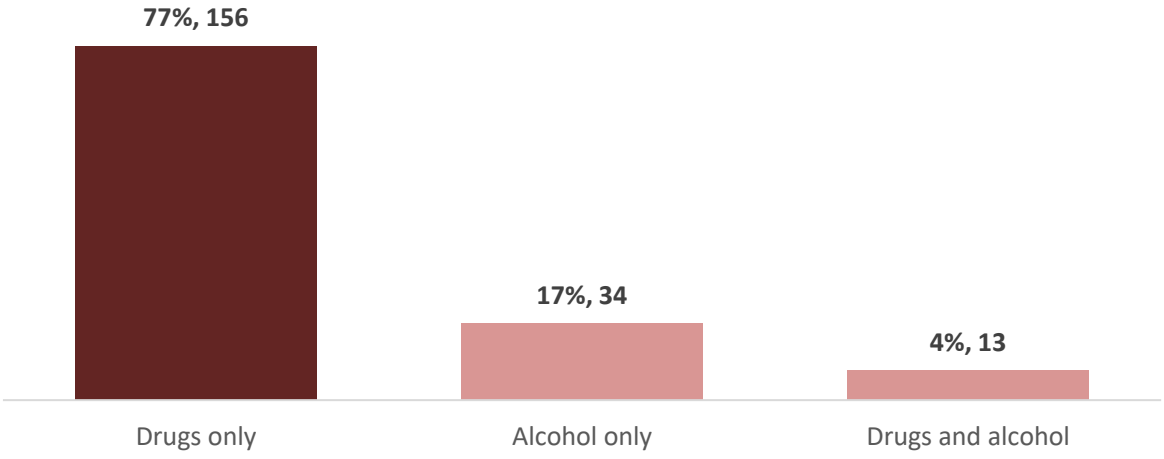
There were a total of 203 heat-associated deaths that involved substance-use that occurred in Maricopa County for 2021. Substance use includes drugs and/or alcohol.

Graph 24. Sixty percent of all cases involved substance use as a cause of death or a contributing factor.



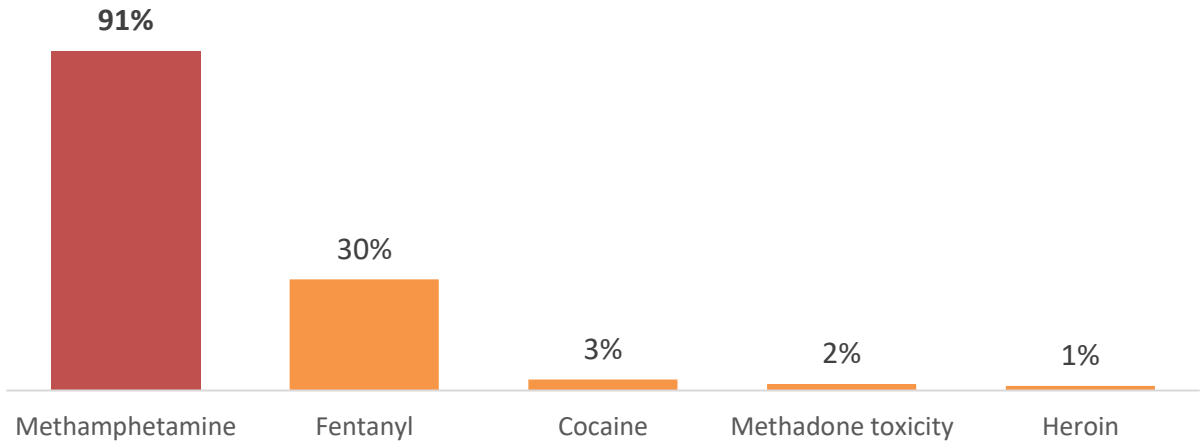
**See Substance Use Profile for more detailed information on substance use heat-associated deaths*

Graph 25. In seventy-seven percent of cases that involved substance use, drug use was listed as either a cause of death or a contributing factor.

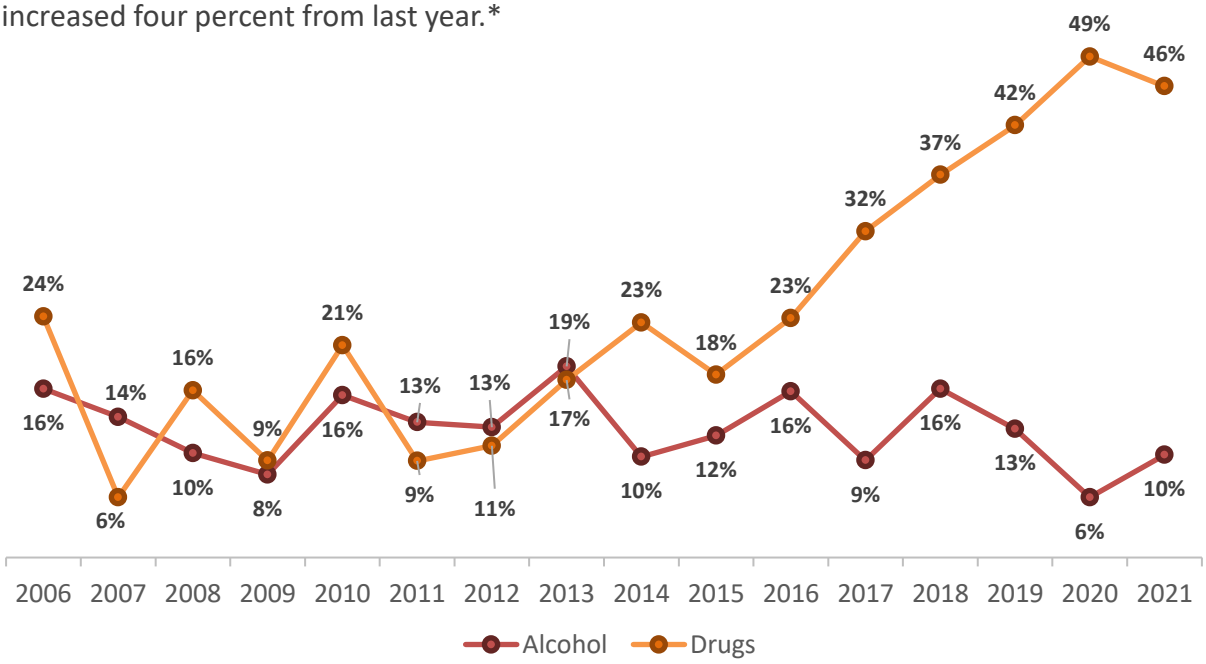


**The types of drugs included in multiple drug toxicity cases were: Methamphetamine, Oxycodone, Fentanyl, Citalopram, Opioids, Benzodiazepines, Lorazepam, Morphine, Hydroxyzine, Aripiprazole, Oxymorphone, Gabapentin, Cyclobenzaprine, Diphenhydramine, and Carisoprodol*

Graph 26. Of the heat-related deaths where drugs were involved (N=169), 91% involved methamphetamine toxicity.

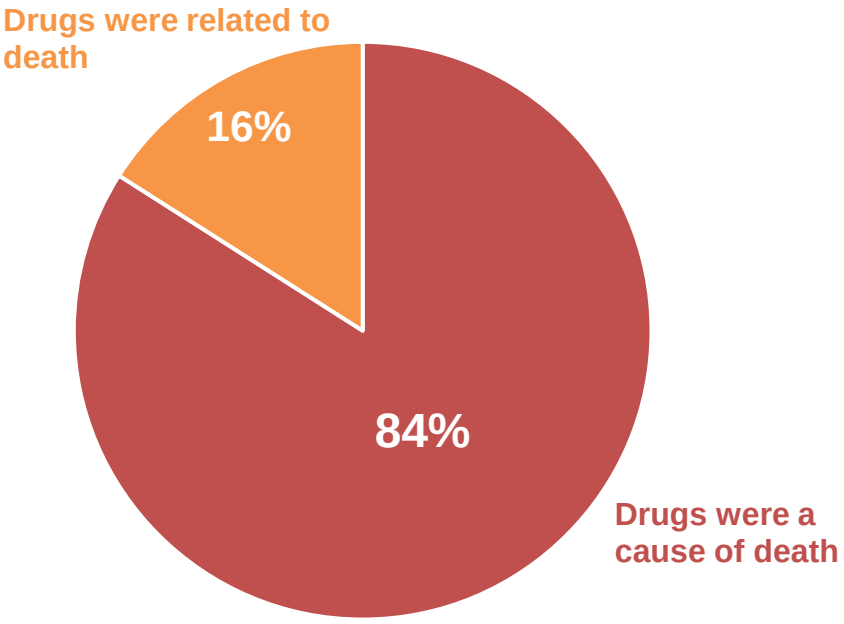


Graph 27. The proportion of heat-associated deaths involving drug use decreased by three percent while the proportion involving alcohol use increased four percent from last year.*



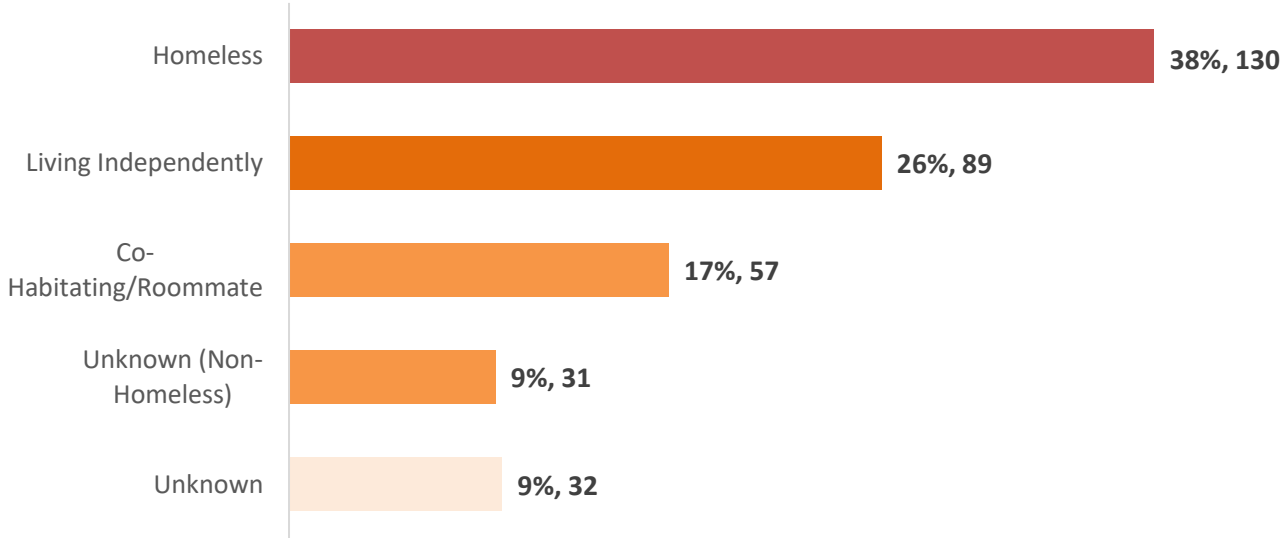
**Does not include cases where both alcohol and drugs were involved in death.*

Graph 28. Of the heat-associated deaths where drugs were involved (N=169), 84% of the time drugs were a primary cause of death.

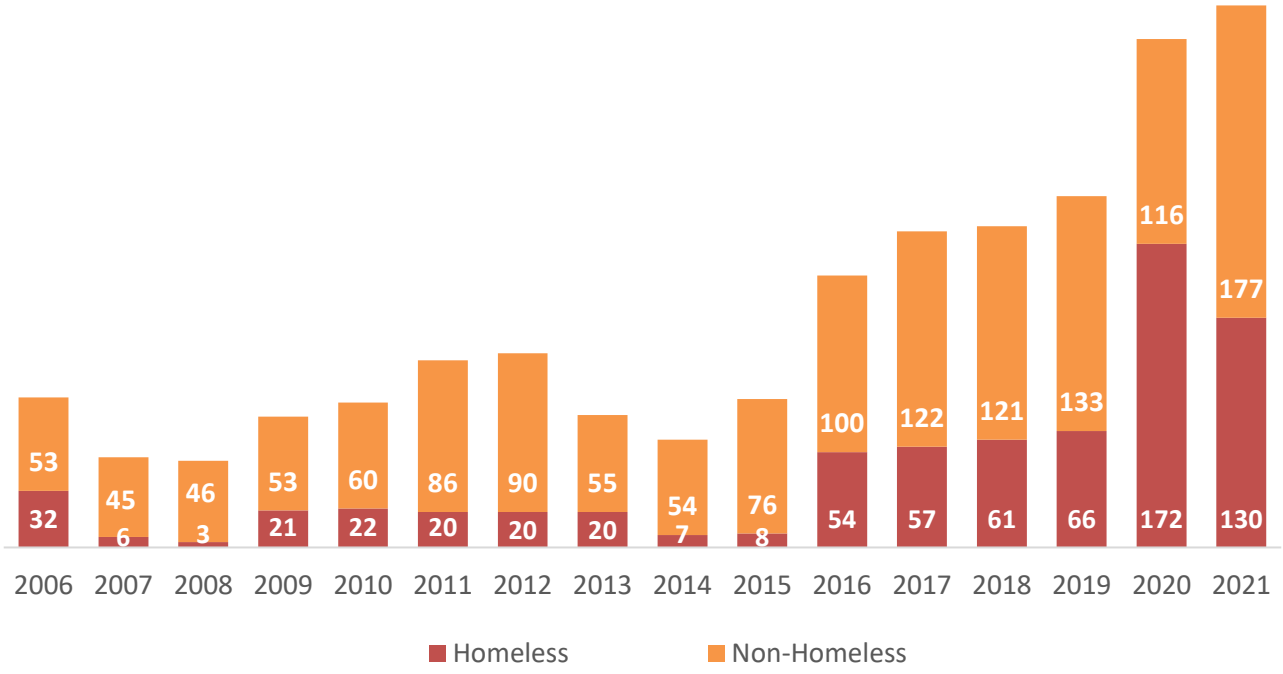


Living Situation among Heat-Associated Deaths

Graph 29. Thirty-eight percent of cases were homeless at time of death.



Graph 30. The number of heat-associated deaths among the homeless population decreased 24% from 2020 to 2021, but it almost doubled from 2019.



**32 cases where living situation was unknown were excluded from the homeless count*

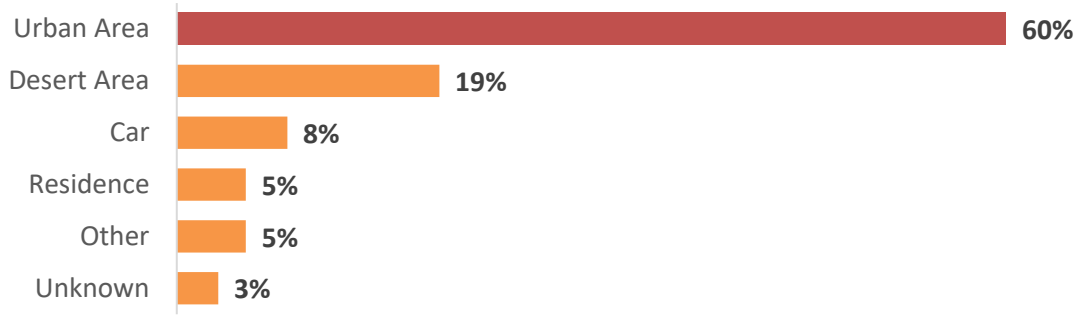
***16 homeless heat-associated deaths had an unknown county of residence*

****See Homeless profile for more detailed information on homeless heat-associated deaths*

Homeless Outdoor Death Demographics

- Ninety-nine percent of homeless deaths occurred outdoors
- Sixty percent of homeless outdoor deaths died in an urban area
- Ninety-two percent of homeless outdoor deaths were male
- Forty percent of homeless outdoor deaths were among 50-64 years old
- Forty-nine percent of homeless outdoor deaths were among White Non-Hispanics; twenty-three percent were among Hispanics, and eighteen percent were among Blacks

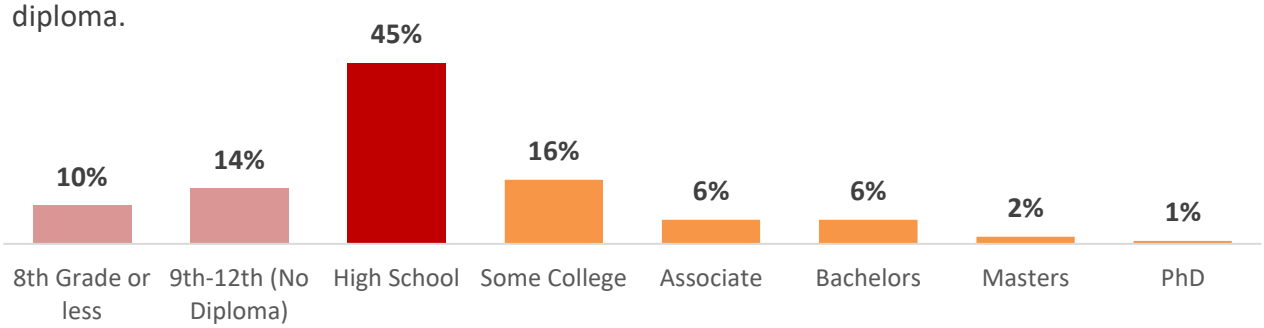
Graph 31. Sixty percent of homeless outdoor deaths (N=129) occurred in an urban area.*



**One homeless death is unknown for outdoor/indoor place of injury.*

Education and Heat-Associated Deaths

Graph 32. 69% of the total number of heat-associated deaths where education is known (N=280) have not received an education higher than a high school diploma.



**56 cases have an unknown level of education*

***Only adults aged ≥20 were included in these results*

Conclusions

- There was a 5% increase in heat-associated deaths between 2020 and 2021 and a 70% increase in heat-associated deaths between 2019 and 2021.
- In 2021, there was a total of 19 Excessive Heat Warning days, and on those days 25% of all heat-associated deaths occurred. The average number of heat warnings for the past 5 years (2017-2021) is lasting for a total of approximately 26 days.
- Most Arizona residents who died from heat-associated deaths lived here for more than 20 years.
- Males, African Americans, American Indians, and those ages 75+ have the highest rates of heat-associated death.
- Males had a 3x higher death rate than females per 100,000.
- The proportion of outdoor deaths was 75% compared to 25% for indoor deaths in 2021.
- Phoenix had the highest number of heat-associated deaths compared to all other cities in Maricopa County.
- Forty-eight percent of heat-related injuries that happened outdoors occurred in an urban area.
- Seventy-five percent of decedents who had A/C at the time of death were reported as having a non-functioning A/C.
- Substance misuse was directly correlated with 60% of all heat deaths, 77% of which involved drugs only.
- Methamphetamine was a contributing factor or main cause of death in 45% of all heat-associated deaths.
- Thirty-eight percent of heat-associated deaths occurred among the homeless population.

Appendices

Appendix 1 - Background and Methodology

Background

In July 2005, Maricopa County (MC) experienced exceptionally high temperatures that contributed to 45 deaths, of which 35 occurred over nine consecutive days. Temperatures reached 116° F and three excessive heat warnings were issued during this month. After this event, the Maricopa County Department of Public Health (MCDPH) created a novel and effective approach for surveillance of heat-associated deaths in 2006 and has continued to use this system annually.

Methodology

Surveillance data is obtained from the following sources:

1. The Maricopa County Office of the Medical Examiner (OME) forwards suspected heat-related deaths to MCDPH and provides data including demographics, preliminary information regarding how the death occurred, and the circumstances of death. In the past, this information came solely as a weekly line list with limited information for each case. However, in February of 2012, MCDPH started receiving all preliminary reports of death (PRODs) from the OME. These reports provide expanded information daily and have changed the screening methods used by MCDPH staff to ensure that all potential heat-related deaths are documented.

2. The MCDPH Office of Vital Registration registers all Maricopa County death certificates in the Arizona Department of Health Services vital records database. The MCDPH Office of Epidemiology 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 because 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 indicated in ***Part I***[1] 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***[2] 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.

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 location, indoor/outdoor occurrence, air conditioning use, and homelessness are retrieved based on explicit notations made in the death certificate and/or OME notes. For the purposes of this report, reasons for not having a cooled environment at the time of death in indoor cases where an A/C unit was present were grouped into three categories: non-functioning, functioning but turned off, and no electricity. "Non-functioning" is defined as an A/C unit that was not operating properly, was broken, or could not be turned on despite the presence of electricity. Cases categorized as having a "functioning but turned off" A/C unit indicates that the unit worked properly but the A/C was turned off for some reason at the time of the OME scene inspection. In cases where the unit could not be turned on due to a lack of electricity, regardless of whether it was functioning or non-functioning, were counted in the "no electricity" category.

Homelessness is defined as having an address on the death certificate that matches a homeless shelter, government agency, business, or 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

[1] **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.

[2] **Part II of the death certificate:** Other significant conditions contributing to death but not resulting in the underlying cause given in Part I.

To receive additional data, please submit a data request form through the Maricopa County Public Health website here. A staff member from the Climate and Health team will contact you to discuss your request.

You may also contact the Climate and Health Team through email:

Tianna Baker: Tianna.baker@maricopa.gov

Aaron Gettel: Aaron.gettel@maricopa.gov

Jackie Ward: Jackie.ward@maricopa.gov

Appendix 2 – Tables

Table 1.

Heat-Associated Deaths by Year

Year	Number of deaths	Under Investigation
2001	21	0
2002	38	0
2003	49	0
2004	42	0
2005	75	0
2006	85	0
2007	51	0
2008	49	0
2009	74	0
2010	82	0
2011	106	0
2012	110	0
2013	75	0
2014	61	0
2015	84	0
2016	154	0
2017	179	0
2018	182	0
2019	199	0
2020	323	0
2021	339	0

Table 2.

Heat-Associated Deaths by Year

Year	Heat-Caused	Heat-Related	Total
2006	58	27	85
2007	38	13	51
2008	32	17	49
2009	47	27	74
2010	48	34	82
2011	57	49	106
2012	63	47	110
2013	42	33	75
2014	33	28	61
2015	45	39	84
2016	88	66	154
2017	90	89	179
2018	119	63	182
2019	138	61	199
2020	213	110	323
2021	194	145	339
TOTAL	1304	848	2152

Table 3.

Heat-Associated Deaths by Month and Classification, Maricopa County, 2021

	March	April	May	June	July	August	September	October	November	December	Total
Heat-Related	0	1	5	39	45	32	22	1	0	0	145
Heat-Caused	0	0	9	53	62	48	19	1	2	0	194
Total	0	1	14	92	107	80	41	2	2	0	339

Table 4.

Heat-Associated Deaths by Year and Month

Years	Jan	Feb	March	April	May	June	July	August	Sept	October	November	December	Total
2007-2009	0	0	0	1	5	27	84	39	14	4	0	0	174
2010-2012	1	0	1	1	7	51	109	93	28	4	3	0	298
2013-2015	0	0	3	2	5	49	89	49	20	2	1	0	220
2016-2018	0	0	3	3	17	122	200	113	45	7	4	1	515
2019-2021	0	0	0	5	29	140	342	248	84	10	3	0	861

Table 5.

Heat-Associated Deaths by Residency

	Maricopa County Resident	**Non-Maricopa County Arizona Resident**	**Non-Arizona Resident**	**Total**	**Unknown**
Total (N=339)	267	18	27	312	27
% of Cases	86%	6%	9%	100%	

Table 6.

Heat-Associated Deaths by Time Residing in Arizona*

Years in Arizona	Number of Deaths n=339	% Deaths
<3 Years	25	13%
3-9 Years	18	9%
10-19 Years	23	12%
20+ Years	128	66%
Total	194	100%
Unknown	145	43%

Heat-Associated deaths by Demographic

Table 7.

Total Deaths by Gender

Gender	N	%
Male	273	81%
Female	66	19%

Table 8.

Total Deaths by Gender and Age Group

Age Group	0-4	5-19	20-34	35-49	50-64	65-74	75+	Unknown	Total
Female	0	0	5	12	14	12	23	0	66
Male	2	1	51	60	99	34	26	0	273
Total	2	1	56	72	113	46	49	0	339
Percent	0.5%	0.2%	17%	21%	33%	14%	14%	0%	100%

Table 9.

Total Deaths by Race

Race	Heat-Associated Deaths	All Deaths (Incl Non-MC Res)
Asian/Pacific Islander	1%	5
American Indian	7%	23
African American	13%	45
Hispanic	18%	60
White	60%	205
Total	100%	339
Unknown	0%	1

Heat-Associated Death Rates

All populations based on US Census Bureau 2020 population counts.

Table 10.

Death Rates by Gender and Age

Gender	Male			Female		
Age Group	Deaths	Population	Rate	Deaths	Population	Rate
0-4	1	139669	0.7	0	133513	0.0
5-19	1	461503	0.2	0	442721	0.0
20-34	33	498641	6.6	4	478914	0.8
35-49	45	439796	10.2	9	442250	2.0
50-64	78	394891	19.8	11	417371	2.6
65-74	30	192741	15.6	11	226935	4.8
75+	22	136195	16.2	22	173941	12.6
TOTAL	210	2263436	9.3	57	173941	2.5

Table 11.

Deaths Rate by Race

Race	% of all Heat-Associated Deaths for which race and ethnicity are known in MC	Rate per 100,000 MC residents	MC Population by Race	All MCR Deaths
Asian/Pacific Islander	1%	1	252864	3
American Indian	5%	9	145400	13
African American	13%	10	337871	34
Hispanic or Latino	17%	4	1309888	46
White Non-Hispanic	64%	7	2533058	171
Total	100%			267

Heat-Associated Deaths by Place of Injury

Table 12.

Gender and Place of Injury

POI	Male	Male N	Female	Female N	Total
Indoor	21%	56	41%	26	82
Outdoor	79%	214	58%	38	252
Unknown		3		2	5
Total		273		66	339

Table 13.

Place of Injury by Year

Year	Outdoor	Indoor	Outdoor	Indoor
2021	75%	25%	252	82
2020	85%	15%	271	46
2019	76%	24%	152	47
2018	72%	28%	128	51
2017	60%	40%	108	71
2016	61%	39%	93	59
2015	61%	39%	51	33
2014	72%	28%	42	16
2013	59%	41%	44	30
2012	58%	42%	62	45
2011	46%	54%	47	56

**Unknowns not included in % calculations.*

Table 14.

Outdoor Place of Injury

Place of Injury (Outdoor)	N	%
Car	20	8%
Desert Area/Hiking Trail	48	19%
Residence	34	14%
Urban Area/Park	122	49%
Unknown	10	4%
Other	18	7%
Total	252	100%

Table 15.

Indoor Place of Injury

Place of Injury (Indoor)	N	%
Mobile (Manufactured) Home	29	35%
House	39	48%
Apartment/Condo	14	17%
Total	82	100%

Table 16.

Welfare Check	Indoor Deaths	Outdoor Deaths
Yes	43	9
No	39	243
Total	82	252
Welfare Check	52%	4%
No Welfare Check	48%	96%

Air Conditioning Use for Indoor Injury

Table 17.

A/C Status

A/C Present (Indoor)	Number of Cases	Percent
A/C Present	69	86%
A/C Not Present	11	14%
Total (not including unknowns)	80	100%
Unknown	2	

Table 18.

A/C Reason

Reasons for not having properly running AC	N
Non-Functioning	52
Not In Use	13
No Electricity	2
Unknown	2
Total	69

Substance Use among Heat-Associated Deaths

Table 19.

Substance use

Substance use status	N	%
Substance Use	203	60%
No Substance Use	136	40%

Table 20.

Substance Type

Substance	N	%
Drugs only	156	77%
Alcohol only	34	17%
Drugs and alcohol	13	6%
TOTAL	203	

Table 21.

Type of Drug Used (Cause or Related to Death)

Drug Name	# of Cases Drug was Involved in Death	Cause of Death	Related to Death
Methamphetamine	158	128	24
Cocaine	5	5	0
Fentanyl	50	44	6
Total	213	182	30

Table 22.

Substance Use by Year*

Year	Alcohol	Percent	Drugs	Percent
2006	14	16%	20	24%
2007	7	14%	*	6%
2008	*	10%	8	16%
2009	6	8%	7	9%
2010	13	16%	17	21%
2011	14	13%	10	9%
2012	14	13%	12	11%
2013	14	19%	13	17%
2014	6	10%	14	23%
2015	10	12%	15	18%
2016	25	16%	36	23%
2017	17	9%	57	32%
2018	30	16%	68	37%
2019	25	13%	84	42%
2020	19	6%	158	49%
2021	34	10%	156	46%

**Does not include cases where both alcohol and drugs were involved in the death.*

Living Situation among Heat-Associated Deaths

Table 23.

Living Situation Type

Living Situation	N	%
Homeless	130	38%
Living Independently	89	26%
Co-Habiting/Roommate	57	17%
Unknown (Non-Homeless)	31	9%
Unknown	32	9%
Total	339	100%

Table 24.

Living Situation by Year*

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	202
Homeless	32	6	*	21	22	20	20	20	7	8	54	57	61	66	172	130
Non-Homeless	53	45	46	53	60	86	90	55	54	76	100	122	121	133	116	177
Percent Homeless	38%	12%	6%	28%	27%	19%	18%	27%	11%	10%	35%	32%	34%	33%	60%	42%

**Does not include unknown living situation cases.*

Education Level Among Heat-Associated Deaths

Table 25.

Education

Education Level	# of Deaths	% of Total Deaths
8th Grade or less	27	10%
9th-12th (No Diploma)	40	14%
High School	128	45%
Some College	45	16%
Associate	17	6%
Bachelors	17	6%
Masters	5	2%
PhD	2	1%
Total	281	100%