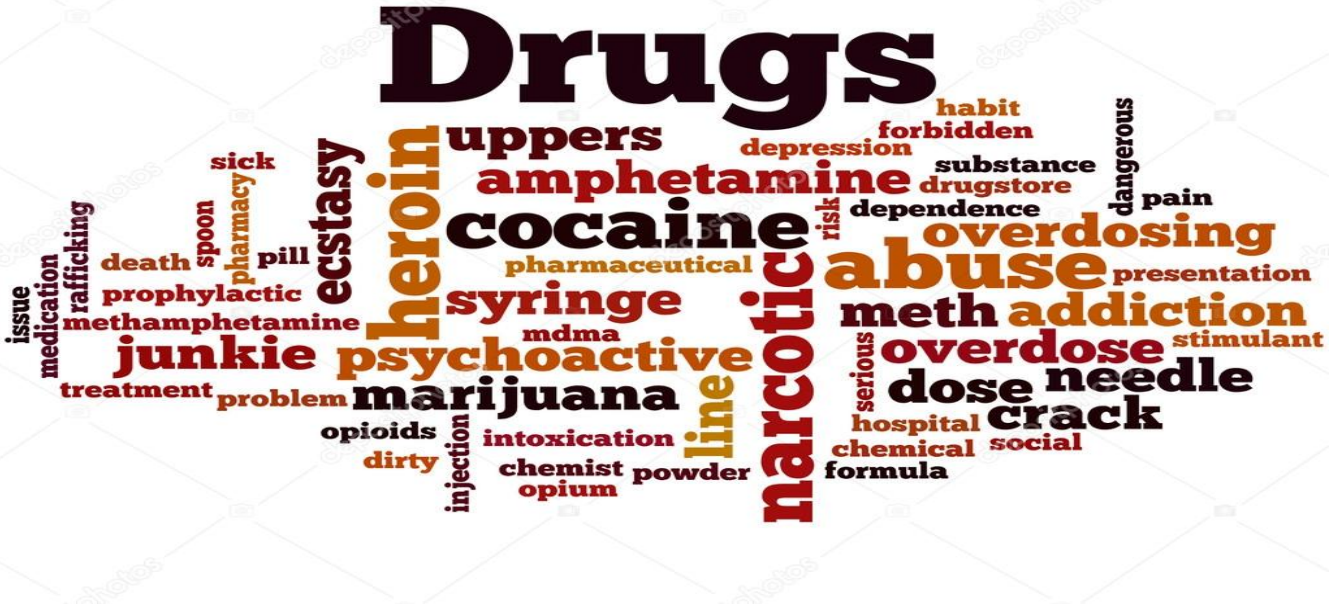
Poisonings among Arizona Residents 2017



Resources for the development of this report were provided through funding to the Arizona Department of Health Services from the Centers for Disease Control and Prevention, Cooperative Agreement 5U17CE002023 Core Violence and Injury Prevention Program.

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December, 2018

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Executive Summary

The data presented in this report show that poisoning is a public health problem that impacts the lives of thousands of Arizona residents each year. These injuries can occur throughout the life span, and like so many injuries, poisonings are preventable. Understanding the circumstances of poisonings is an important step towards educating and empowering communities and implementing prevention strategies.

Poisoning was the leading cause of injury-related mortality among Arizona residents in 2017. There were 1,637 deaths among Arizona residents, where death certificate listed poison code as the primary cause of death. The age-adjusted poisoning mortality rate in 2017 was 24.0 deaths per 100,000 residents and represents a 7% increase from 2016. Males aged 45 to 54 years had the highest rate of poisoning-related deaths with 59.5 deaths per 100,000 residents. Age-adjusted poisoning mortality rates were highest among American Indians or Alaska Natives (41.8). The manner of death for majority of poisoning related deaths was unintentional (84%, n=1,376), followed by suicides (10%, n=171).

The most common poison specified on the death certificates of these 1,637 deaths were pharmaceutical opioids (n=597), psychostimulants (including methamphetamine, n=562), and heroin (n=329). Sixty-seven percent of pharmaceutical opioids were among White Non-Hispanic residents. Among pharmaceutical opioids deaths, males aged 35 to 44 years had the highest rate (19.2 deaths per 100,000 residents), while for females the 55 to 64 years age group had the highest rate (13.9 deaths per 100,000 residents). Sixty-nine percent of pharmaceutical opioids related deaths occurred in Maricopa County. The age-adjusted psychostimulant poisoning mortality rate for 2017 was 8.4 deaths per 100,000 residents. Residents 45 to 54 years of age made up 28% of psychostimulant poisoning deaths. Methamphetamine was identified and used in 96% of psychostimulant poisoning deaths. The age-adjusted heroin poisoning mortality rate for 2017 was 4.9 deaths per 100,000 residents, and represents an 11% increased from 2016. In 2017, the 25 through 34 years age group had the highest rate for fatal heroin poisoning (11.4 deaths per 100,000 residents).

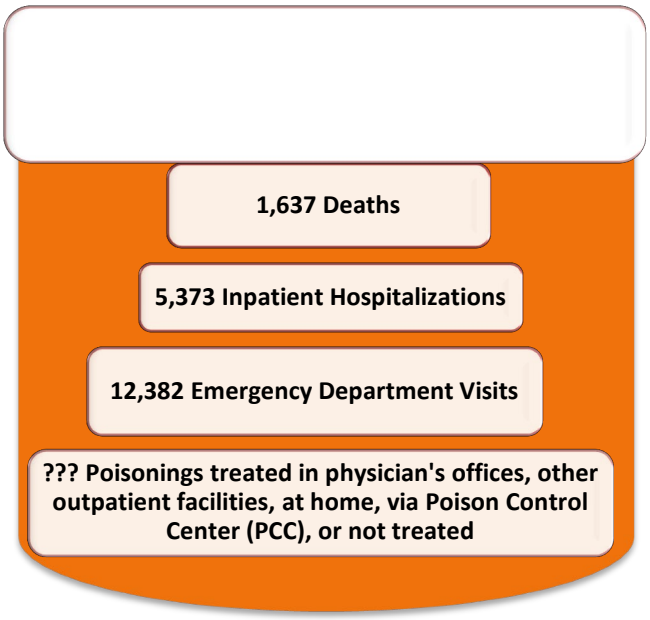
There were 5,373 poisoning-related inpatient hospitalizations among Arizona residents. Overall, inpatient hospitalization (IP) rates due to poisoning have decreased by 24% since 2013. Adult females continue to have the highest rates of poisoning-related inpatient hospitalizations. Females aged 55-64 years old had the highest rate with 113.6 hospitalizations per 100,000 residents. For males, the highest rate was among those 25 through 34 years of age (107.8 hospitalizations per 100,000 residents). White Non-Hispanics had the highest age-adjusted poisoning-related rate of IP with 91.4 hospitalizations per 100,000 residents, followed by Hispanics Black or African Americans (91.1 hospitalizations per 100,000 residents). Unintentional poisoning accounted for 56% of poisoning-related IP (n=3,023), intentional poisonings comprised an additional 41% (n=2,197). Hospital charges for poisoning-related inpatient hospitalizations totaled more than $239.3 million, with charges to AHCCCS totaling over $112.9 million (n=2,549, 47%). Arizona residents spent a total of 19,553 days hospitalized for poisoning injuries. Gila County had the highest age-adjusted rate of IP due to poisonings (160.7 hospitalizations per 100,000 residents), followed by Pima County (93.4 hospitalizations per 100,000 residents).

There were 12,382 poisoning-related emergency department visits among Arizona residents. Overall, Emergency Department Visits (EDV) rates due to poisoning have increased by 2.8% since 2013. The highest age-specific rates of poisoning-related emergency department visits were among children aged 1 to 4 years old with 331.4 EDV per 100,000 residents, followed by young adults 15 to 24 years of age (329.4 EDV per 100,000 residents). Sixty-two percent of the poisoning-related EDV were the result of unintentional poisonings (n=7,608), and thirty-four percent of the EDV resulted from intentional injuries (n=4,218). Graham County and Gila County had the highest rate with 299.5 EDV and 291.7 EDV per 100,000 residents, respectively.

Overview of Poisonings among Arizona Residents

Poisoning, particularly drug poisoning, has emerged as a significant public health concern in the United States and Arizona. Beginning in 2007, poisoning-related deaths surpassed motor-vehicle crashes as the leading injury-related cause of death among Arizonans.[1] As this report shows, the burden of poisoning-related injuries has been increasing steadily over the past decade, accounting for a greater percentage of injury-related morbidity and mortality. Figure 1 shows the overview of the number of poisoning-related events by outcome and illustrates the **limitations of currently available data sources and the inability to enumerate the true number of poisonings.**

Figure 1. Primary Diagnosis for Poisoning Outcomes Pyramid, Arizona 2017



This report presents a comprehensive picture of poisoning-related injuries among Arizona residents in 2017, as well as poisoning trends during the five years since 2013. **Data includes cases where the cause of death, hospitalization, or emergency department visit among Arizona residents was due to poisoning, which were identified by having a primary diagnosis or cause of death code for poisoning.** To help better understand the data, information about poison control centers is also presented. For additional information about data sources and methods used, please refer to the Methodology section of this report. ***In order to learn about preventing poisonings, please refer to the Prevention Tips and Resources section of this report.*** Figure 2 illustrates shows the gradual increase in poisoning deaths in Arizona for the last ten years, 2007 through 2017. Also included in figure 2 are drug overdose fatalities, a sub-category of poisoning deaths that include overdoses from prescription drugs, illicit drugs and/or over-the-counter drugs, as the underlying cause of poisoning death. Since 2007 poisoning deaths have increased by 49%, while motor vehicle crash deaths have decreased by 31% during the same time period.

[1] Please refer to the Methodology Section for a description of the types of poisonings included in this report; these numbers may not match other publications.

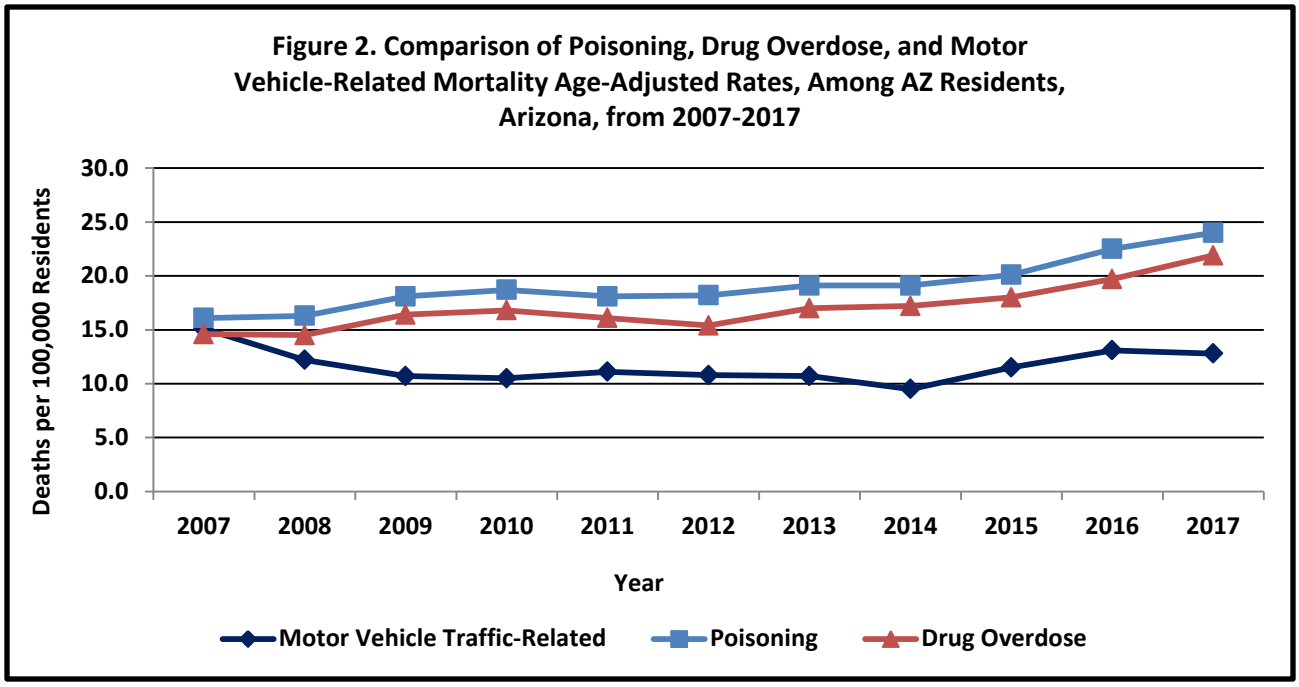


Figure 2. Comparison of Poisoning, Drug Overdose, and Motor Vehicle-Related Mortality Age-Adjusted Rates, Among AZ Residents, Arizona, from 2007-2017
Deaths per 100,000 Residents
30.0
25.0
20.0
15.0
10.0
5.0
0.0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year
Motor Vehicle Traffic-Related
Poisoning
Drug Overdose

Poison Control Centers Serving Arizona

Poison Control Centers (PCCs) are widely considered to be a cost-effective tool for reducing healthcare costs resulting from poisoning events. A recent study on the cost-savings analysis and return on investment regarding poison control centers found that every dollar invested in America's poisoning centers saves $13.39 in health care costs and lost productivity. [2] In total, the poison center system saves approximately $1.8 billion per year in medical costs and productivity.[3] Because of the clear benefit to citizens, the state of Arizona has mandated the existence of a PCC since 1980. Per Arizona Revised Statutes (ARS) 36-1161 through 36-1163, the Arizona Department of Health Services is responsible for establishing a poison and drug information system consisting of two poison control centers. While the poison control centers are charged with serving as a resource for poison identification and treatment, they are also tasked with educating the public about poisoning prevention.

The Arizona Poison and Drug Information Center (APDIC) is affiliated with the University of Arizona College of Pharmacy located in Tucson and the Banner Good Samaritan is located in Phoenix. The PCC serves the whole state of Arizona.

Similar to other nationally recognized PCCs, both Arizona centers are accessed by calling the National Poison Control Center toll-free telephone number: 1-800-222-1222. Calls to this number are routed to the appropriate PCC based on geography. Because calls are routed based on the telephone number from which the call is placed, individuals with an Arizona telephone area code will speak to representative of the PCC even if they are calling from outside Arizona. Individuals are encouraged to call PCCs with any concerns, whether or not an incident has occurred. While providing information and medical advice about poisonings, Arizona's PCC provide additional services to residents including drug information and identification, medical consultation with clinicians, and poisoning prevention education and outreach.

In 2017, the Arizona's PCC documented 64,173 calls for human exposures to toxins and poisons, out of 86,763 total calls (73%). Majority of human exposure calls to toxins and poisons were managed at home or non-health facility (68%, n=43,432), while another 28% (n=17,884) of the calls were managed in a healthcare facility.

The availability of a 24-hour poison control center allows many people who may have sought emergency care to be treated in their own homes, resulting in financial savings for themselves and the healthcare facilities they may have otherwise visited. It is estimated that more than 50,000 callers may have sought medical treatment at an emergency department in 2017 if they had not been able to consult with the poison control center and care for themselves at home. PCC centers means the community prevented more than $58 million in emergency treatment costs.

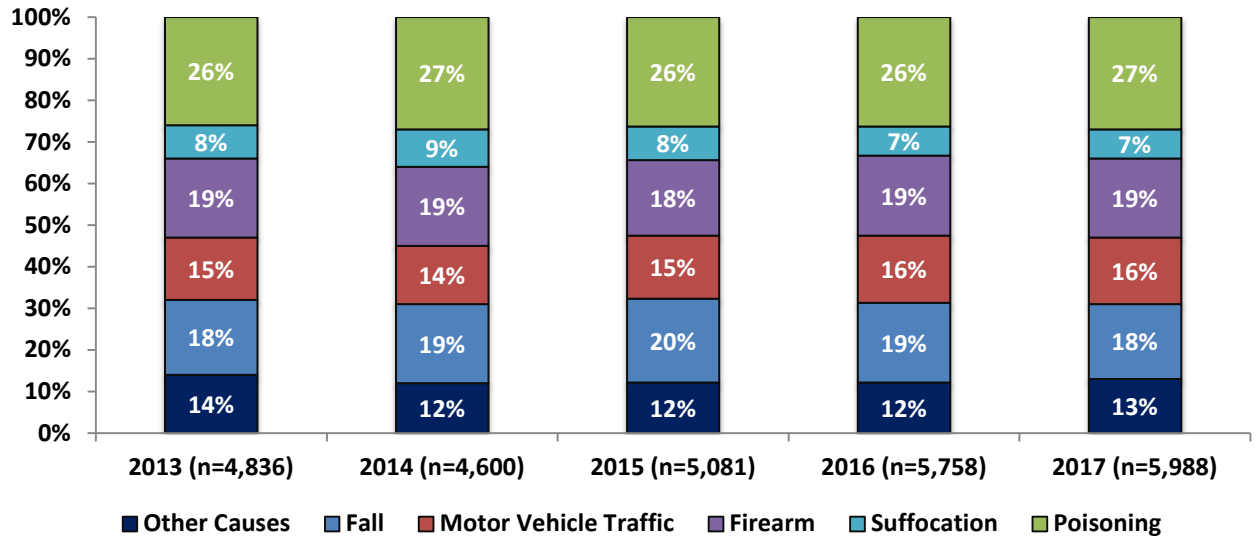
[2,3] The Lewin Group. (2012) Final Report on the value of the Poison Center System. [White Paper]. Retrieved from https://aapcc.s3.amazonaws.com/files/library/Value_of_the_Poison_Center_System_FINAL_9_26_2012_--_FINAL_FINAL_FINAL.pdf

Five-Year Trends in Poisonings among Arizona Residents, Arizona, from 2013-2017

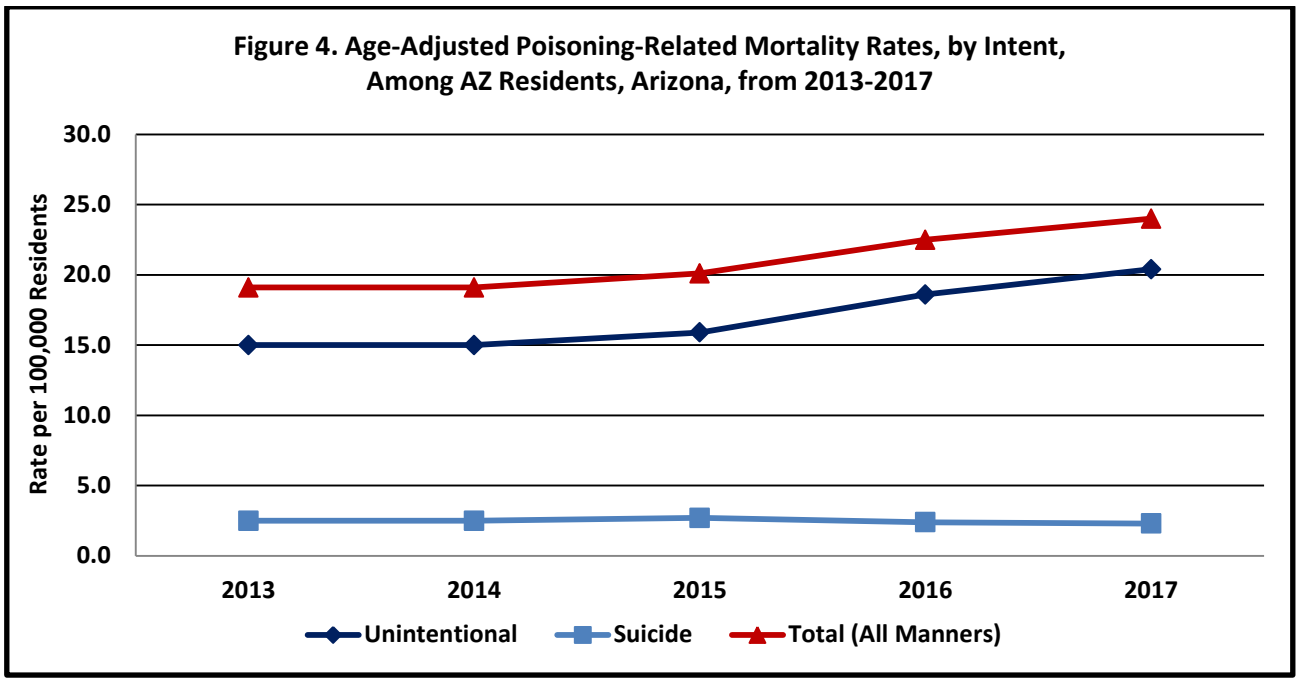
Mortality

Injuries account for approximately ten percent of deaths among Arizona residents each year and the proportion of injuries have remained relatively stable over time. Since 2013, the percentage of poisoning-related deaths has increased slightly, from 26% of all injury-related deaths in 2013 (n=1,257) to 27% of injury-related deaths in 2017 (n=1,637). Over this five-year period, the number of injury-related deaths has increased 24%, from 4,836 deaths in 2013 to 5,988 deaths in 2017. Figure 3 shows the distribution of injury-related deaths by mechanism of injury over the five year period from 2013 through 2017.

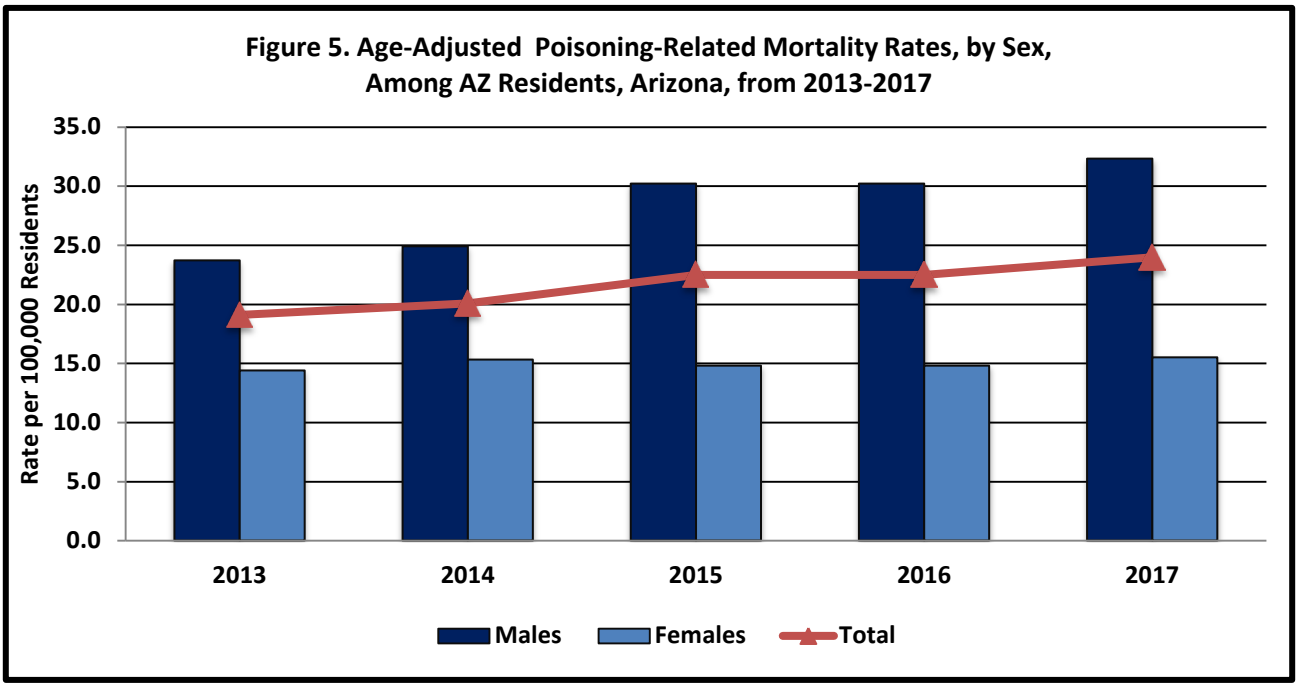
Figure 3. Proportion of Injury-Related Fatalities, by Mechanism of Injury, Among AZ Residents, Arizona, from 2013-2017



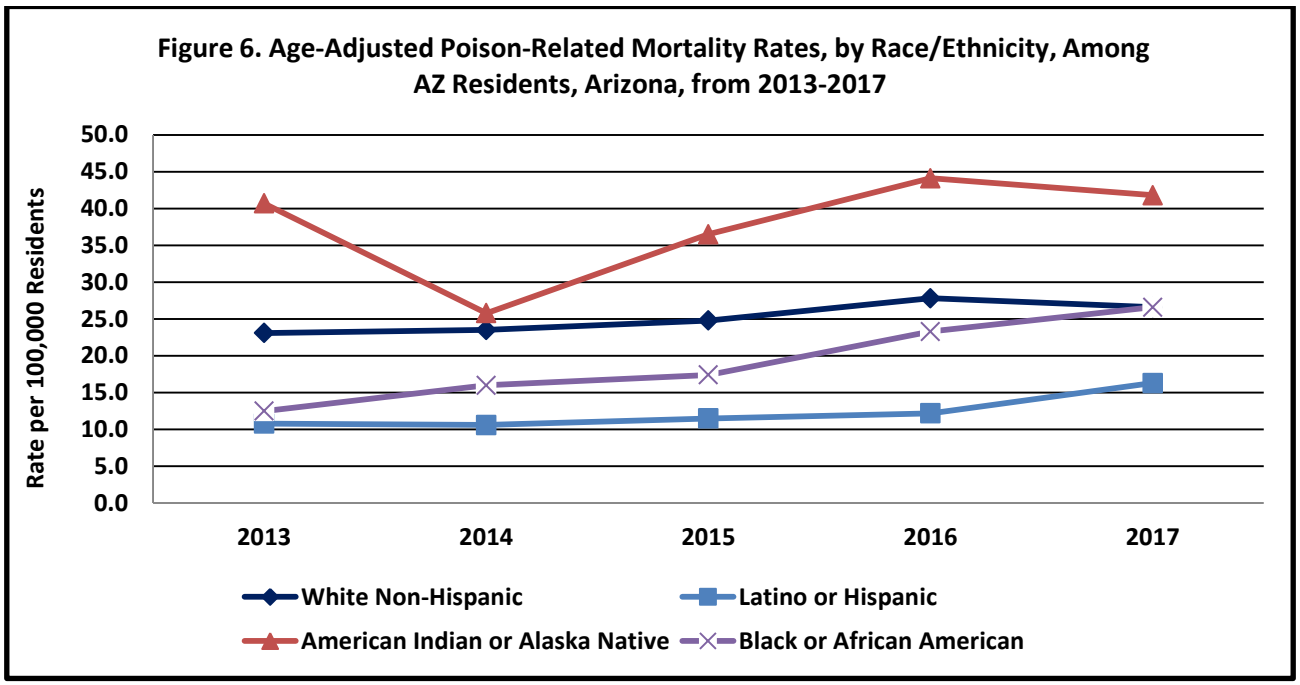
Between 2013 and 2017, the age-adjusted poisoning-related mortality rate increased by 26% for Arizona residents. This overall increase is attributable to the rate of unintentional poisoning deaths, which has increased by 36% in 2017 (20.4 deaths per 100,000 residents) from since 2013 (15.0 deaths per 100,000 residents). Overall from 2013-2017, suicide-related poisonings have decreased by 8% since 2013. Figure 4 displays the age-adjusted poisoning-related mortality rates by manner of death for Arizona residents from 2013 to 2017.



Overall, male mortality rates due to poisoning were consistently higher than females between 2013 and 2017. The age-adjusted poison mortality rate increased by 36% for males (36.2 deaths per 100,000 residents) and 8% for females (15.5 deaths per 100,000 residents) in 2017 compared to 2013 (23.7 deaths per 100,000 for males, and 14.4 deaths per 100,000 residents for females). Figure 5 shows the age-adjusted poisoning-related mortality rates by gender during the five year period.



Overall the age-adjusted poison-related mortality increased across all race/ethnicity groups from 2013-2017. American Indians or Alaska Native residents continued to have the highest poisoning-related mortality rate at 41.8 deaths per 100,000 residents, and represents a 5% decrease from 2016 (44.1 deaths per 100,000 residents). Mortality rates increased 14% for Black or African American and 33% for Latino or Hispanic residents from 2016. Figure 6 shows the age-adjusted poisoning-related mortality rates by race/ethnicity for Arizona residents from 2013 to 2017. Due to small numbers, age-adjusted poisoning-related mortality rates have not been presented for Asian residents.



While the trend is not supported in all counties, the rate of poisoning-related fatalities in Arizona increased 12% between 2013 and 2017. Age-adjusted mortality rates increased from last year for all counties except Gila, La Paz, Mohave, Navajo, Pinal, and Yuma. Table 1 shows the age-adjusted mortality rate per 100,000 residents for poisoning-related deaths by county of residence from 2013 to 2017.

Table 1. Age-Adjusted Mortality Rates per 100,000 Residents for Poisoning-Related Deaths, by County, Among AZ Residents, Arizona, from 2013-2017

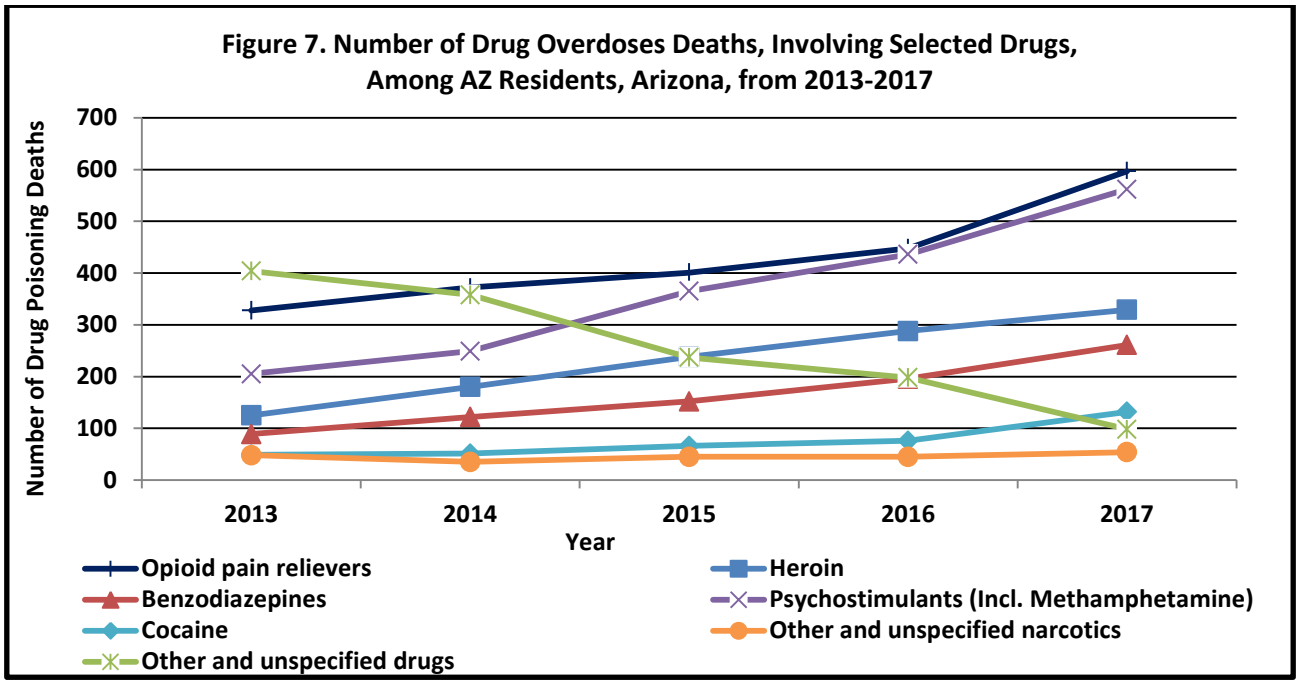
	2013	2014	2015	2016	2017
Apache*	9.5	30.0	42.7	45.3	33.5
Cochise*	9.8	15.7	31.5	20.2	23.9
Coconino*	36.1	24.2	26.9	27.3	35.2
Gila	28.1	48.8	38.1	51.3	39.9
Graham*	20.4	17.4	23.6	18.0	19.0
Greenlee*	**	20.9	43.6	**	**
La Paz*	28.8	36.9	48.8	49.4	38.6
Maricopa	16.7	17.0	17.6	20.2	22.2
Mohave	30.7	24.8	32.3	32.5	28.5
Navajo*	58.8	39.1	33.9	47.8	28.5
Pima	23.0	22.6	24.9	26.7	27.1
Pinal	13.3	9.5	14.1	15.6	14.3
Santa Cruz*	7.3	9.0	11.8	8.8	15.8
Yavapai	34.1	27.4	26.2	34.0	30.1
Yuma*	11.1	20.7	13.8	21.2	15.5
Statewide Total	19.1	19.1	20.1	22.5	24.0

*Rates are unstable for counties indicated, as they had fewer than 20 deaths in at least one year.
** No poisoning-related deaths were recorded for these counties.

Drug Overdose Deaths

Every poisoning-related death has its own circumstances, including the type of poison used. Multiple drugs may be listed as contributing to a single death. Prescription drug overdoses, specifically from opiate pain relievers such as hydrocodone, oxycodone, and methadone, have become an epidemic in the United States. The graph shows that overdoses due to prescription opiate pain relievers, heroin, and psychostimulant drugs have been on the rise since 2013. The number of deaths involving heroin continues to rise and has doubled since 2013 from 125 to 329 deaths. Deaths involving psychostimulants (including methamphetamine) have also doubled from 2013 (n=205) to 2017 (n=562).

An emerging public health concern with drug overdoses is the appearance of new or altered drugs. These synthetic drugs, composed of several drug classes or unknown substances, are difficult to identify by laboratory testing. This also creates challenges with monitoring drug overdose trends by specific drug. Other and unspecified drugs and unspecified narcotics are examples of synthetic groups that may also contain multi or poly-drug combination overdose. The decrease in other and unspecified drugs group, may be due to the ability of the State Laboratory and Medical Examiners to identify specific drug classes within these synthetic drugs. Further analysis of death records shows while opiate drugs were not specifically coded as the main cause of death, they still contributed to the increasing number of overdoses in combination with other prescription illicit drugs. An example of a poly drug overdose death listed with a code of other and unspecified drugs/narcotic could include an opiate derivative mix with a stimulant and benzodiazepine. In such a case the agent solely responsible for the death is unknown, and not be classified into a definitive drug category. Figure 7 illustrates the specific drugs that were listed on the death certificates contributing to the overdose fatality.



Approximately one Arizona resident dies per day due to a prescription opioid poisoning. Figure 8 illustrates the trends in prescription opioid, heroin, and psychostimulant poisoning mortality rates from 2013 to 2017. During this time, the prescription opioid poisoning mortality rate increased 74% (from 5.0 to 8.7 deaths per 100,000 residents), heroin poisoning rate increased 158% (from 1.9 to 4.9 deaths per 100,000 residents), and the psychostimulant poisoning mortality rate increased 211% (from 2.7 to 8.4 deaths per 100,000 residents).

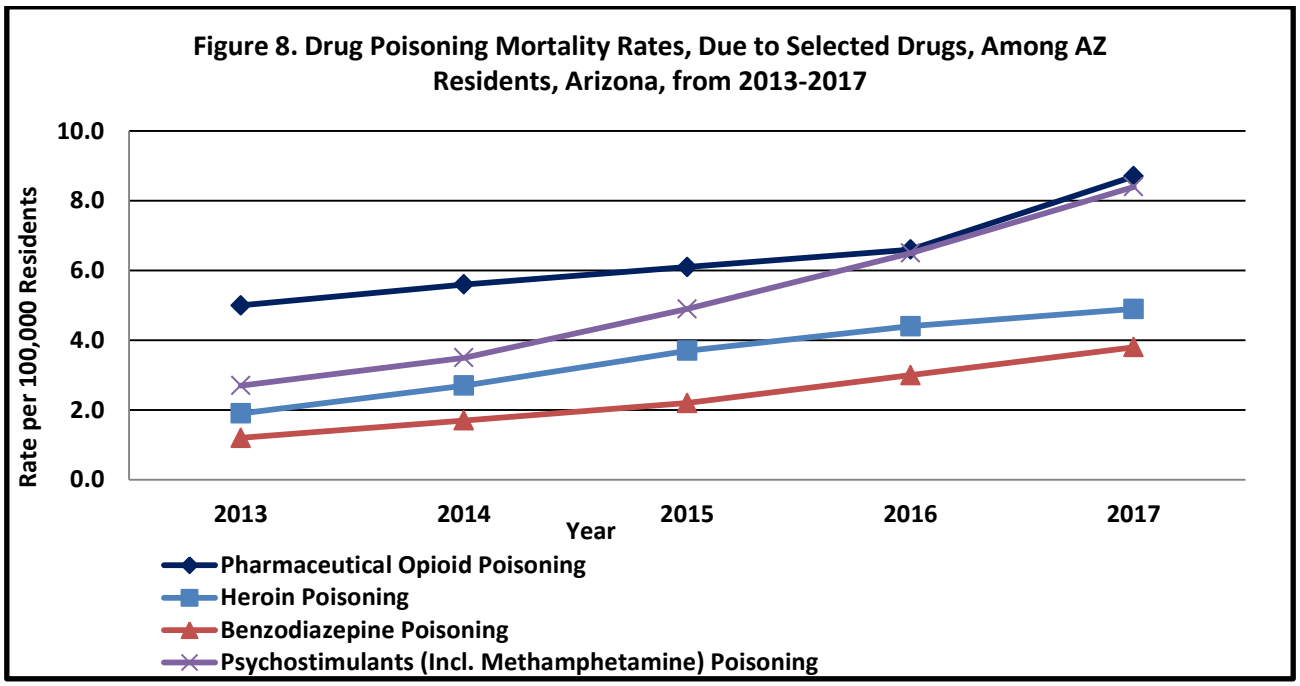
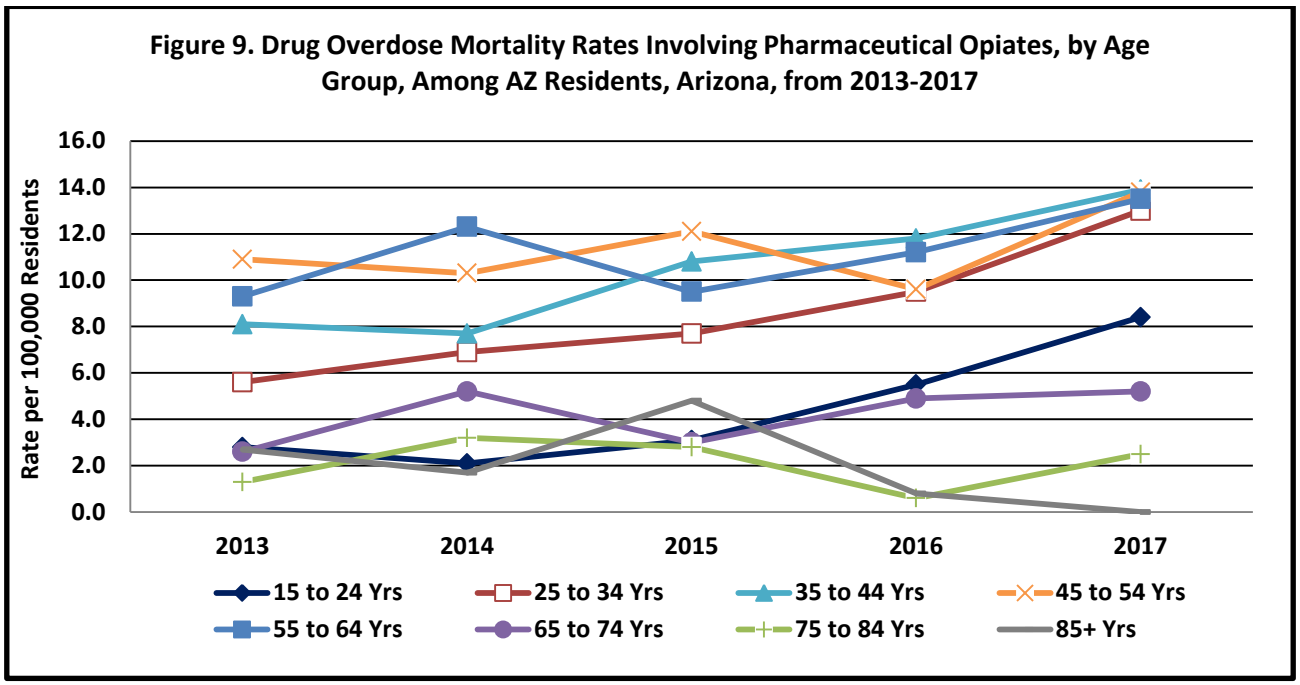


Figure 9 shows the mortality rates for pharmaceutical opiate poisonings by age group. The highest pharmaceutical opiate poison mortality rate per 100,000 residents among age groups were adults 35 through 44 years old (13.9 deaths), followed by 45 through 54 years old (13.8 deaths), and then 55 through 64 years old (13.5 deaths) age group. The mortality rate for teen and young adults have increased by 52% from 2016 (5.5 deaths per 100,000 residents) to 2017 (8.4 deaths per 100,000 residents).



Alcohol and Non-Drug Poisoning Deaths

Alcohol and non-drug poisonings, such as carbon monoxide, organic solvent, and other gases/fumes also contribute to the burden of poisoning deaths in Arizona. Annually, alcohol poisoning deaths are at least 4X higher than any non-drug poisoning death. Figure 10 illustrates a selection of toxin listed on the death certificates contributing to fatality.

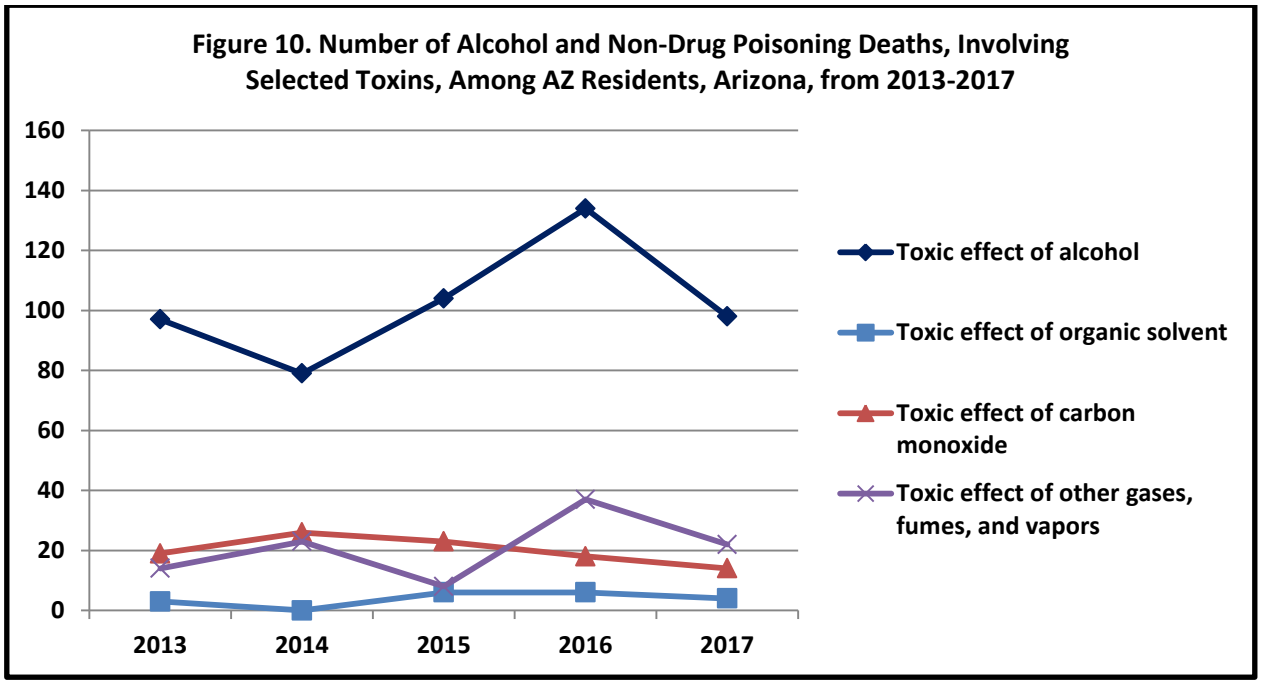
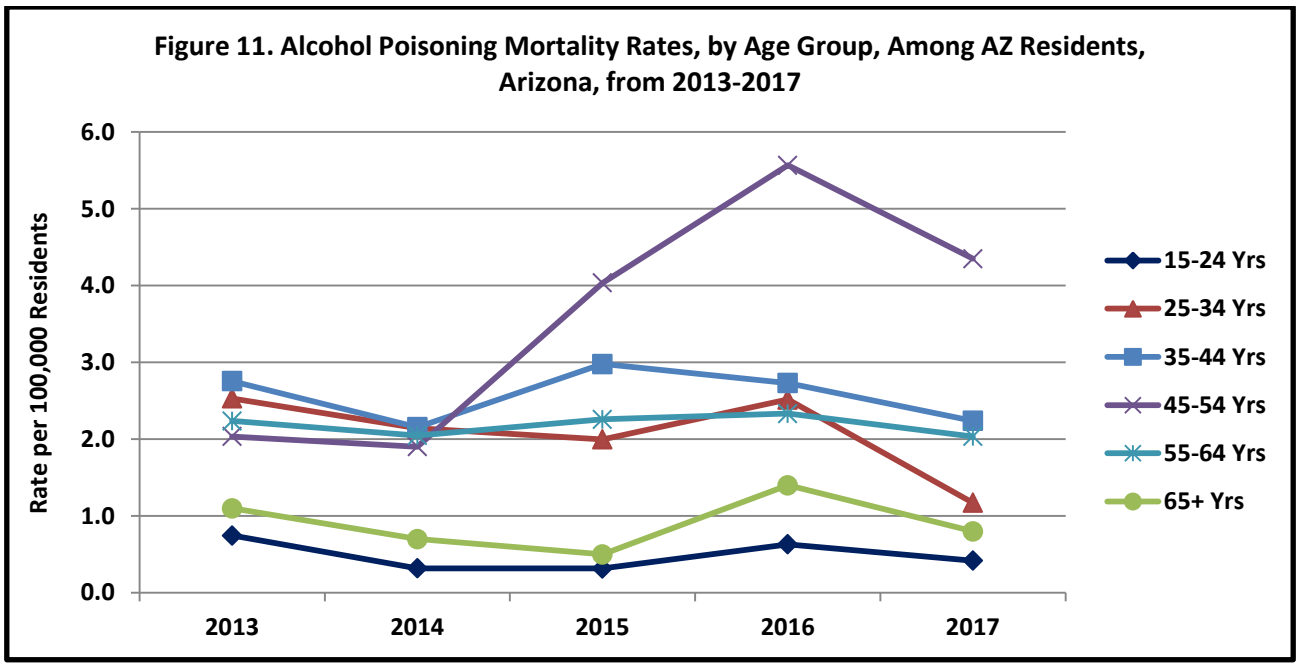


Figure 11 shows the mortality rates for alcohol poisonings by age group. Over the last three years, the highest alcohol poisoning mortality rates per 100,000 residents have been among adults 45 through 54 years old.

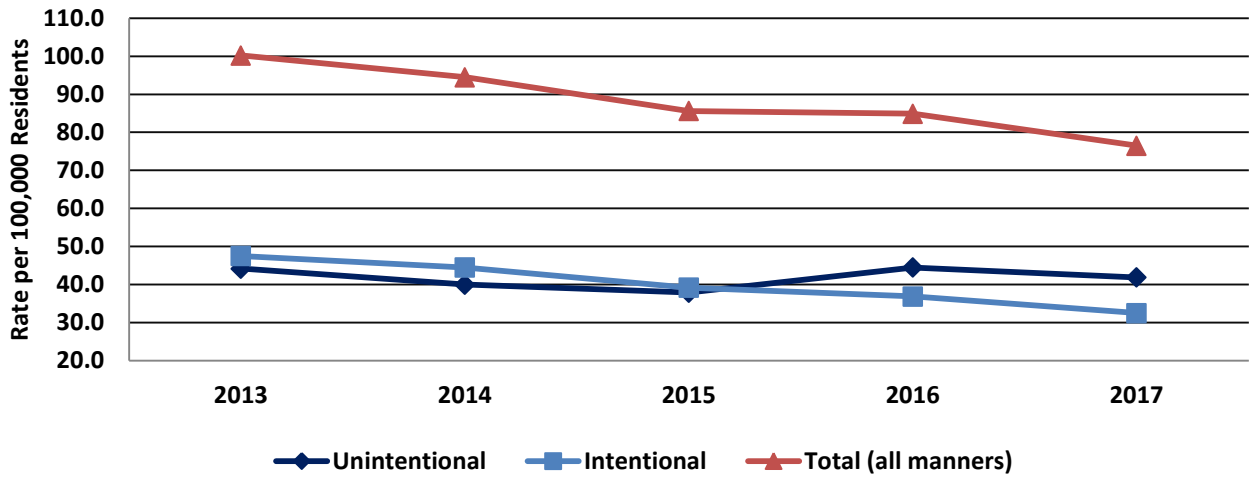


Inpatient Hospitalizations

Overall, between 2013 and 2017, the age-adjusted rate of poisoning-related inpatient hospitalizations (IP) among Arizona residents decreased by 24%, from 100.2 hospitalizations per 100,000 residents in 2013 to 76.5 hospitalizations in 2017.

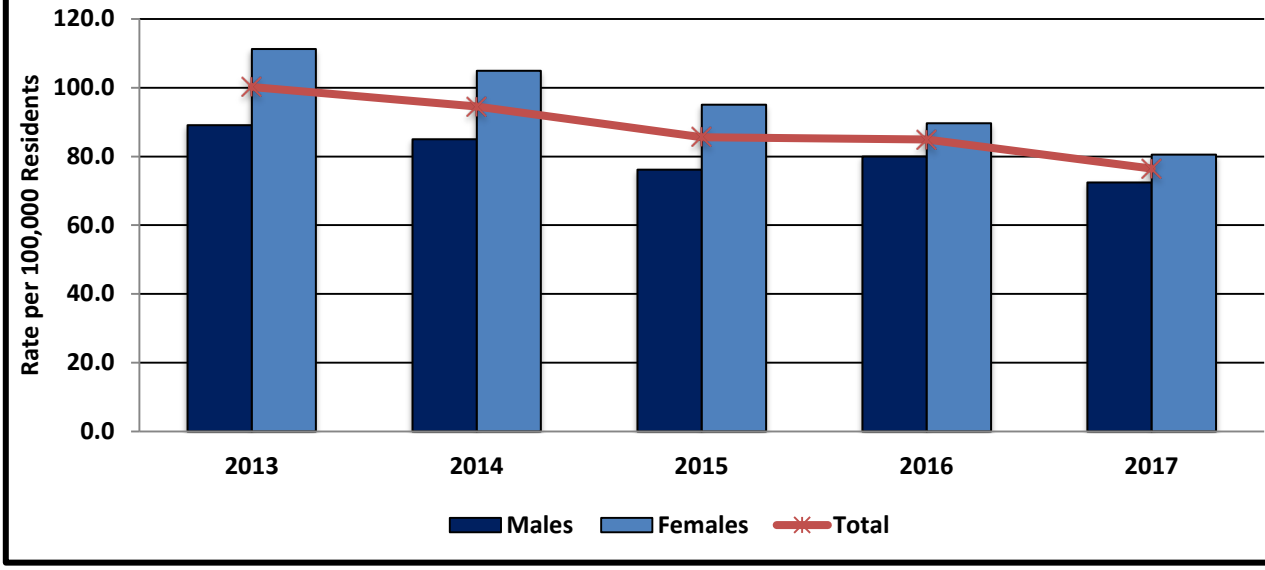
The age-adjusted rate for unintentional poisoning-related IP decreased 6%, while the rate for the intentional poisoning-related IP decreased by 12% from the previous year. Figure 12 shows the age-adjusted poisoning-related rates for inpatient hospitalizations (IP) by injury intent for Arizona residents from 2013 to 2017.

Figure 12. Age-Adjusted Poisoning-Related Inpatient Hospitalization Rates, by Manner, Among AZ Residents, Arizona, from 2013-2017



The age-adjusted rates for poisoning-related inpatient hospitalizations were higher for females than for males. Figure 13 shows the age-adjusted rates by sex for poisoning-related inpatient hospitalizations from 2013-2017.

Figure 13. Age-Adjusted Poisoning-Related Inpatient Hospitalization Rates, by Sex, Among AZ Residents, Arizona, from 2013-2017



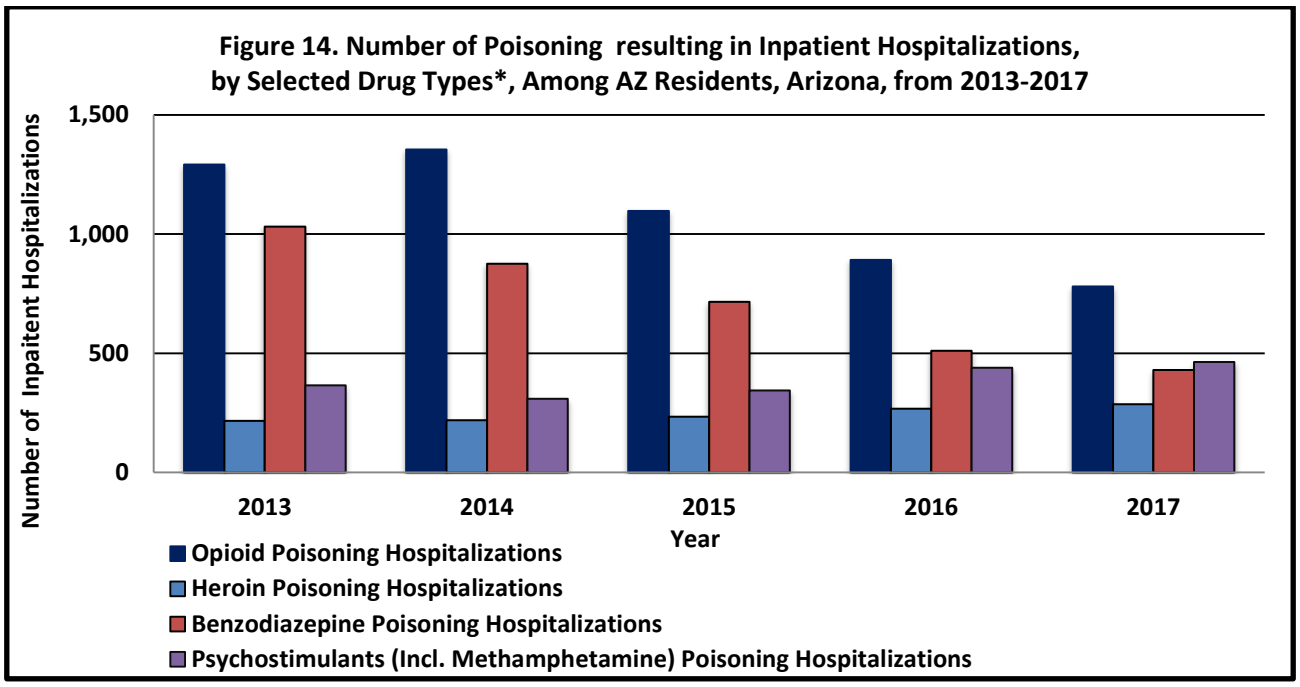
Only three counties had higher age adjusted rates for inpatient hospitalizations than the state rate. Table 2 shows the age-adjusted inpatient hospitalization poisoning rate by county of residence from 2013 through 2017.

Table 2. Age-Adjusted Rate per 100,000 Residents for Poisoning-Related Inpatient Hospitalizations, by County of Residence, Among AZ Residents, Arizona, from 2013-2017

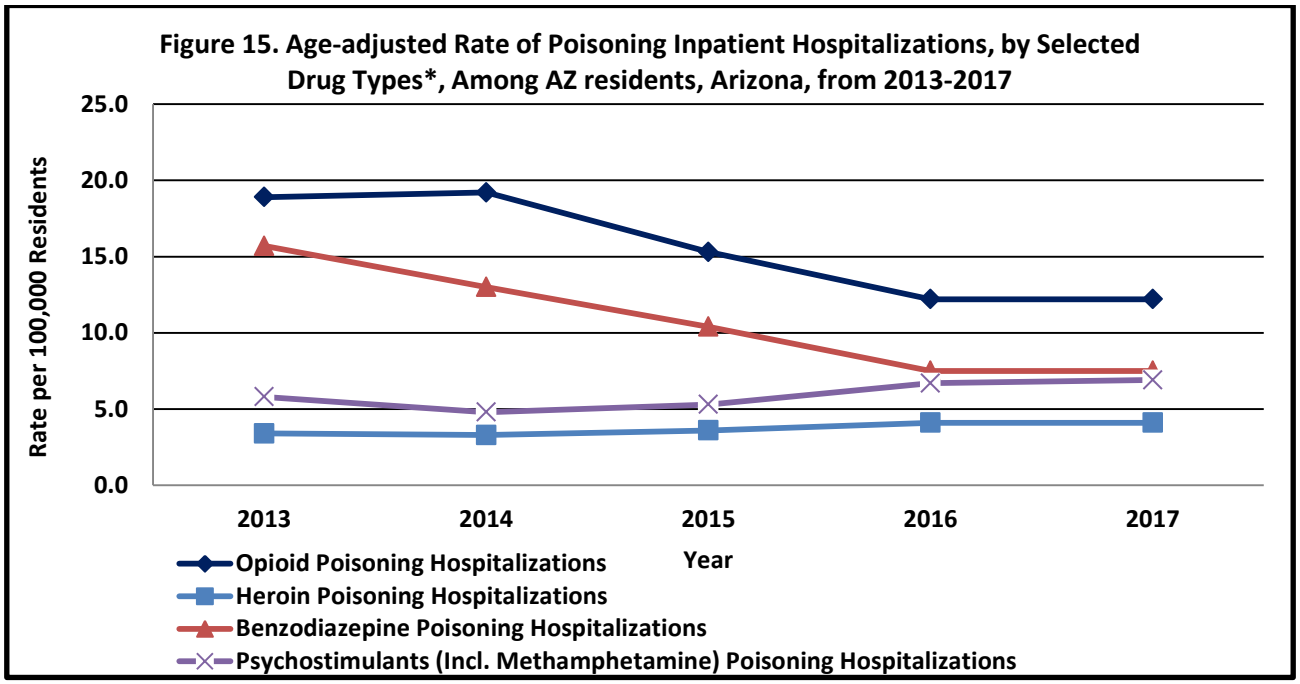
	2013	2014	2015	2016	2017
Apache*	54.7	55.6	69.9	39.0	27.5
Cochise	56.7	66.3	69.6	96.0	59.3
Coconino	101.5	92.6	108.1	64.5	10.3
Gila	136.0	139.9	113.9	94.4	160.7
Graham*	58.9	46.3	40.8	45.1	71.6
Greenlee*	80.3	64.7	28.3	94.8	41.4
La Paz*	57.8	78.2	64.2	55.3	21.1
Maricopa	102.0	93.4	82.6	83.4	80.3
Mohave	160.5	137.9	109.5	89.0	73.6
Navajo	112.5	132.6	109.9	83.0	69.9
Pima	113.0	112.5	110.9	106.2	93.4
Pinal	83.1	81.8	74.6	78.0	68.1
Santa Cruz*	42.6	18.3	36.8	34.8	39.3
Yavapai	94.0	96.0	68.2	89.6	53.9
Yuma	42.3	38.8	48.3	61.8	43.3
Statewide Total	100.2	94.5	85.6	84.9	76.5

*Rates are unstable for counties indicated, as they had fewer than 20 cases in at least one year.

From 2013 to 2017, the number of opioid poisoning resulting in inpatient hospitalization (IP) decreased by 40%, and there was a 13% decrease in the rate for opioid poisoning IP from last year. The number of heroin poisoning IP visits increased by 32%, and there was a 7% increase in the rate for heroin poisoning IP from last year. The number of benzodiazepines poisoning IP decreased by 58%, and there was a 16% decrease in the rate for benzodiazepines poisoning IP from last year. The psychostimulant (Incl. methamphetamine) poisoning IP increased by 26% and there was a 3% increase in the rate for psychostimulant (Incl. methamphetamine) poisoning IP from last year. Figures 14 and 15 illustrate the trends in prescription opiate poisonings along with heroin and benzodiazepine poisoning from 2013 to 2017.



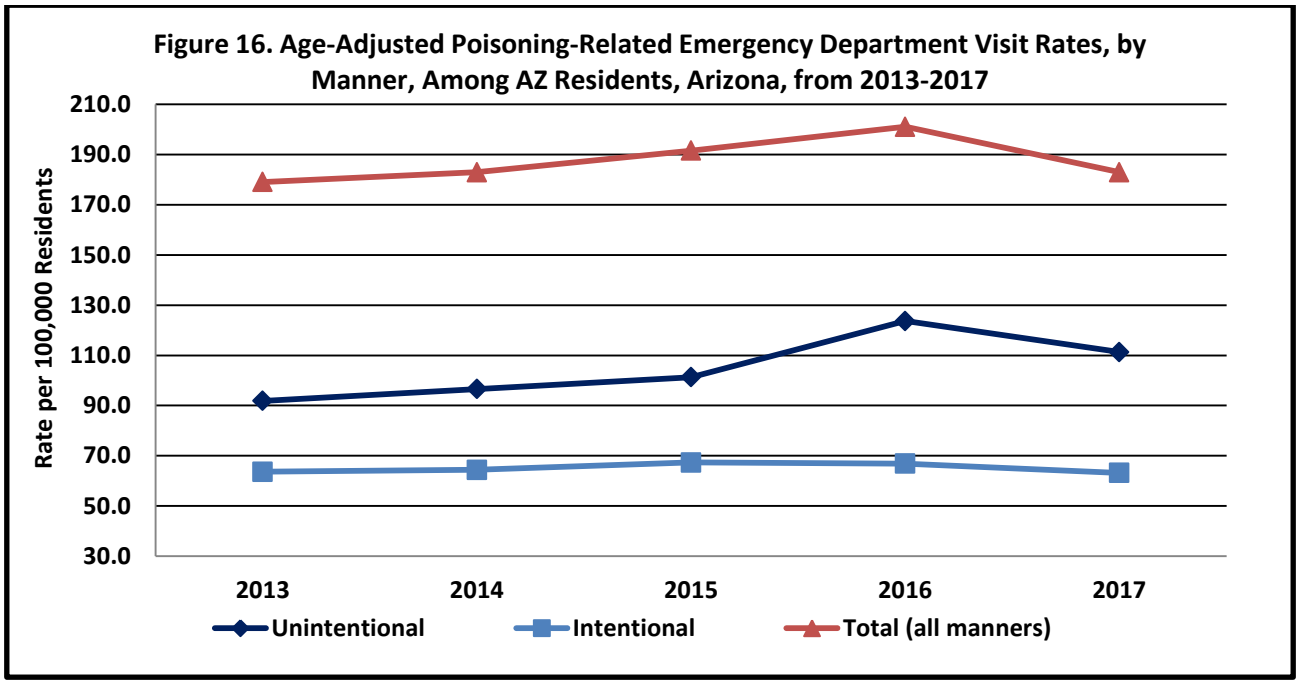
*Primary Diagnosis Code and E-Codes only



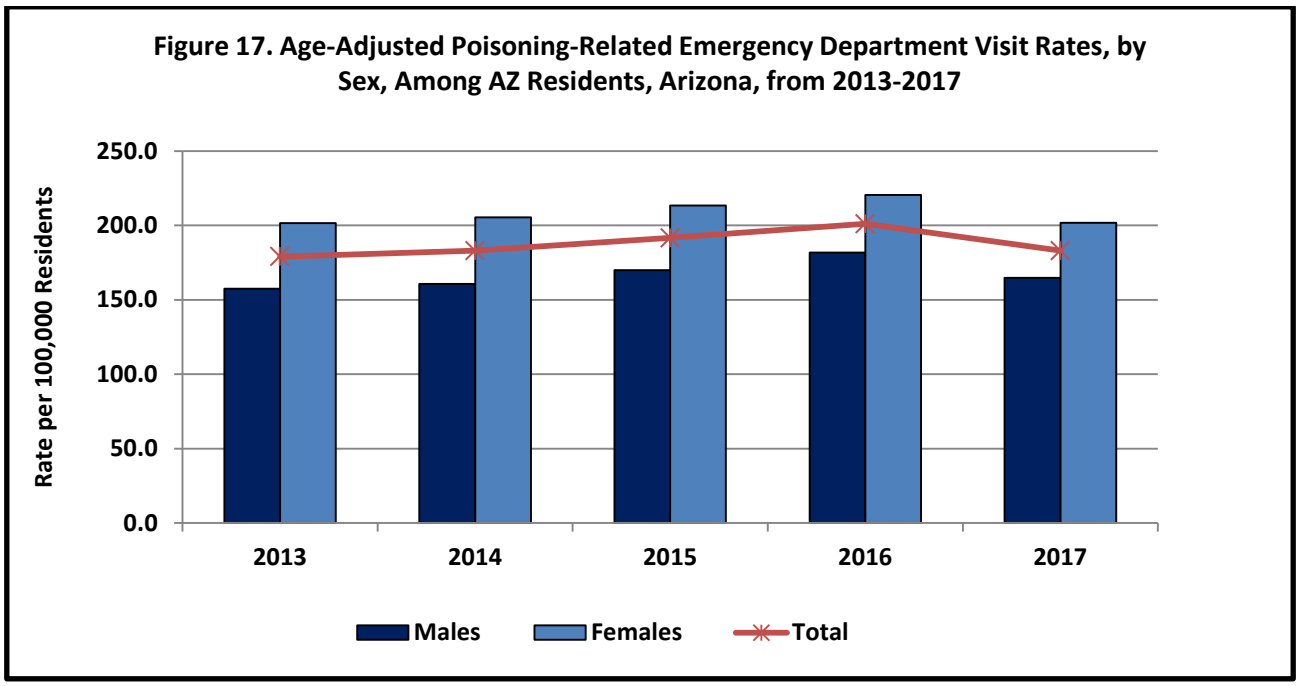
*Primary Diagnosis Code and E-Codes only

Emergency Department Visits

Overall, between 2013 and 2017, the age-adjusted rate of poisoning-related Emergency Department Visits (EDV) among Arizona residents increased by 2.8%, from 179.1 EDV per 100,000 residents in 2013 to 183.0 EDV per 100,000 residents in 2017. The age-adjusted rate of poisoning EDV decreased 9% from last year. In 2017, the rate of unintentional poisonings-related EDV was 111.3 EDV per 100,000 residents (n=7,608), and represents a 10% change from 2016 (123.7 EDV per 100,000 residents). In 2017, the age-adjusted rate for intentional related EDV was 63.2 EDV per 100,000 residents (n=4,395) and represents a 0.6% change from 2016 (66.9 EDV per 100,000 residents). Figure 16 shows the age-adjusted poisoning-related rates for emergency department visits by injury intent from 2013 to 2017.



The age-adjusted rates for poisoning-related emergency department visits were higher for females then for males. Over the five year, the poisoning-related emergency department visit rate increased by 4.7% for males and increased 1.0% for females. Figure 17 shows the age-adjusted rates by sex for poisoning-related emergency department visits from 2013 through 2017.



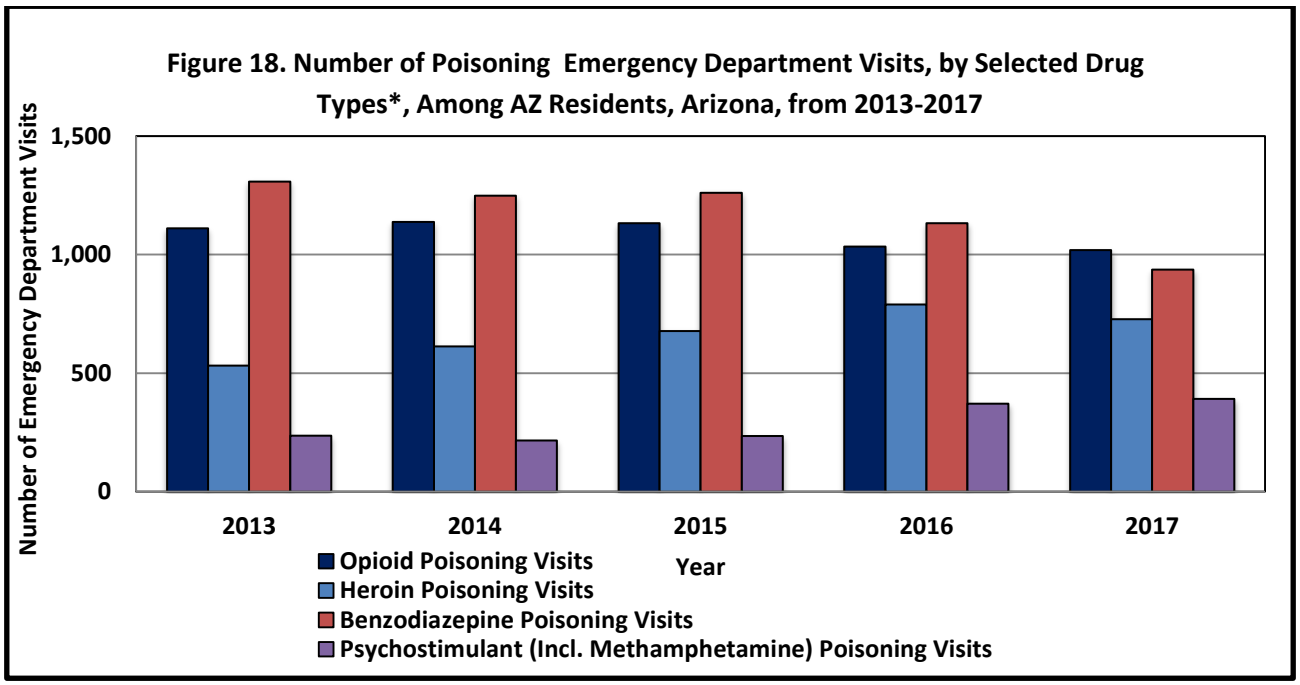
The rates of the counties with at least 20 visits per year varied between 2013 and 2017 and are listed below. Table 3 shows the age-adjusted poisoning-related emergency department visit rates per 100,000 residents by county of residence from 2013 to 2017. Eight counties had poisoning-related EDV rates higher than the state.

Table 3. Age-Adjusted Rate per 100,000 Residents for Poisoning-Related Emergency Department Visits, by County of Residence, Among AZ Residents, Arizona, from 2013-2017

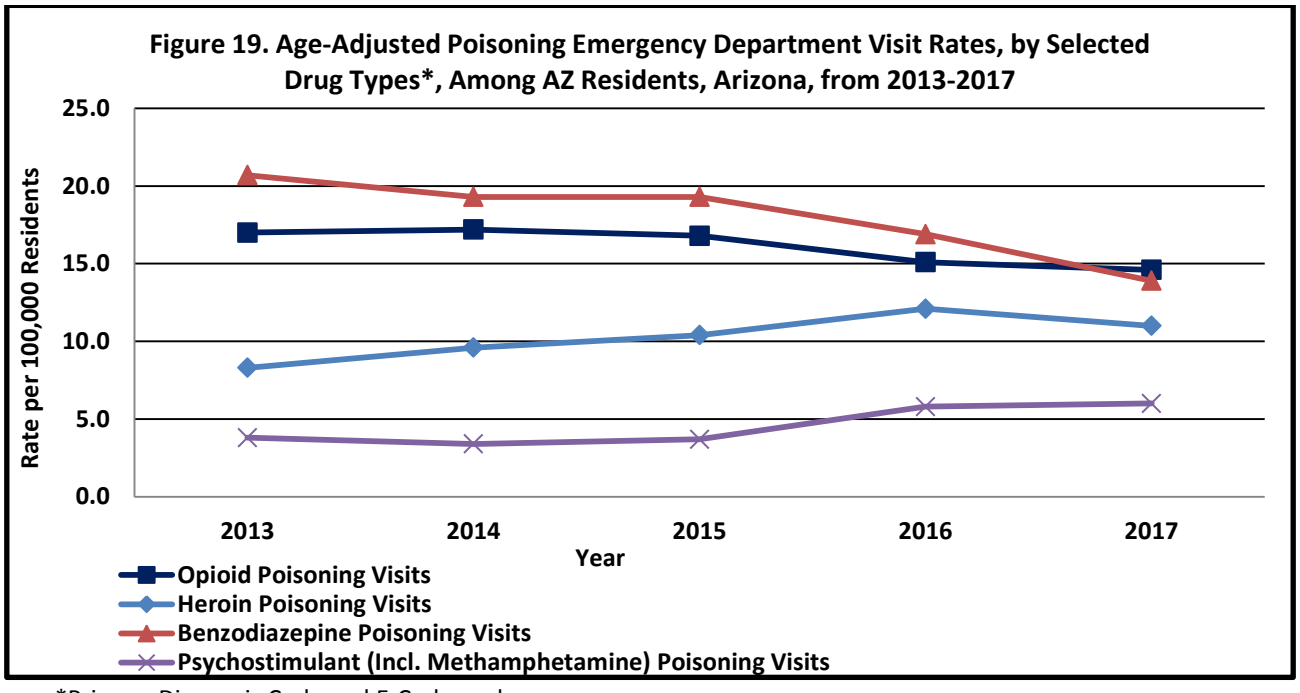
	2013	2014	2015	2016	2017
Apache	150.4	110.2	114.6	130.3	153.7
Cochise	249.5	205.3	192.5	241.8	152.8
Coconino	186.3	174.3	186.8	219.4	40.7
Gila	281.2	326.0	293.2	320.6	291.7
Graham	309.6	352.6	326.4	221.0	299.5
Greenlee*	187.2	182.5	155.7	181.3	153.3
La Paz*	220.4	168.5	192.1	219.0	203.1
Maricopa	165.6	172.7	176.7	190.4	180.0
Mohave	29.0	288.6	285.1	292.4	201.3
Navajo	261.8	219.2	208.1	224.2	207.4
Pima	195.9	198.0	232.6	230.1	208.5
Pinal	158.9	180.1	191.8	194.0	200.6
Santa Cruz*	136.8	74.6	136.2	138.1	135.7
Yavapai	232.7	258.5	267.2	260.9	191.1
Yuma	164.8	144.4	148.3	169.0	169.2
Statewide Total	179.1	183.0	191.6	201.1	183.0

*Rates are unstable for counties indicated, as they had fewer than 20 cases in at least one year.

From 2013 to 2017, the number of opioid poisoning emergency department visits (EDV) decreased by 8%, and there was a 3% decrease in the rate for opioid poisoning EDV from last year. The number of heroin poisoning EDV increased by 37%, and there was a 10% decrease in the rate for heroin poisoning EDV from last year. The number of benzodiazepines poisoning EDV decreased by 28%, and there was an 18% decrease in the rate for benzodiazepine poisoning EDV from last year. The number of psychostimulant (Incl. methamphetamine) poisoning EDV increased by 65%, and there was a 3% increase in the rate for psychostimulant (Incl. methamphetamine) poisoning EDV from last year. Figures 18 and 19 illustrate the trends in selected drug poisonings along from 2013 to 2017.



*Primary Diagnosis Code and E-Codes only

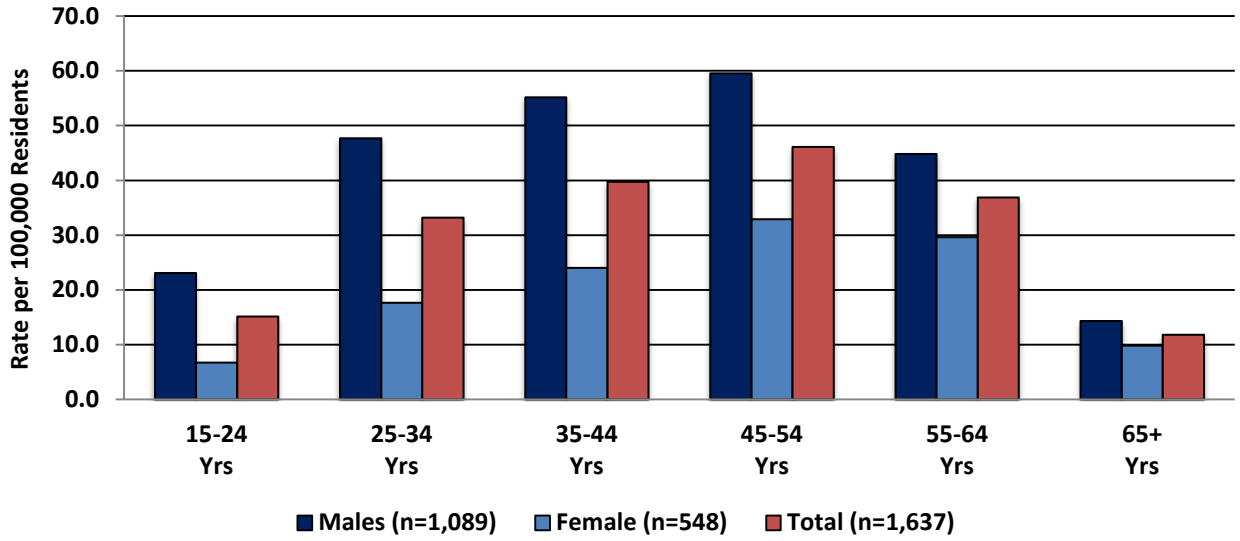


*Primary Diagnosis Code and E-Codes only

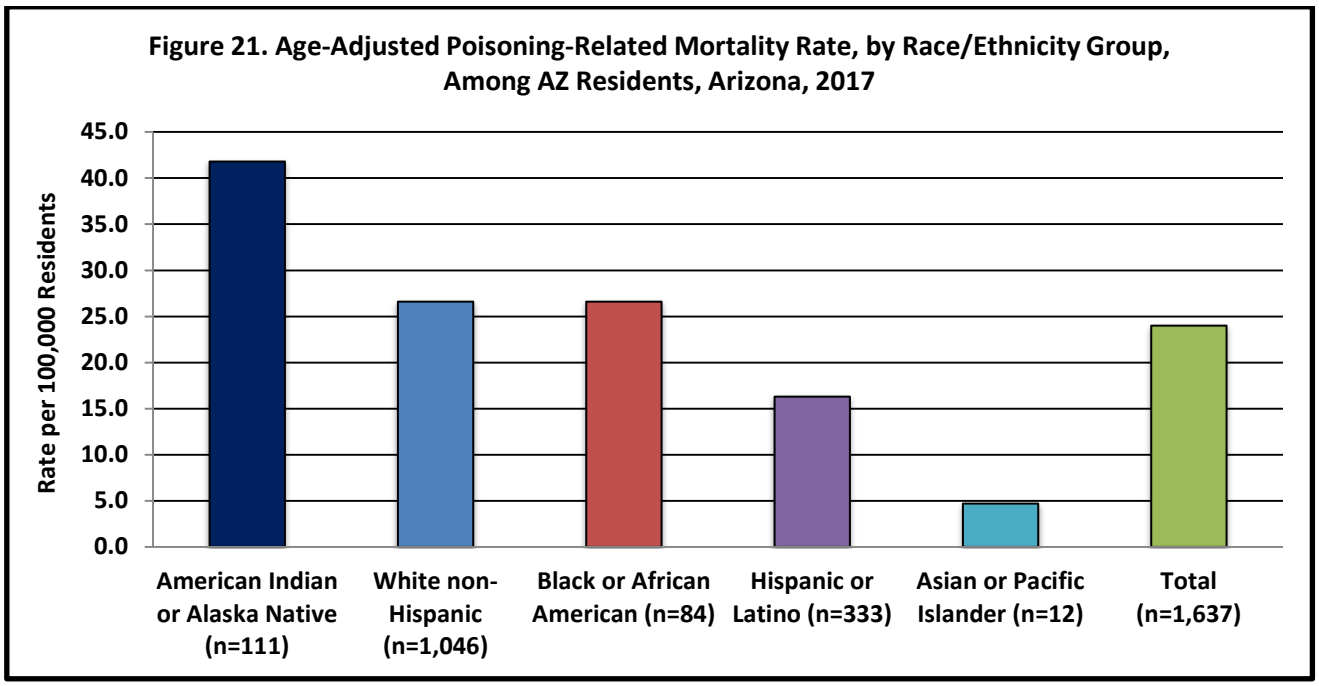
Poisoning-Related Mortality, 2017

There were 1,637 deaths among Arizona residents attributed to poisoning in 2017. Sixty-seven percent of deaths were among males (n=1,089), and thirty-three percent were among females (n=549). In 2017, the age-adjusted poisoning mortality rate among females was 15.5 deaths per 100,000 residents, while the rate among males was 32.3 deaths per 100,000 residents. Males had higher mortality rates than females in each age group. In 2017, adults 45 through 54 years of age had the highest rate of fatalities among males (59.5 deaths per 100,000 residents) and females (32.9 deaths per 100,000 residents). Adults 35-44 years old had the largest difference in the number of deaths between males and females. The poison-related mortality rate for residents 35 through 44 years of age increased by 20.3% from 2016 (33.0 deaths per 100,000 residents) to 2017 (39.7 deaths per 100,000 residents). Figure 20 shows the poisoning-related mortality rates per 100,000 residents by age group and sex.

Figure 20. Poisoning Mortality Rates, by Age Group and Sex, Among AZ Residents, Arizona, 2017



American Indian or Alaska Native residents had the highest age-adjusted poisoning-related mortality rate in 2017 (41.8 deaths per 100,000 residents. Figure 21 shows the age-adjusted poisoning-related mortality rates by race/ethnicity for Arizona residents in 2017.



*There were 51 deaths among individuals of other or unknown race/ethnicity group.

In 2017, drugs (over-the-counter medication, prescription, and illicit drugs) were the underlying cause of death for 91% of all poisoning deaths (n=1,496). This means majority of poisoning deaths were due to drugs. Of the drug overdose deaths, 85% were unintentional (n=1,269), 9% were suicide or intentional self-harm (n=140), and 5.7% had an undetermined intent (n=100). For each age group, males had higher rates than females. Figure 22 shows the drug overdose mortality rates and Figure 23 shows non-drug poisoning mortality rates by age group and sex.

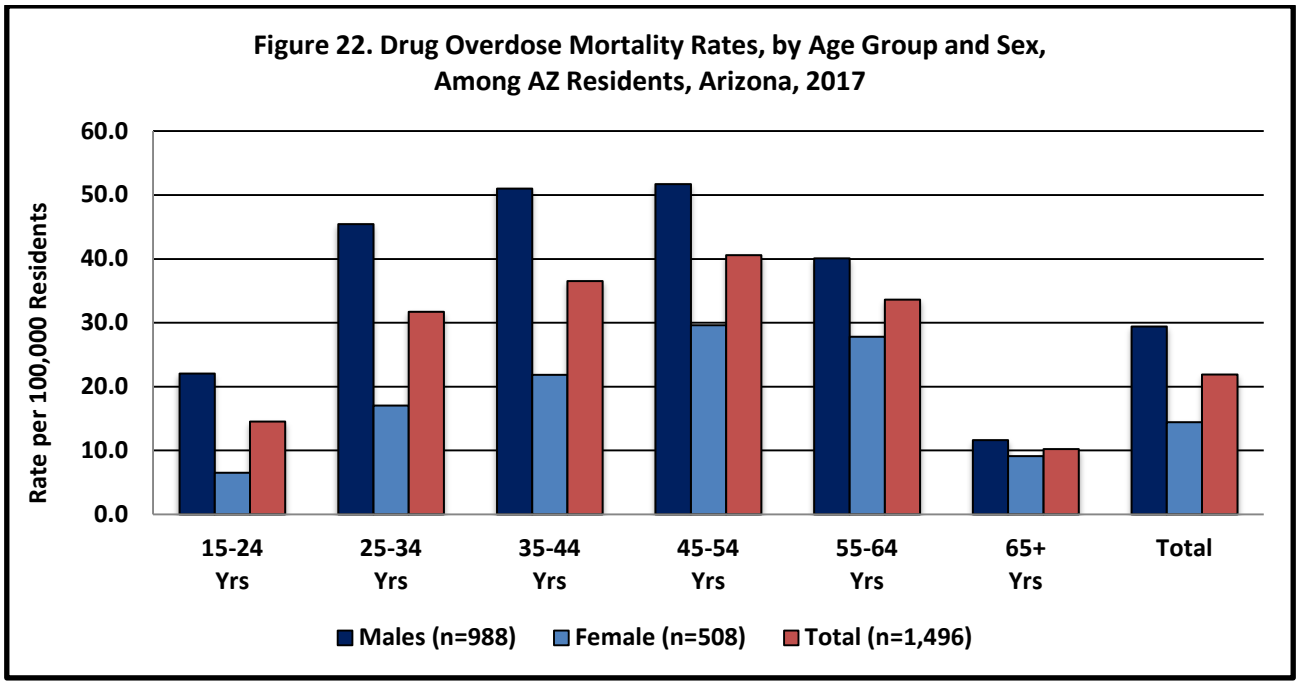
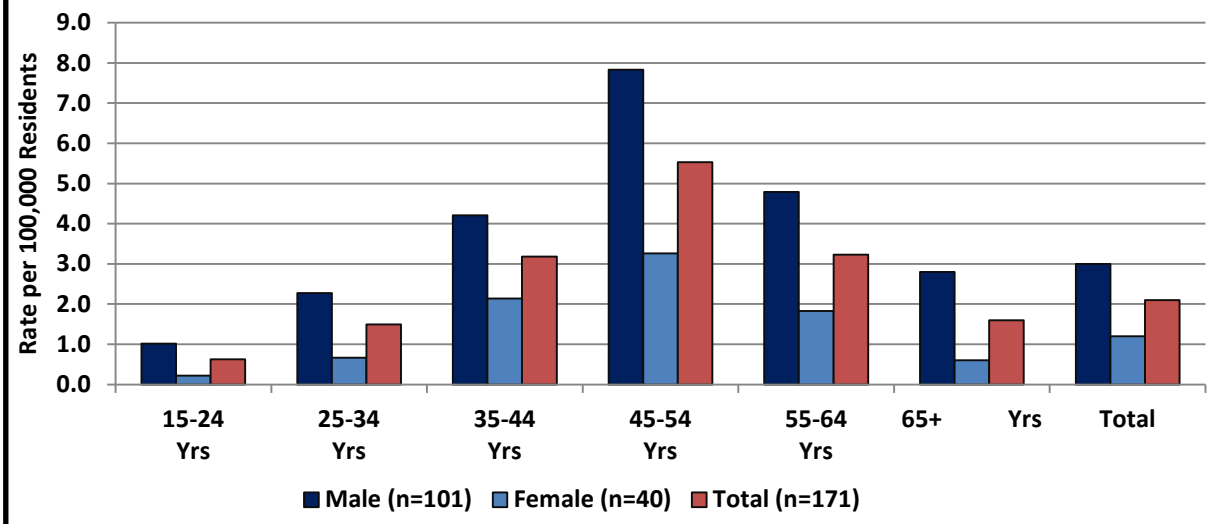


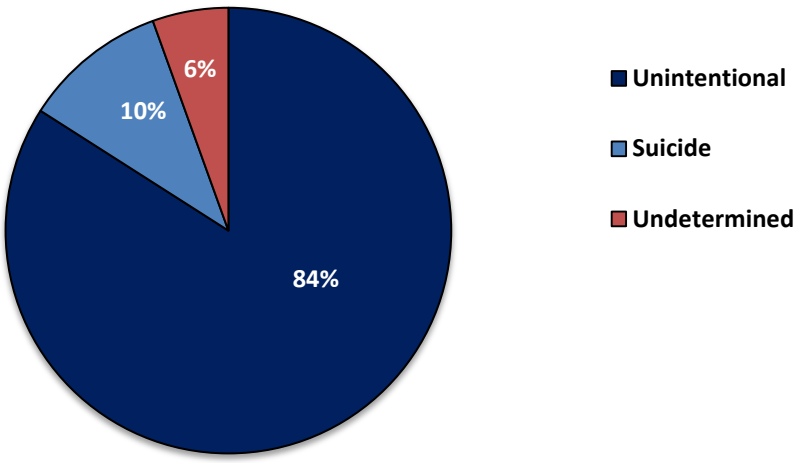
Figure 23. Non-Drug Poisoning Mortality Rates, by Age Group and Sex, Among AZ Residents, Arizona, 2017



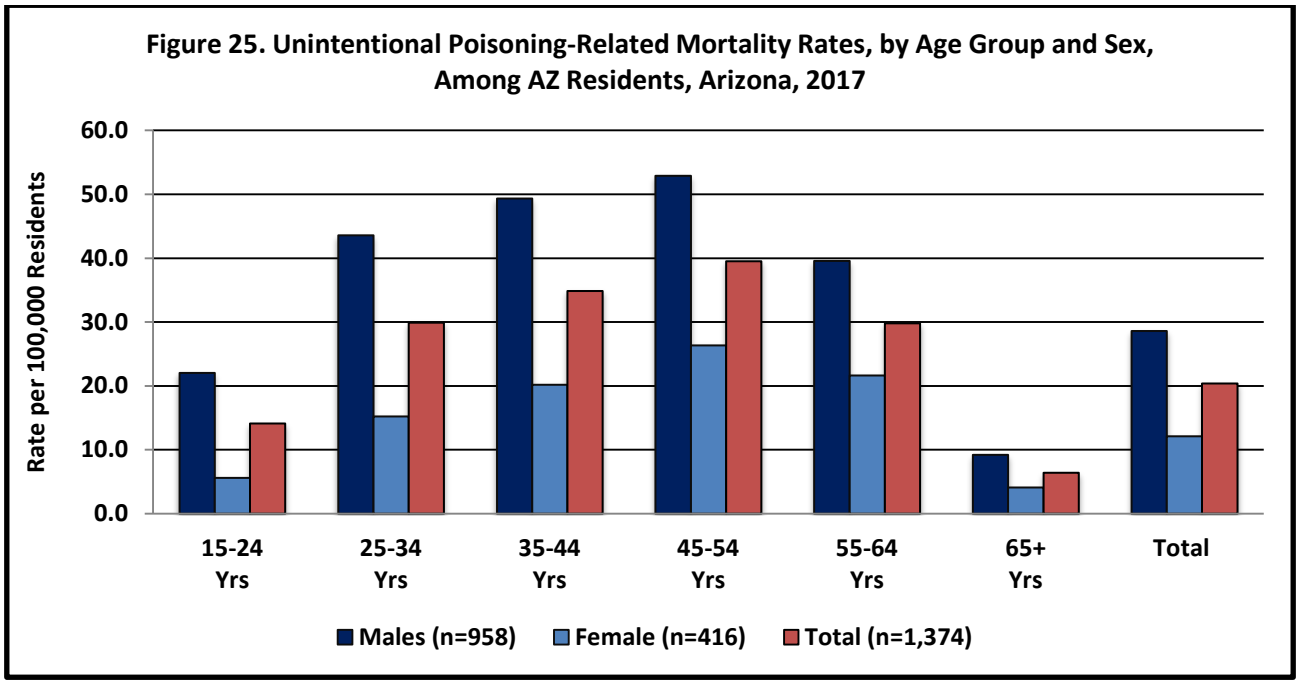
Poisoning Fatalities by Manner

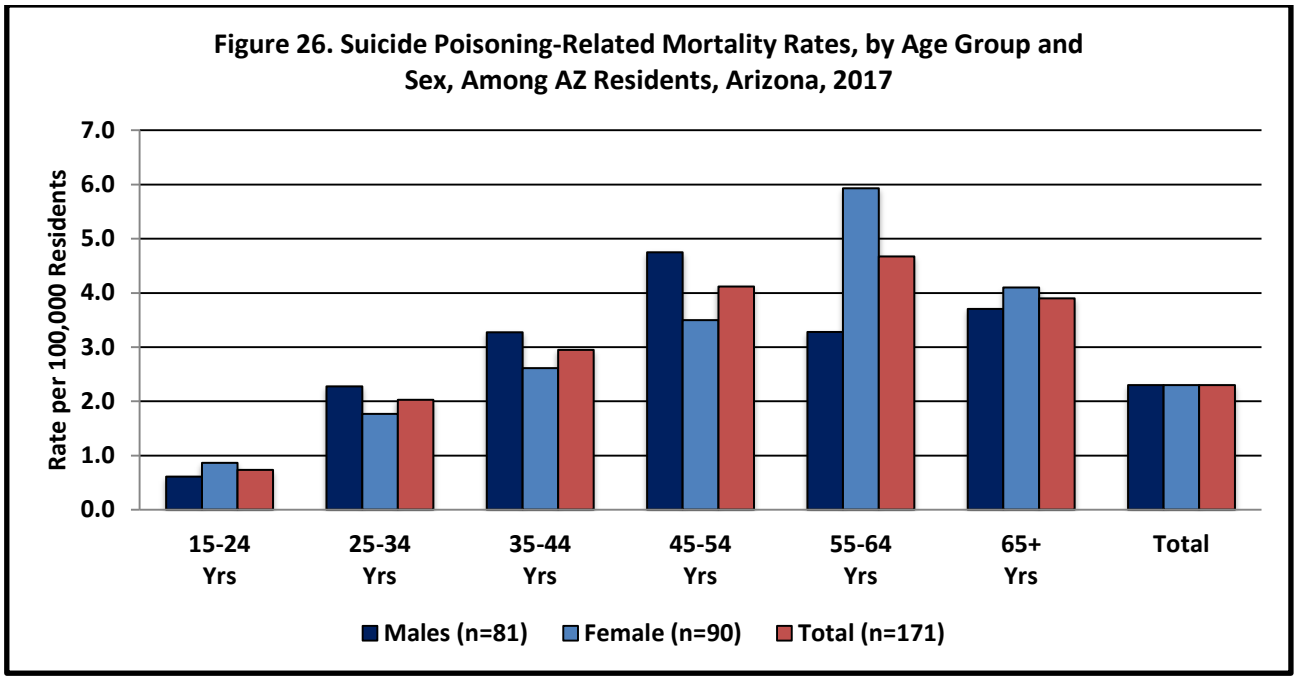
As in previous years, the majority of poisoning-related deaths were determined to be unintentional. In 2017, 84% of poisoning-related deaths among Arizona residents were unintentional (n=1,374). Of the 1,248 unintentional deaths, 70% were among males (n=958), and 30 percent were among females (n=416). In 2017, there were 171 poisoning-related suicides (10%) and 52% (n=90) were among females. There were no poisoning-related suicides in children below the age of 15 years among either sex. Figure 24 shows the percentage of poisoning-related deaths for 2017.

Figure 24. Percentage of Poisoning-Related Fatalities, by Intent, Among AZ Residents, Arizona, 2017



In 2017, males aged 45 through 54 years old had the highest mortality rate for unintentional poisoning-related deaths (52.9 deaths per 100,000 residents), followed by males aged 35 through 44 years old (49.3 deaths per 100,000). Males had higher unintentional poisoning-related mortality rates than females in all age groups. In 2017, females had higher suicide mortality rates than males in the following age groups: 15 through 24 years, 55 through 65+ years. The highest suicide rates overall were among females aged 55 through 64 years old (5.9 suicides per 100,000 residents), followed by males aged 45 through 54 years old (4.7 suicides per 100,000 residents). Figures 25 and 26 show the mortality rates for poisonings by age group, manner, and sex in 2017.

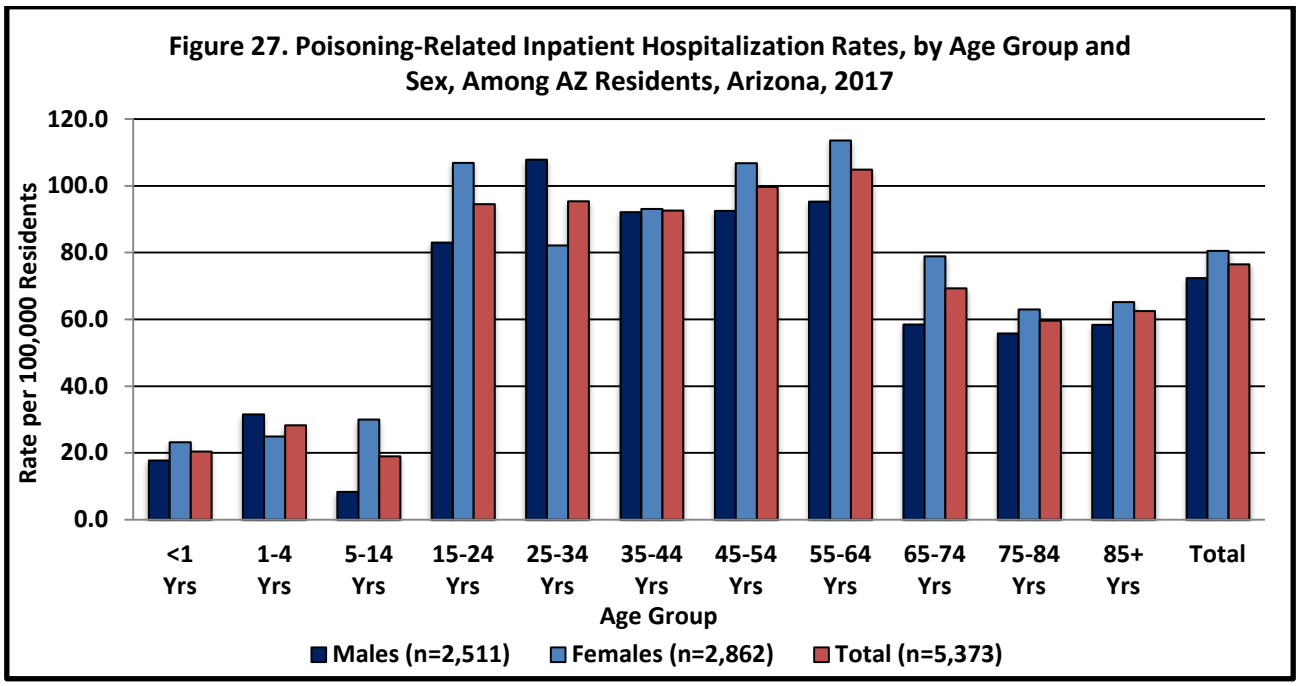




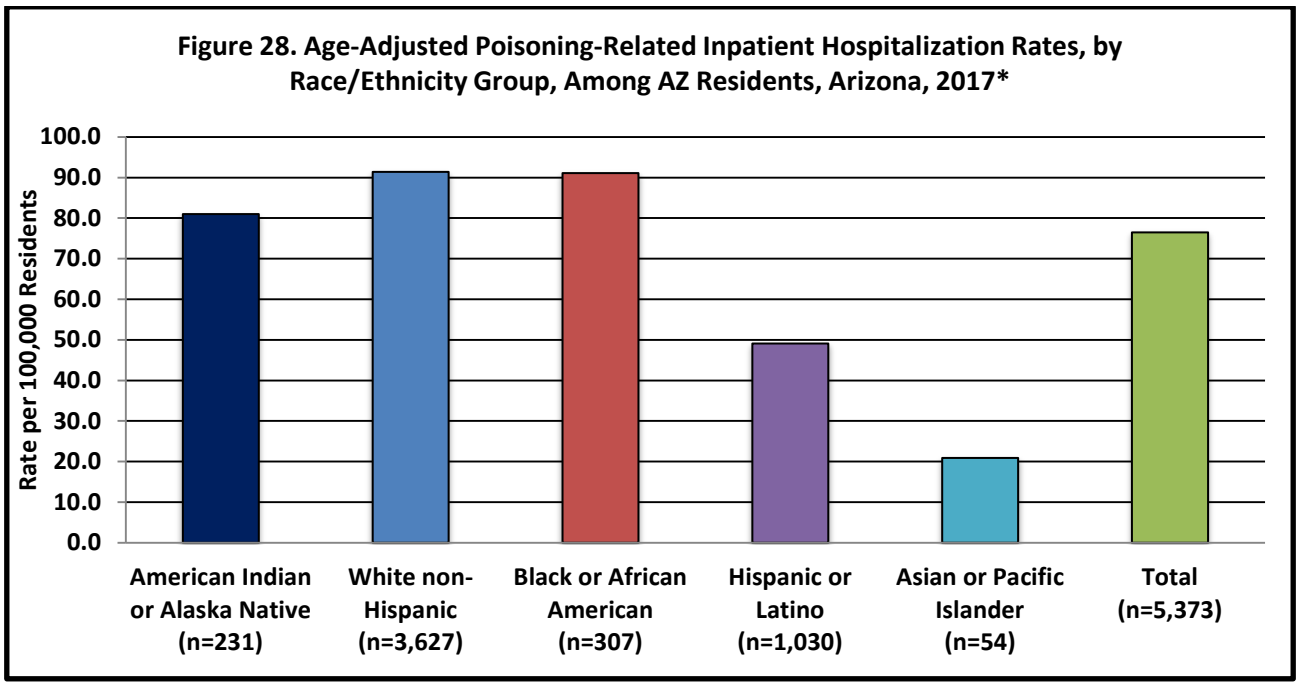
Poisoning-Related Inpatient Hospitalizations, Among AZ Residents, Arizona, 2017

There were 5,373 inpatient hospitalizations among Arizona residents attributed to poisoning in 2017. This equates to an age-adjusted rate of 76.5 hospitalizations per 100,000 residents. Forty-seven percent of the hospitalizations were among males (n=2,511) and fifty-three percent were among females (n=2,862). Fifty-six percent of the poisoning-related inpatient hospitalizations were attributed to unintentional poisonings (n=3,023), forty-one percent resulted from intentional poisonings (n=2,197).

Across all age groups, females had higher rates of poisoning-related inpatient hospitalizations than males. The 55 through 64 year age group had the highest rate among females, while for males residents 25 through 34 years had the highest rate. Figure 2 shows the poisoning-related inpatient hospitalization rates per 100,000 residents in Arizona by age group and sex.

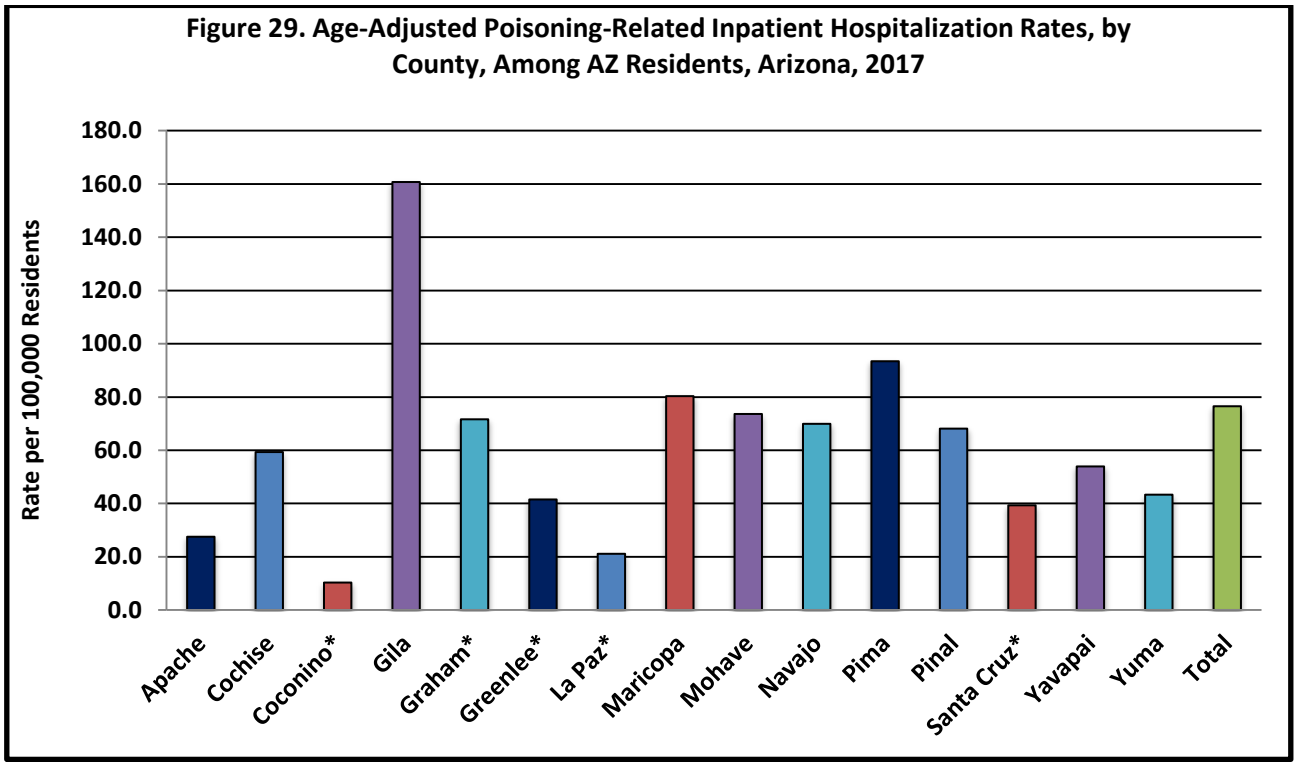


White Non-Hispanic residents had the highest age-adjusted poisoning-related inpatient hospitalization rate in 2017 (91.4 hospitalizations per 100,000 residents), followed by Black or African American residents (91.1 hospitalizations per 100,000 residents), and then American Indian or Alaska Native (81.0 hospitalizations per 100,000 residents) residents. Asian or Pacific Islander residents had the lowest poisoning-related rate with 20.9 hospitalizations per 100,000 residents. Figure 28 shows the age-adjusted poisoning-related inpatient hospitalization rates by race/ethnicity for Arizona residents in 2017.



*There were 124 hospitalizations among individuals of other or unknown race/ethnicity group.

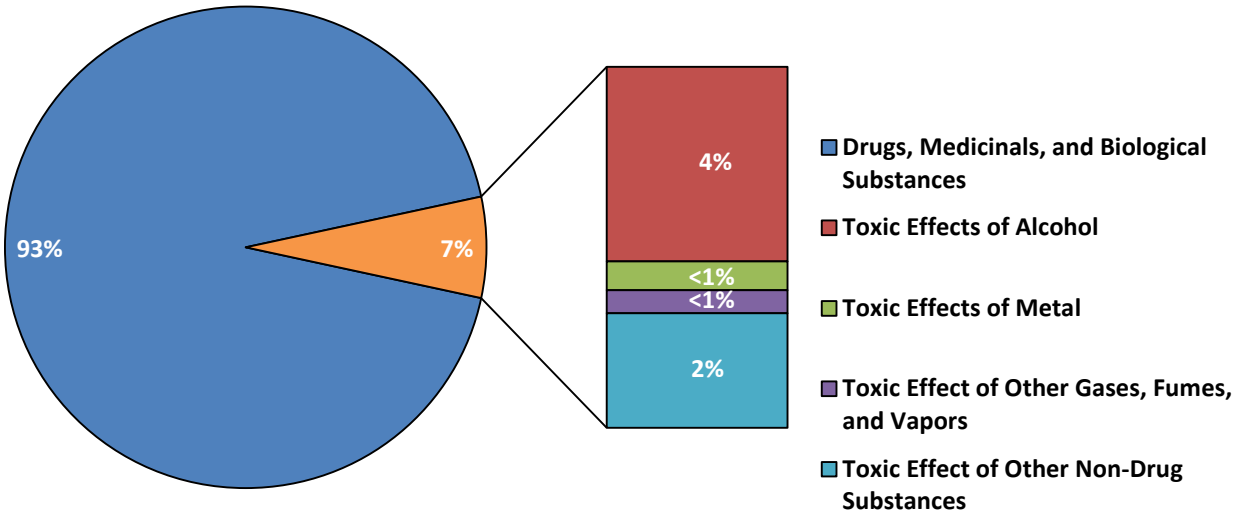
In 2017, Gila County had the highest rate of inpatient hospitalizations for poisonings (160.7 hospitalizations per 100,000 residents), followed by Pima County (93.4 hospitalizations per 100,000 residents), and then Maricopa County (80.3 hospitalization per 100,000 residents). Figure 26 displays the rate of poisoning-related inpatient hospitalizations among residents of Arizona by counties as shown in Figure 29.



* Counties with counts <20 are unstable

Among all manners of poisoning-related inpatient hospitalizations, 93% were due to drug use (n=5,011). This percentage includes prescription, non-prescription, and illicit drugs. Figure 30 shows percentage of poison hospitalizations by poison type.

Figure 30. Poisoning-Related Inpatient Hospitalizations by Poison Type, Among AZ Residents, Arizona, 2017

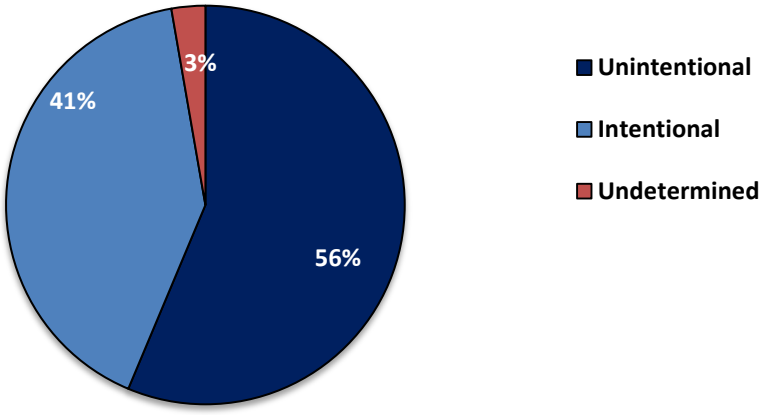


In 2017, the average cost for poisoning-related inpatient hospitalization was $44,550 and 3.0 days was the average length of stay in hospital. Arizona residents spent a total of 19,553 days in the hospital for poisoning-related events and the longest hospital stay for a case was 56 days. Hospital charges for inpatient hospitalizations due to poisonings totaled over $239.3 million for Arizona residents in 2017. Forty-seven percent of the poisoning-related inpatient hospitalizations were charged to the Arizona Health Care Cost Containment System (AHCCCS) (n=2,549 and more than $112.9 million in cost). Hospital charges do not reflect hospital reimbursement rates, nor do they include charges or costs related to emergency medical services, outpatient care, rehabilitation, legal fees, or lost work/ school time.

Poisoning-Related Inpatient Hospitalizations by Manner

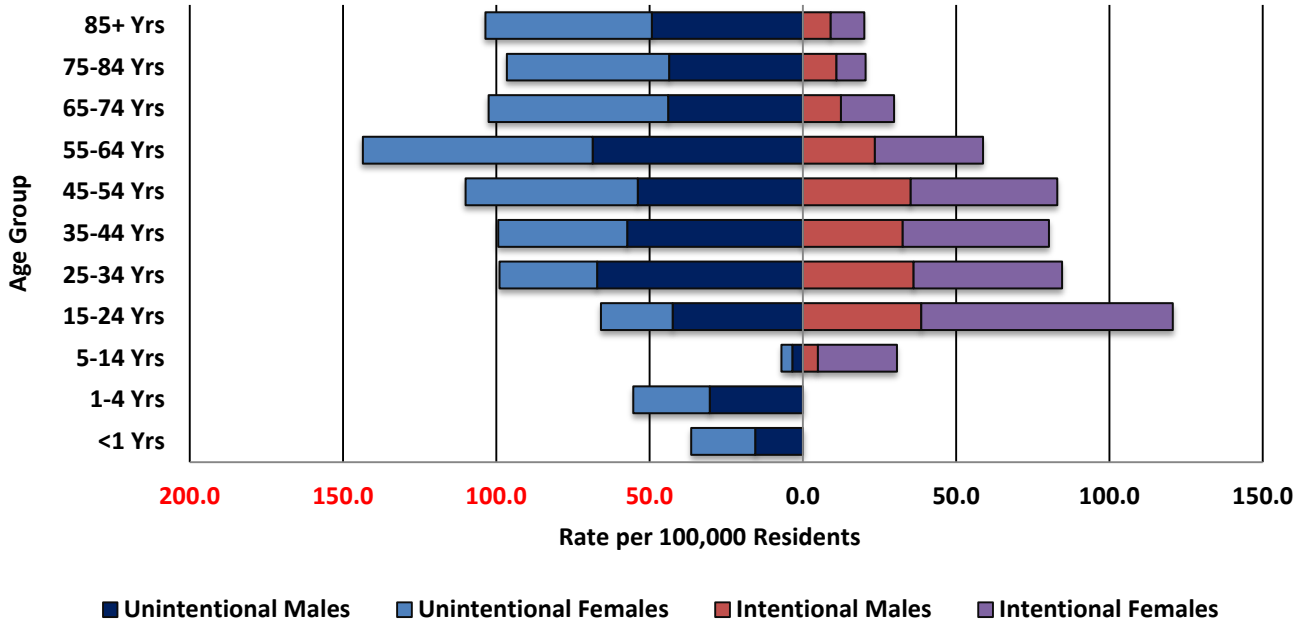
There were 3,023 inpatient hospitalizations among Arizona residents attributed to unintentional poisoning in 2017 (56%) and 2,197 hospitalizations attributed to intentional poisoning (41%). Figure 31 shows the distribution of poisoning-related inpatient hospitalizations by manner.

Figure 31. Percentage of Poisoning-Related Inpatient Hospitalizations by Manner, Among AZ Residents, Arizona, 2017



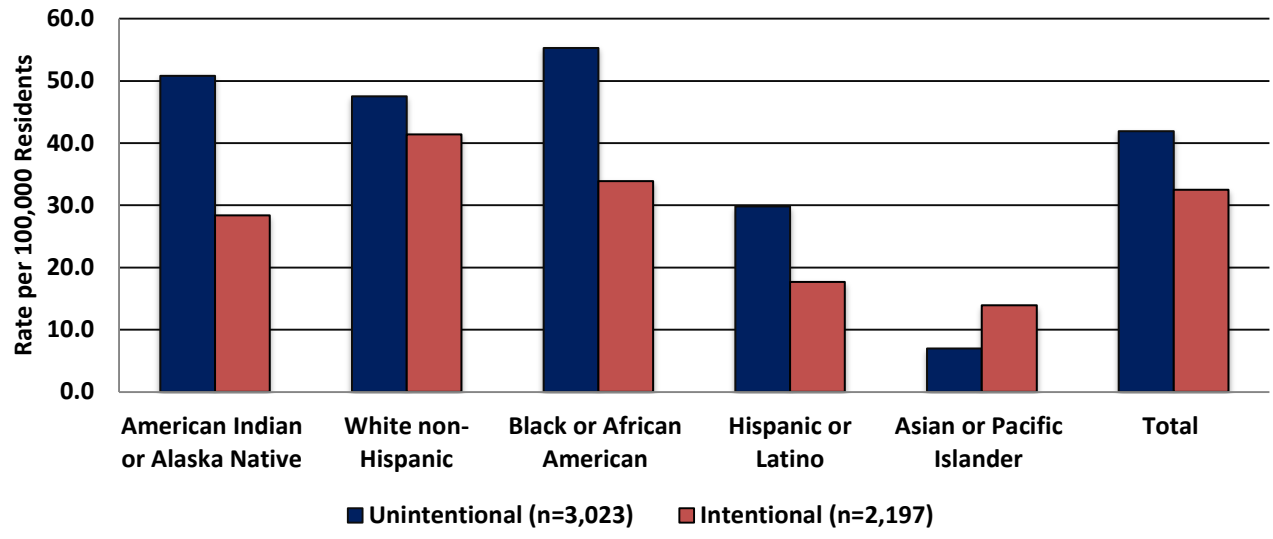
In 2017, forty-seven percent of unintentional poisoning-related inpatient hospitalizations (IP) and sixty-two percent of intentional poisoning-related IP were among females (n=1,425 and n=1,365, respectively). Female residents aged 15 through 24 years old had the highest rate of intentional poisoning-related IP (82.0 hospitalizations per 100,000 residents), while males within the same age group were lower (38.7 hospitalizations per 100,000 residents). Female residents aged 55 through 64 years old had the highest rate of unintentional poisoning-related IP (75.0 hospitalizations per 100,000 residents). Male residents aged 55 through 64 years had the highest rate of unintentional poisoning-related IP (68.5 hospitalizations per 100,000 residents). In general, the highest rates of intentional poisoning-related hospitalizations were among adults and teenagers aged 15 through 44 years old, whereas unintentional poisonings were highest among those aged 45 years and older. Figure 32 shows the poisoning-related inpatient hospitalization rates per 100,000 residents by age group and sex, separated by manner.

Figure 32. Age-Specific Poisoning-Related Inpatient Hospitalization Rates, by Age, Sex and Manner, Among AZ Residents, Arizona, 2017



Black or African American had the highest unintentional poisoning hospitalization rate in 2017 with 55.3 hospitalizations per 100,000 residents, followed by American Indian or Alaska Native (50.8 hospitalizations per 100,000 residents), and then White Non-Hispanics residents (47.5 hospitalizations per 100,000 residents). White Non-Hispanic had the highest intentional poisoning hospitalization rate with 41.4 per 100,000 residents, followed by Black or African American residents (33.9 hospitalizations per 100,000 residents). Figure 33 shows the age-adjusted poisoning-related hospitalization rates by race/ethnicity group and manner for Arizona residents in 2017.

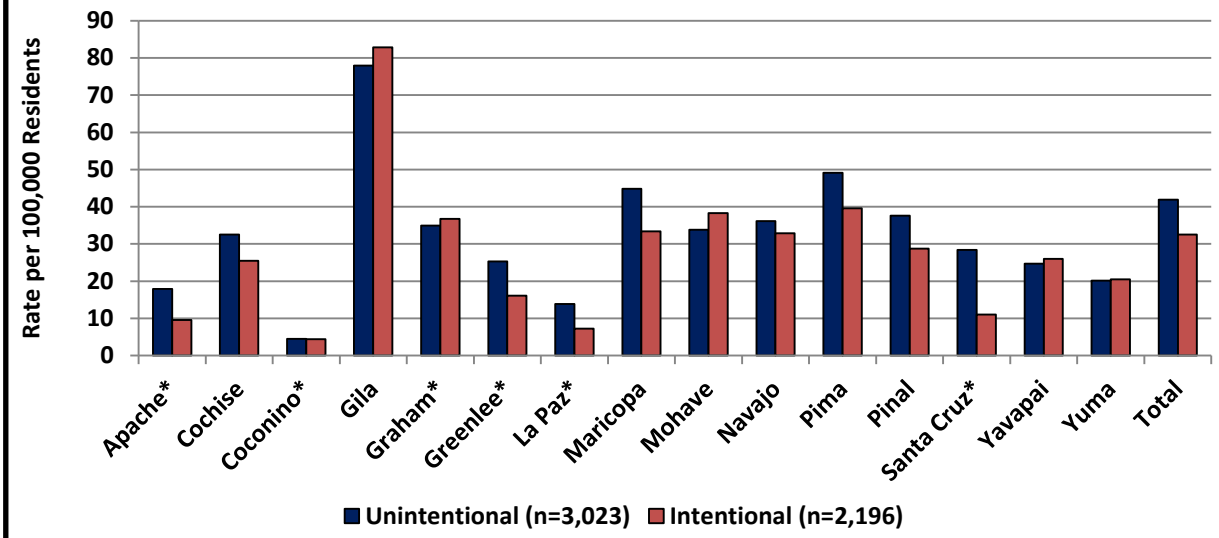
Figure 33. Age-Adjusted Poisoning-Related Inpatient Hospitalizations Rates, by Race/Ethnicity Group and Manner, Among AZ Residents, Arizona, 2017*



*There were 124 hospitalizations among individuals of other or unknown race/ethnicity.

Gila County had the highest inpatient hospitalization rate for unintentional poisonings (77.9 hospitalizations per 100,000 residents), followed by Pima County (49.1 hospitalizations per 100,000 residents). Gila County had the highest rate of intentional poisonings in 2017 (82.8 hospitalizations per 100,000 residents), followed by Pima County (39.6 hospitalizations per 100,000 residents). Poisoning-related hospitalizations were distributed among residents of Arizona's counties as shown in Figure 34.

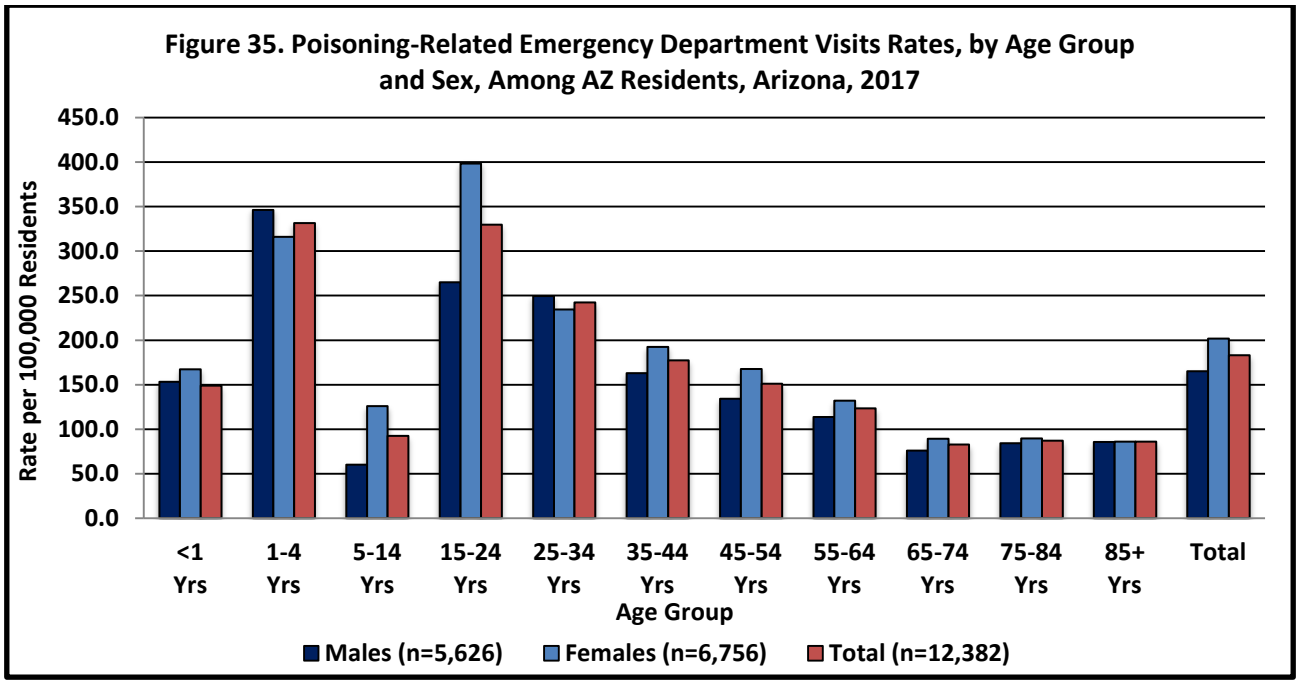
Figure 34. Age-Adjusted Poisoning-Related Inpatient Hospitalization Rates, by County and Manner, Among AZ Residents, Arizona, 2017



* Counties with counts <20 are unstable

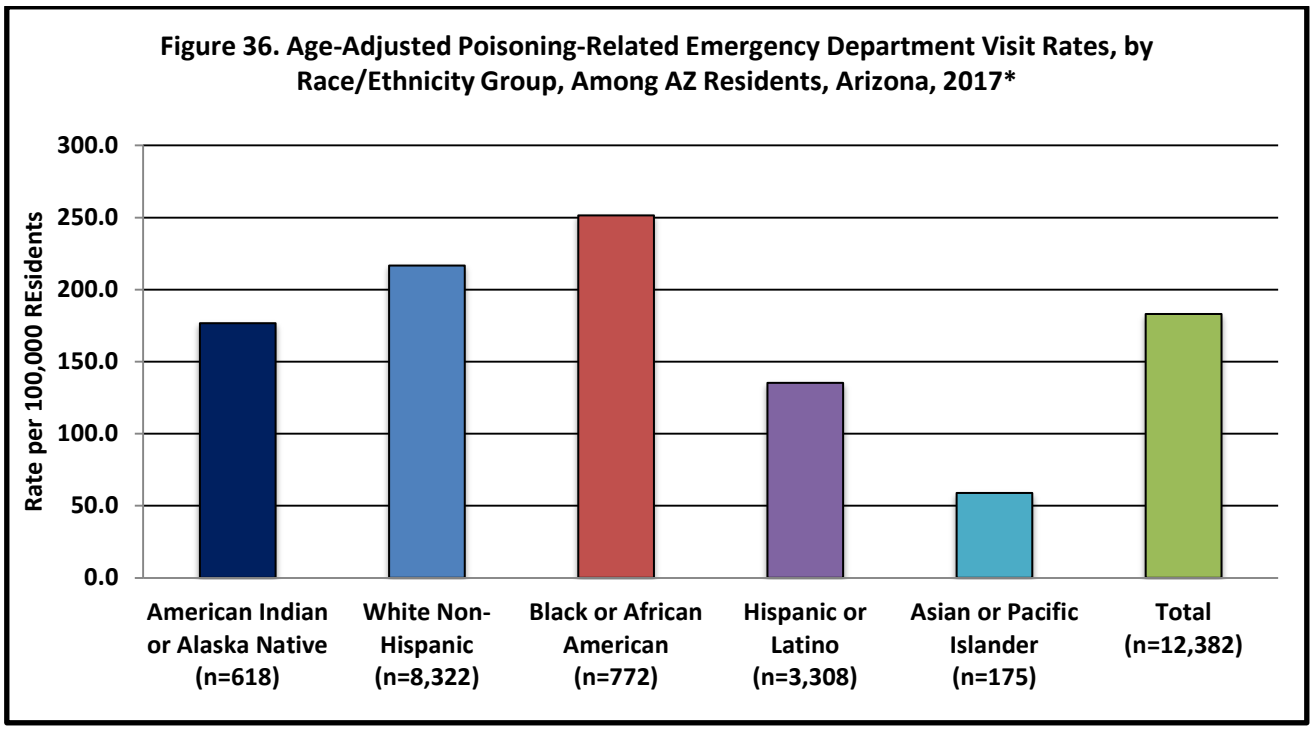
Poisoning-Related Emergency Department Visits, 2017

There were 12,382 emergency department visits among Arizona residents attributed to poisoning in 2017. Forty-five percent of the visits were among males (n=5,626), and fifty-five percent were among females (n=6,756). Females had higher rates of poisoning-related emergency department visits (EDV) than males across all age groups. Children aged 1 through 4 years old had the highest rate of EDV (331.4 EDV per 100,000 residents), followed by young adults aged 15 through 24 years old (329.4 EDV per 100,000 residents). The highest rate for males were among children 1 through 4 years old (346.3 EDV per 100,000 residents, while the highest rate for females were among young adults aged 15 through 24 years old (413.5 EDV per 100,000 residents). One study has shown that a substantial proportion of young children brought to an urban tertiary-care emergency department with apparent life-threatening events had positive toxicology screenings, even when parents denied medicating the child.[4] Though the rate of poisoning events among Arizona's young children is very high, the results of that study suggest that the rate may be higher still if all young children presenting in the emergency department with an apparent life-threat were screened for potential poisons. Figure 35 shows the poisoning-related emergency department visits rates per 100,000 residents by age group and sex.



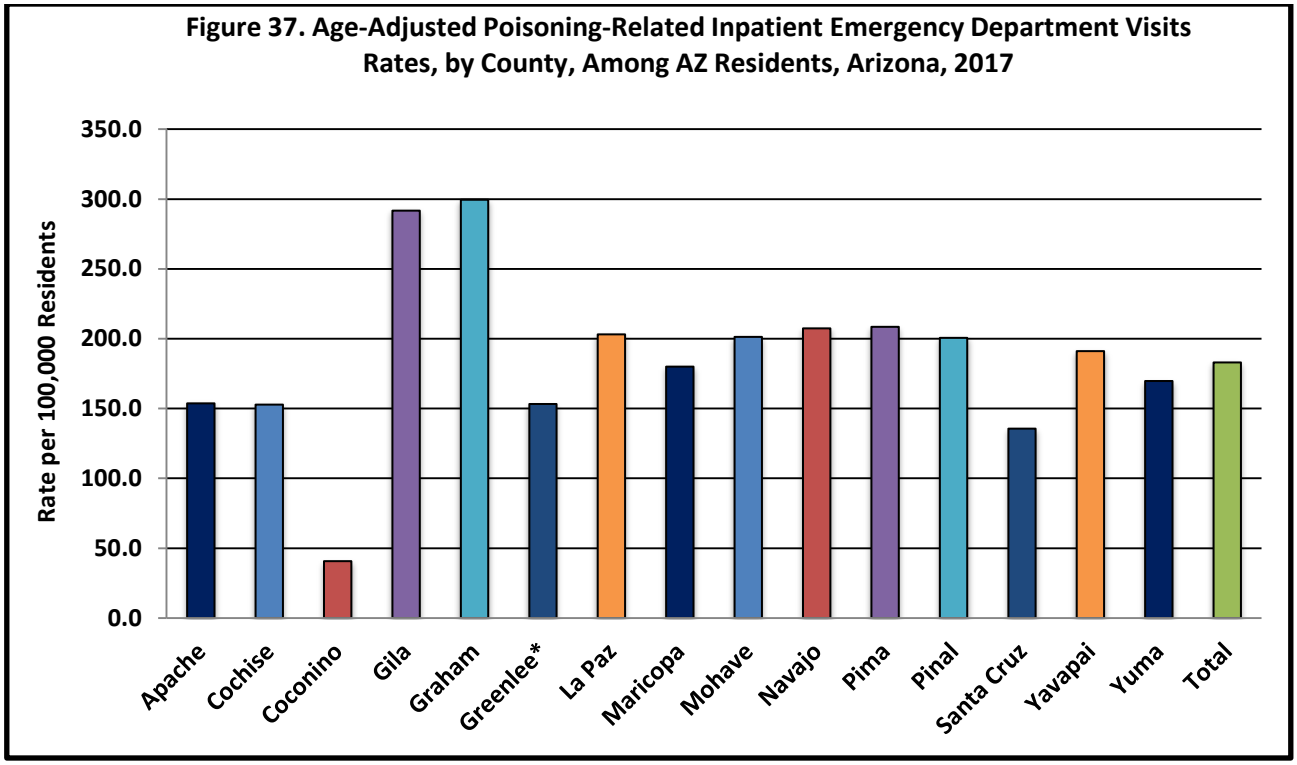
Black or African American had the highest poisoning-related emergency department visit rate (251.1 EDV per 100,000 residents, followed by White Non-Hispanic residents (216.7 EDV per 100,000 residents). The lowest rate was among Asians or Pacific Islander with 58.9 EDV per 100,000 residents. Figure 36 shows the rate distribution of emergency department visits by race/ethnicity in 2017.

[4] Pitetti RD, Whitman E, Zaylor A. Accidental and Nonaccidental Poisonings as a Cause of Apparent Life-Threatening Events in Infants. *Pediatrics* 2008; 122:e539-e362.



*Does not include 172 records with unknown or refused race/ethnicity.

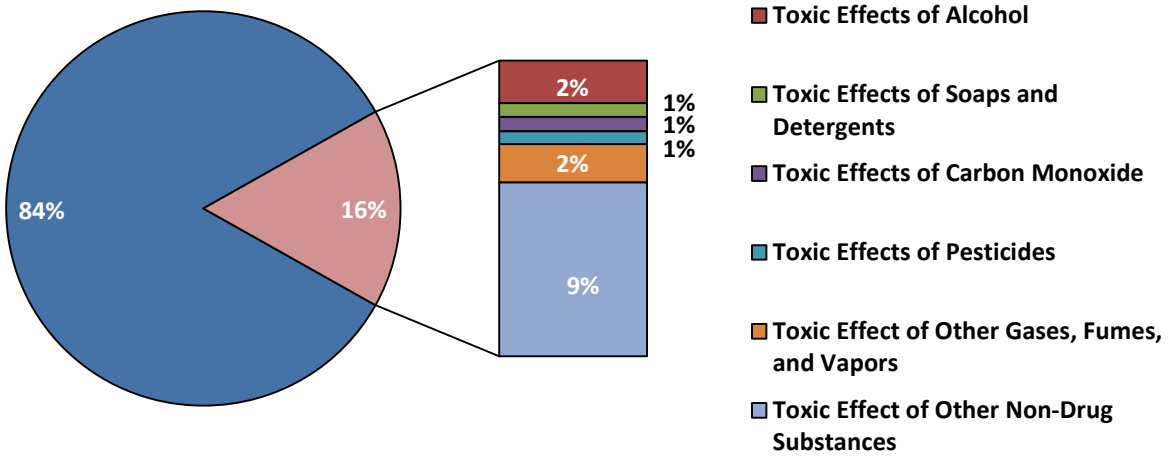
Graham County had the highest rate of poisoning-related emergency department visits in 2017 with 299.5 EDV per 100,000 residents, followed by Gila County with 291.7 EDV visits per 100,000 residents, and then Pima County with 208.5 EDV per 100,000 residents. Poisoning-related emergency department visits were distributed among residents of Arizona's counties as shown in Figure 37.



* Counties with counts <20 are unstable.

The vast majority poisoning-related emergency department visits were due to drug use (84%, n=10,266). This percentage includes prescription, non-prescription, and illicit drugs. Figure 38 shows percentage of poison hospitalizations by poison type.

Figure 38. Poisoning-Related Emergency Department Visits, by Poison Type, Among AZ Residents, Arizona, 2017

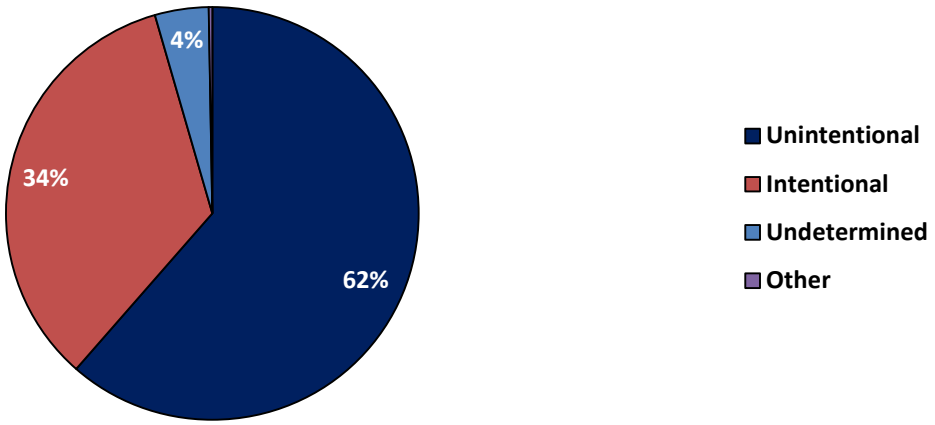


In 2017, the average poisoning-related emergency department visit resulted in $7,182 in hospital charges (median=$5,905). Hospital charges for emergency department visits due to poisonings totaled more than $88 million for Arizona residents in 2017. Fifty percent of those hospital charges were charged to the Arizona Health Care Cost Containment System (AHCCCS) totaling more than $42 million. Hospital charges do not reflect hospital reimbursement rates, nor do they include charges or costs related to emergency medical services, rehabilitation, legal fees, or lost work/school time.

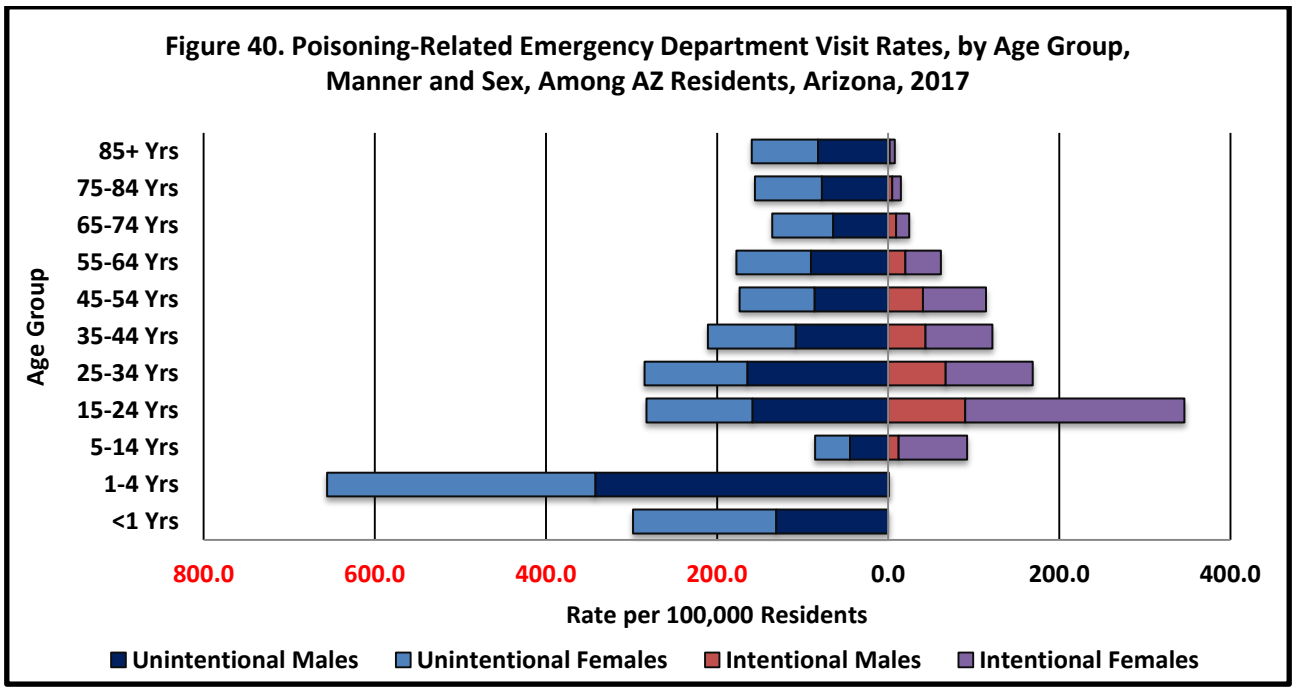
Poisoning-Related Emergency Department Visits by Manner

Majority of poisoning-related emergency department visits were identified as being unintentional injuries (61%, n=7,608). Thirty-four percent of emergency department visits were attributed to intentional poisonings (n=4,218), and poisonings of undetermined intent accounted for four percent of visits (n=520). Figure 39 shows the distribution of poison-related emergency department visits by manner.

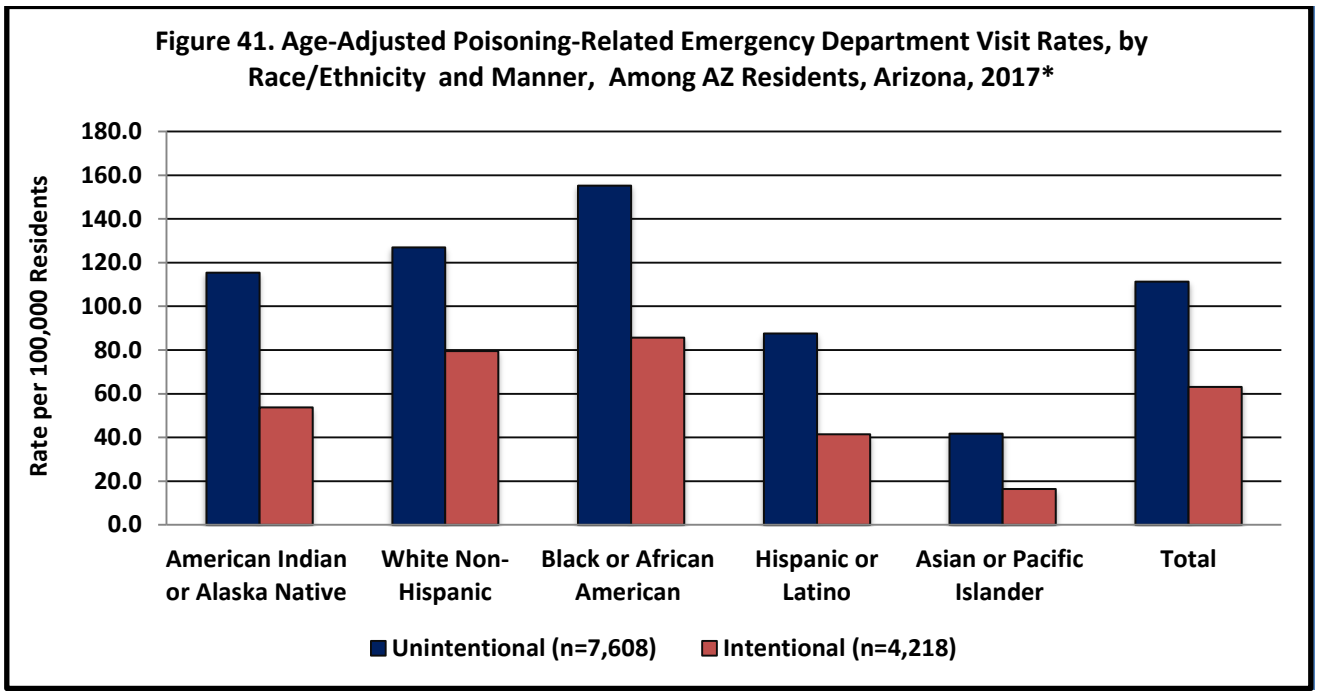
Figure 39. Poisoning-Related Emergency Department Visits, by Manner, Among AZ Residents, Arizona, 2017



Children one through four years of age had the highest rates of unintentional poisoning-related emergency department visits among both males (342.4 EDV per 100,000 residents) and females (313.5 EDV per 100,000 residents). Teens and young adults aged 15 through 24 years of age had the highest intentional poisoning-related emergency department rates (170.3 EDV per 100,000 residents). Females in all age groups had higher rates of intentional poisoning-related visits than males. Figure 40 shows the poisoning-related emergency department visit rates per 100,000 residents by age group and sex, separated by manner.

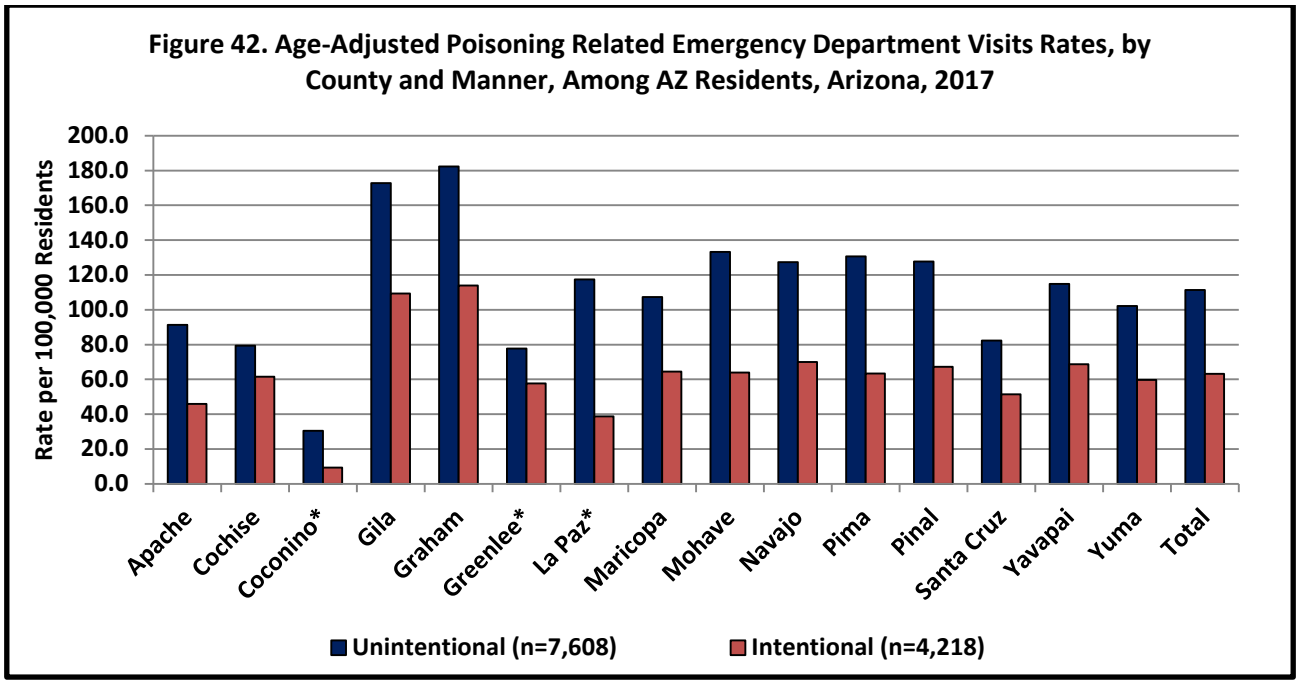


The highest rates of emergency department visits were among Black or African American residents for both unintentional and intentional poisonings. It is important to note that American Indian or Alaska Native residents are known to be under-represented in emergency department data since the hospital discharge database does not include records from Indian Health Services facilities, and therefore the rates presented here are most likely an underrepresentation of poisoning-related visits for that race group. Figure 41 shows the distribution of emergency department visits by race/ethnicity and manner.



*Does not include 172 records with unknown or refused race/ethnicity.

Graham County had the highest emergency department visit rates for unintentional poisonings (182.3 EDV per 100,000 residents) for intentional poisonings (113.9 EDV per 100,000 residents). Poisoning-related emergency department visits were distributed among residents of Arizona's counties as shown in Figure 42.



Poisoning and Prescription Drug Overdoses as an Arizona Public Health Concern

Deaths

- In 2017, poisoning was the leading cause of injury-related deaths (27%) accounting for more deaths among Arizonans than car crashes, falls, or firearm injuries.
- Between 2013 and 2017, the age-adjusted poisoning-related mortality rate increased 26% for Arizona residents.
- The age-adjusted poisoning mortality rate among females was 15.5 deaths per 100,000 residents, while the rate among males was 32.3 deaths per 100,000 residents.
- Adults 45-54 years of age had the highest age-adjusted poisoning-related morality rate (46.1 deaths per 100,000 residents.
- Drugs (prescription, non-prescription and illicit) were responsible for 91% of poisoning-related deaths.
- The poisons most commonly specified on death certificates in 2017 were pharmaceutical opioids (n=597), psychostimulants (including methamphetamine; n=562), and heroin (n=329). The number of heroin poisoning deaths increased by 19% in 2017 (n=329 or 4.9 deaths per 100,000 residents) from 2016 (n=288 or 4.4 deaths per 100,000 residents).
- In 2017, as in previous years, poisoning-related fatality rates were highest among American Indian or Alaska Natives (41.8 deaths per 100,000 residents).

Inpatient Hospitalizations and Emergency Department Visits

- Between 2013 and 2017, the age-adjusted rate of poisoning-related inpatient hospitalizations among Arizona residents decreased by 24%, from 100.2 hospitalizations per 100,000 residents in 2013 to 76.5 hospitalizations in 2017.
- In 2017, females aged 55 through 64 years old had the highest rate of poisoning-related inpatient hospitalizations (104.9 hospitalizations per 100,000 residents). Females aged 55 through 64 years old had the highest unintentional poisoning-related inpatient hospitalization rate (75.0 hospitalizations per 100,000 residents) and females aged 15 through 24 years old had the highest intentional poisoning-related inpatient hospitalization rate (82.0 hospitalization per 100,000 residents).
- The highest unintentional poisoning-related inpatient hospitalization by race or ethnicity group was among Black or African American Residents (55.3 hospitalizations per 100,000 residents).
- Between 2013 and 2017, the age-adjusted rate of poisoning-related emergency department visits (EDV) among Arizona residents increased by 2.8%, from 179.1 EDV per 100,000 residents in 2013 to 183.0 EDV per 100,000 residents in 2017.
- Children 1 through 4 years old had the highest rate of EDV (395.6.4 EDV per 100,000 residents), followed by young adults aged 15 through 24 years old (345.5 EDV per 100,000 residents).
- Children 1 through 4 had the highest unintentional poisoning-related emergency department visit (328.3 EDV per 100,000 residents), while young adults 15 through 24 had the highest intentional poisoning-related emergency department visit (59.6 EDV per 100,000 residents),
- Hospital charges for poisoning-related inpatient hospitalizations totaled more than $239 million in 2017, and Arizona residents spent a total of 19,553 days hospitalized for poisonings. Hospital charges for poisoning-related emergency department visits totaled over $88 million in 2017.

Arizona's Response

- The Arizona's Prescription Drug Misuse and Abuse Initiative which began in 2012, has 5 key strategies multi-faceted activities to combat prescription drug and opioid abuse and misuse across the state. ADHS has been vigorously involved in the dissemination of community toolkits in areas of need. Additional information regarding this initiative, along with toolkit materials can be found at (www.rethinkrxabuse.org).

- Patient and provider education: The *Arizona Opioid Prescribing Guidelines* for the treatment of acute pain and chronic non-terminal pain were published in November of 2014. http://azdhs.gov/clinicians/clinical-guidelines-recommendations/index.php?pg=prescribing. The *Arizona Guidelines for Emergency Department Controlled Substance Prescribing* were developed in 2012. Arizona has two nationally affiliated poison control centers providing education and drug exposure response throughout the state.

- Prescription monitoring: Arizona's Controlled Substances Prescription Monitoring Program is managed by the Arizona State Board of Pharmacy. Dispensing pharmacies and practitioners are required under Arizona law to report information on Schedule II, III, and IV prescriptions to the database. http://www.azpharmacy.gov/CS-Rx_Monitoring/aboutpmp.asp

- On June 5, 2017 Governor Ducey declared a public health state of emergency in response to the growing opioid epidemic, calling for a heighted response to reducing death and injury caused by opioid misuse and abuse in Arizona. This declaration designated ADHS as the lead agency for coordinating public health efforts between state, local and private-sector partners and allows the state to utilize all of its public health resources to respond rapidly to the epidemic. Below are a few activities ADHS was able to accomplish because of the declaration.
    - Created an enhanced surveillance system to collect real time data on opioid related events that include cases of suspected fatal and non-fatal opioid overdoses, Neonatal Abstinence Syndrome (NAS), naloxone administered by first responders, and naloxone distributed through pharmacies.
    - Created new opioid prescribing and treatment rules for healthcare institutions. Developed guidelines to educate healthcare providers on responsible prescribing practices.
    - Provided training to local law enforcement agencies on proper protocols for carrying, handling, and administering naloxone in response to a suspected opioid overdose.
    - Developed a 50 State Review Report on laws, policies, interventions, recommendations, and evidence base practices from other states dealing with the opiate epidemic.
    - Hosted several meetings and conferences to gain insight from partner agencies and key stakeholders on the impact of prescription drug misuse and abuse across the state.
    - Submitted a final report to the Governor on preliminary findings from the enhance surveillance, discussion, and recommendations from key stakeholders. Additional information regarding ADHS response to the emergency declaration on opioids can be found azhealth.gov/opioid.

- To achieve the goals outlined in the emergency declaration, and to reduce opioid related deaths by 10% in 2-years and by 25% in 5-years, ADHS will continue to partner with other state agencies, county health departments, and key stakeholders across the state. Below are a few activities ADHS strives to complete:

- Finish the rulemaking process for opioid prescribing and treatment in healthcare institutions, and rulemaking to make opioid related reporting by designated entities a permanent requirement as well.

- Complete and review of updated recommendations for the 2014 Arizona Opioid Prescribing Guidelines and incorporate the latest evidence and best practices for improving patient safety, and reducing adverse outcomes in patients receiving opioids.

- Continue to work with the Arizona Peace Officer Standards and Training Board (AZPOST) to train local law enforcement on how to properly handle and administer naloxone. To date, ADHS has trained 52 law enforcement agencies, and has provided 5,150 naloxone kits to local law enforcement for use while out in the field.

Poisoning Prevention Tips and Resources

Call **1-800-222-1222** to be connected to a local Poison Control Center.

You can prevent poisonings!

- **Store household cleaners in their original containers, away from children**
  - Pills, vitamins, antifreeze, nail polish remover, or insecticide may look similar to children's candy or beverages. Teach children not to eat or drink something without first asking an adult.
  - Teach children to identify medication, and don't refer to pills as 'candy'.
- **Identify poisonous plants around your home and remove from children's reach**
  - Visit the Cornell University Department of Animal Science website on poisonous plants at http://www.ansci.cornell.edu/plants or contact your local PCC to learn about poisonous plants.
- **Read the label and follow directions for using household products or medications**
- **Check with your doctor or pharmacist to prevent dangerous medication interactions**
- **Properly discard unused, unneeded, or expired medication**
  - Look for drug disposal events in your community. These provide a safe, easy way to responsibly get rid of unneeded medication. Such events may be sponsored by local hospitals, pharmacies, police or fire departments.
    - Go to www.dumpthedrugsaz.org for a map of prescription drug drop-off sites.
  - Only flush drugs down the toilet if the label specifically says to do so
    - Ask your pharmacist if you're unsure about proper disposal
  - To dispose of all other medications:
    - Remove the medication from the original packaging
    - Crush the pills and mix them with kitty litter, coffee grounds, or sand
    - Seal the mixture in a plastic bag and dispose of it with your household trash
- **Properly discard unused or unneeded household poisons and their containers**
  - Check with your city or county for hazardous waste collection events and locations.
  - Household poisons can include paints and solvents, auto fluids, household cleaners, pesticide, and pool chemicals
- **Participate in National Poison Prevention Week, held annually during the 3rd week of March**
  - The federal Health Resources and Services Administration (HRSA) provides an Event Planner Kit to help your agency or business get involved. Visit www.poisonprevention.org for more information.

Visit Arizona's Poison Control Centers on the internet at:

Arizona Poison and Drug Information Center, Tucson, Arizona
http://www.pharmacy.arizona.edu/outreach/poison/index.php

Banner Good Samaritan Poison and Drug Information Center, Phoenix, Arizona
http://www.bannerhealth.com/Locations/Arizona/Banner+Poison+Control+Center/_Banner+Poison+Control+Center.htm

Methodology

Mortality data for 2013 through 2017 were compiled from the death certificates registered with the Arizona Department of Health Services Office of Vital Records. Poisoning Deaths presented in this report were analyzed and compiled at a date that was before final year close out. Lag times for examining, confirming toxicology, and reporting unusual deaths from Medical Examiners to Office of Vital Records may vary from 4-6 months. ADHS anticipates the numbers of drug poisoning deaths will be higher than what is reported in this report. ADHS is currently analyzing close out and an enhanced drug poison report will be released after analysis is complete. Deaths in Any death record for an Arizona resident assigned an International Classification of Diseases, 10th Revision (ICD-10) code for poisoning as the underlying cause of death was included in the count. Poisonings due to envenomation by animals, plants, or insects were excluded from this report.

Inpatient hospitalization discharge data and emergency department discharge data from 2013 through 2017 were compiled from the Arizona Hospital Discharge Database at the Arizona Department of Health Services. The discharge database contains information from private, acute-care facilities in the state of Arizona, and do not include visits to federal facilities, such as Veterans' Affairs Hospitals or Indian Health Services facilities. The discharge databases do not contain data from urgent care facilities, private physician practices, or medical clinics. Hospital discharge data include hospital transfers and readmissions. Therefore, a single injured individual may be counted more than once. These data should be interpreted as episodes of medical treatment, not individual injuries.

Additionally, the data do not allow for analysis of the combined effect of two or more poisonous agents.
Records for Arizona residents assigned an International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) External Cause of Injury Code (E-Code) for poisoning as the primary cause of injury were included in this report. Poisonings due to envenomation by animals, plants, or insects were excluded from this report, as were cases in which medications caused an adverse reaction after therapeutic use. Medications were counted as poisoning events only if they were administered incorrectly or with the intent to harm. This could include the administration of the wrong drug, or an incorrect dose of a prescribed medication. This methodology was used for the first three quarters of 2015 (January-September).

ICD-9-CM transition to ICD-10-CM
In October 2015, the federal government's new mandate for ICD, the conversion of ICD-9-CM diagnostic and procedural codes to the implementation and use of ICD-10-CM codes, went into effect. This new mandate provides health providers a wider and more detail range for diagnosing diseases for the last quarter year of 2015 (October-December) and all of 2016 and 2017. The ICD-10-CM codes used are comparable or approximately similar to ICD-9-CM codes to identify poisons. Poisons were identified by analyzing principal diagnosis code for ICD-10 codes relating to Poisoning by, adverse effect of and underdosing of drugs, medicaments and biological substances and Toxic Effects of substances chiefly nonmedicinal as to source. Once cases were identified, poisoning due to adverse reactions after therapeutic use were removed.

Rates for 2013-2017 were calculated using Arizona population data compiled by the Arizona Department of Health Services' Bureau of Public Health Statistics, available on the internet at: http://www.azdhs.gov/plan/menu/info/pop/index.php.

To help compare groups over time, rates have been age-adjusted. Age-adjusting is a statistical procedure used to remove the effect of age differences between populations. All age-adjusted rates in this report were computed using the 'direct' method in which the age-specific rates for a given year are weighted by the age distribution of the 2000 standard population. For information on how to calculate an age-adjusted rate, or to see the 2000 standard age distribution, visit the National Cancer Institute Surveillance Epidemiology and End Results (SEER) program at http://seer.cancer.gov/seerstat/tutorials/aarates/definition.html.