

**DROWNING-RELATED HOSPITALIZATION
IN ARIZONA AND
MARICOPA COUNTY, 2016**

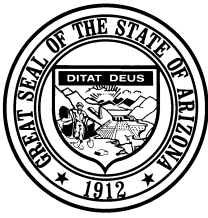
**Annual Report for the
Drowning Prevention Coalition of Arizona**



ARIZONA DEPARTMENT
OF HEALTH SERVICES

Bureau of Public Health Statistics

July 18, 2018



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DROWNING-RELATED HOSPITALIZATIONS IN MARICOPA COUNTY, 2016

SUMMARY

This annual report describes drownings and nonfatal drownings occurring in Arizona, with a focus on incidents occurring in Maricopa county. Previous years' annual reports relied heavily upon incident forms submitted by responding fire departments. This year's report, instead, relies upon the analysis of Arizona hospitalization data, called the Hospital Discharge Database (HDD). The national switch in late 2015 to ICD-10-CM diagnostic coding allows robust analyses of admissions to emergency departments and to the in-patient setting.

In 2016 the HDD recorded 419 statewide admissions (incidents) of persons of all ages. Young children (0-4 years of age) comprised 240 of these admissions statewide. Admissions to hospitals in Maricopa county totaled 275, of which 174 were young children. Swimming pools (131), and bathtubs (19) were the water types most commonly identified in Maricopa county for incidents involving young children. Hospitalizations from incidents in so-called "natural water" (such as rivers and lakes) totaled 46, mostly among persons 15 years of age and older. Hospital charges in Maricopa county exceeded \$7.4 million. In a separate analysis using death certificates, the Maricopa drowning death rate of young children increased from 3.3 deaths per 100,000 children in 2015 to 5.9 deaths per 100,000 children in 2016.

While reliance on HDD for drowning incidence data expands coverage statewide there are shortcomings, such as lack of inclusion of persons who are not hospitalized (e.g., deaths on-scene) and loss of detail about the circumstances that only first responders can provide. Nevertheless, use of HDD when accompanied by data from death certificates can provide data useful for studying the risk factors and monitoring progress in reducing the incidence of drowning and nonfatal drowning.

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INTRODUCTION

In the mid-1980's the drowning death rate of Arizona's preschoolers ranked first in the nation.¹ In the latest 6 years, data for the 50 states show that Arizona ranks 4th highest for drowning of children age 1-4 years.² And in recent years, among children 1-4 years of age in Arizona, drowning is the leading cause of death in that age group.³ Warm weather, long summers, and the presence of more than 300,000 residential swimming pools make Arizona at risk for water-related incidents. Furthermore, in about 9% of nonfatal drowning incidents the child may be left with some degree of neurological impairment.⁴

To address the problem of water-related incidents in the Phoenix metropolitan area (called "Maricopa County" in this report), the Drowning Prevention Coalition of Arizona was formed in 1988. This Coalition is comprised of municipal fire departments, hospitals, the state and county health departments, community organizations, pool builders, suppliers of pool safety equipment, parents of drowned children, concerned business leaders, and others.

The Coalition's website www.preventdrownings.org and a community partner's website <http://childrensafetyzone.com> provide stories about individual incidents. These stories convey the often tragic impact to a child and family. At a community level, the following report aggregates the individual events and uses data from hospital admissions to describe the larger patterns and trends. The information can be used to understanding the risk factors and in designing community approaches to reduce these incidents.

Unlike previous ADHS annual reports that relied mainly upon reports from fire departments the following report presents the hospitalization data for 2016. This new, completely different data source produces findings for 2016 that are not directly comparable to those in previous years. But, as in previous years, much of the report focuses on children under five years of age, and specifically on incidents occurring in swimming pools.

¹ Arizona Department of Health Services. Unintentional Drowning Deaths, Arizona, 1980-1989. Office of Planning & Health Status Monitoring, October 1990.

² CDC WONDER query for AZ deaths, 2010-2016, unintentional drowning, age 1-4 years, AZ crude rate of 4.6 deaths per 100,000 toddlers. Accessed June 14, 2018.

³ [Link to AZ data, 2010-2015, generated from CDC WISQARS.](#)

⁴ Beyda, D. and Masuello, J. Phoenix Children's Hospital. Oral communication, July 1999.

METHODS AND DATA SOURCE

Data Source: Hospitalization records

Effective on October 1, 2015 the U.S. Department of Health and Human Services required hospitals to implement the coding of injuries and diseases using the International Classification of Diseases, 10th edition, Clinical Modification (ICD-10-CM). The ADHS also requires Arizona hospitals to use this system in reporting patient discharges, conditions diagnosed and treated, and hospital charges to the patient. This classification system allows for more detailed epidemiologic analysis of hospital data than was possible in previous years.

To create the dataset for the present analysis, ADHS generated a list of records of persons admitted and discharged using the following criteria.

Data item	Criteria or Code Description	Comment
Year of admission	2016	
Residence	Any state or country	
Age	Any age at time of admission	
Record type	Emergency record or In-patient record	If a case had both types of records, only the single incident record was analyzed
ICD-10-CM code group		
T75.1	Unspecified effects of drowning and nonfatal drowning	
V90	Drowning and submersion due to accident to watercraft	e.g., watercraft overturns
V92	Drowning and submersion due to accident on board watercraft, without accident to watercraft	e.g., falling off the watercraft
W16	Fall, jump or diving into water	Only if the detailed code describes an associated drowning
W22.041	Strike wall of swimming pool causing drowning and submersion	
W65-W74	Accidental non-transport drowning and submersion	Includes bathtub, swimming pool, natural water, other, and unspecified water
X37-X38	Cataclysmic storm or flood	Only if another code implies an associated drowning
Y21	Drowning and submersion, undetermined intent	

Because the ICD-10-CM codes distinguish between an initial hospital encounter for an injury and subsequent admissions for continuing care we limited our analysis to admissions for the initial event.⁵ This report calls them the “incident” event or “case”.

Information sources and records not included: Unlike previous yearly reports, this approach does not include information supplied by fire departments or gleaned from news clipping or TV coverage. Drowning-related cases not admitted to a hospital emergency department (ED) or not admitted to in-patient care are not counted either;

⁵ These records generally contain an “A” in the seventh position of the diagnostic and E codes.

so, cases pronounced dead on scene are not counted in this report.⁶ Minor incidents that are not sent to a hospital are not a part of the dataset. Although they also contained the word 'drowning' in the diagnostic code description, there were 12 cases excluded from analysis where the manner of drowning or nonfatal drowning event was coded as "intentional" or "self harm".

Data assumption: Because the hospital dataset is unable to provide the physical location of drownings and nonfatal drownings, for analysis purposes we assume that the county of the admitting hospital is the same as the county in which the incident occurred. For example, a case admitted to Phoenix Children's Hospital or Banner Desert/Cardon's Children's Hospital is assumed to have occurred in Maricopa county. Thus, any case with an incident scene in one county who is transported for admission to another county would be misclassified as to the county of incidence.

Analysis: Starting with these incidents occurring in 2016, analysis of data was performed using SAS and Microsoft Excel.

⁶ A later section of this report (see Figure 4) presents the counts derived from death certificates.

FINDINGS

Analysis of the 2016 Hospital Discharge Database (HDD) for persons of all ages revealed 419 recorded admissions statewide for an incident of drowning or nonfatal drowning. Admissions to Maricopa county facilities totaled 275 (see **Table 1**), with 210 in EDs, and 65 as in-patients (data not shown). If a person had multiple admissions, only the “incident” admission was considered. If a person was seen in the ED and then was admitted as an in-patient at the same facility, the ED data is contained within the in-patient admission record, and there is no separate record for the ED admission.

The distribution of the 419 incidents in 2016 according to the facility county and age of the victim is shown in **Table 1** also. Maricopa county facilities admitted 275 persons in 2016, and Pima county facilities admitted 44 persons. Again, this report assumes that county of the facility of the admission reflects an occurrence of the incident in that same county.

Table 1. Water-related incidents reported for 2016 according to age group and the county in which the hospital facility was located.

County of the Facility	Age Group					Total
	0-4	5-14	15-34	35-64	65+	
Apache	0	0	0	1	0	1
Cochise	4	0	0	0	0	4
Coconino	4	2	3	3	1	13
La Paz	0	0	5	1	0	6
Maricopa	174	27	34	32	8	275
Mohave	10	7	8	11	1	37
Navajo	1	1	0	0	0	2
Pima	29	7	1	5	2	44
Pinal	7	2	3	3	1	16
Yavapai	2	1	1	0	1	5
Yuma	9	1	2	3	1	16
Total	240	48	57	59	15	419

Among the 275 cases admitted to a hospital facility (either the emergency department or in-patient) in Maricopa county, 257 cases were Arizona residents (see **Table 2**) The most common city of residence was Phoenix (86 cases), followed by Mesa (31 cases), and Chandler (23 cases). Eighteen of the incidents in Maricopa county occurred to out of state residents.

Table 2. Residence City of incident cases presumed to have occurred in Maricopa County

Residence City	Age Group					Total
	0-4	5-14	15-34	35-64	65+	
ANTHEM	1	.	2	.	.	3
APACHE JUNCTION	1	.	.	.	.	1
AVONDALE	1	.	.	.	.	1
BLACK CANYON CITY	1	.	.	.	.	1
BUCKEYE	.	2	.	1	.	3
CASA GRANDE	1	.	.	.	.	1
CHANDLER	17	2	2	2	.	23
CHINO VALLEY	1	.	.	.	.	1
COOLIDGE	2	.	.	.	.	2
EL MIRAGE	4	.	.	.	.	4
FOUNTAIN HILLS	.	.	2	.	.	2
GILBERT	17	.	1	1	.	19
GLENDALE	8	1	.	3	.	12
GLOBE	.	1	.	.	.	1
GOLD CANYON	.	.	.	1	.	1
GOODYEAR	3	.	1	.	1	5
LAVEEN	1	.	1	.	.	2
LITCHFIELD PARK	2	.	.	.	.	2
MARICOPA	1	1	.	.	.	2
MESA	20	5	3	1	2	31
PARADISE VALLEY	1	.	.	.	.	1
PAYSON	1	.	.	.	.	1
PEORIA	7	1	2	2	.	12
PHOENIX	53	10	11	9	3	86
PRESCOTT	.	.	1	.	.	1
QUEEN CREEK	1	.	.	1	.	2
SAN CARLOS	.	.	1	1	.	2
SCOTTSDALE	2	1	1	3	.	7
STANFIELD	1	.	.	.	.	1
SUN CITY	.	.	1	2	.	3
SUN CITY WEST	.	.	.	1	.	1
SURPRISE	4	1	1	1	.	7
TEMPE	8	.	1	.	.	9
TOLLESON	2	1	.	.	.	3
WADDELL	1	.	.	.	.	1
WHITERIVER	.	.	1	.	.	1
WINSLOW	1	.	.	.	.	1
YOUNGTOWN	1	.	.	.	.	1
TOTAL for AZ Residents	164	26	32	29	6	257
Out of State Residents	10	1	2	3	2	18
TOTAL	174	27	34	32	8	275

The four most frequent facilities to which cases were admitted were Banner Desert Medical Center, Phoenix Children’s Hospital, Banner Thunderbird Medical Center, and John C Lincoln Deer Valley (**Table 3**). The cases among young children (age 0-4) predominate among the age groups.

Table 3. Facility in Maricopa county to which cases were admitted, 2016. Hospitals with fewer than 5 admissions are combined in the Table.

Hospital Name	Age Group					All
	0-4	5-14	15-34	35-64	65+	
BANNER DESERT MEDICAL CENTER	52	8	1	1	1	63
PHOENIX CHILDRENS HOSPITAL	48	10	.	.	.	58
BANNER THUNDERBIRD MEDICAL CENTER	22	3	.	1	.	26
JOHN C LINCOLN DEER VALLEY HOSPITAL	14	.	4	2	.	20
CHANDLER REGIONAL HOSPITAL	1	1	4	4	1	11
SCOTTSDALE HEALTHCARE - SHEA	4	.	4	2	.	10
MOUNTAIN VISTA MEDICAL CENTER	3	1	2	1	1	8
BANNER ESTRELLA MEDICAL CENTER	2	1	3	.	1	7
MERCY GILBERT MEDICAL CENTER	4	.	1	1	1	7
JOHN C LINCOLN NORTH MOUNTAIN HOSPITAL	.	.	1	4	1	6
MARICOPA MEDICAL CENTER	4	.	1	1	.	6
SUN HEALTH DEL E WEBB HOSPITAL	4	.	.	2	.	6
WEST VALLEY HOSPITAL MEDICAL CENTER	3	1	.	2	.	6
ARROWHEAD HOSPITAL	1	.	1	3	.	5
SCOTTSDALE HEALTHCARE - OSBORN	1	.	.	4	.	5
17 Other Maricopa County Hospitals	11	2	12	4	2	31
All	174	27	34	32	8	275

The water type in which the incident occurred in Maricopa county according to age group and coded activity of the patient is presented in **Table 4**. For 28 (10%) of the 275 incidents the water type was not specified in the diagnostic codes.

Among persons of all ages, most incidents (175 [64%] of the 275) occurred in swimming pools. So-called 'natural water' (e.g., lakes, streams) involved 46 persons of all ages. Watercraft and water skiing involved 24 incidents among persons of all ages.

Among the 174 incidents involving young children a swimming pool was involved in 131 (75%) of the 174 events. A bathtub was the water type for 19 cases.

For 150 incidents (108 of them in swimming pools) an activity of the victim was not stated in the record.

Table 4. Water type and activity by age group of incidents occurring in Maricopa county, 2016

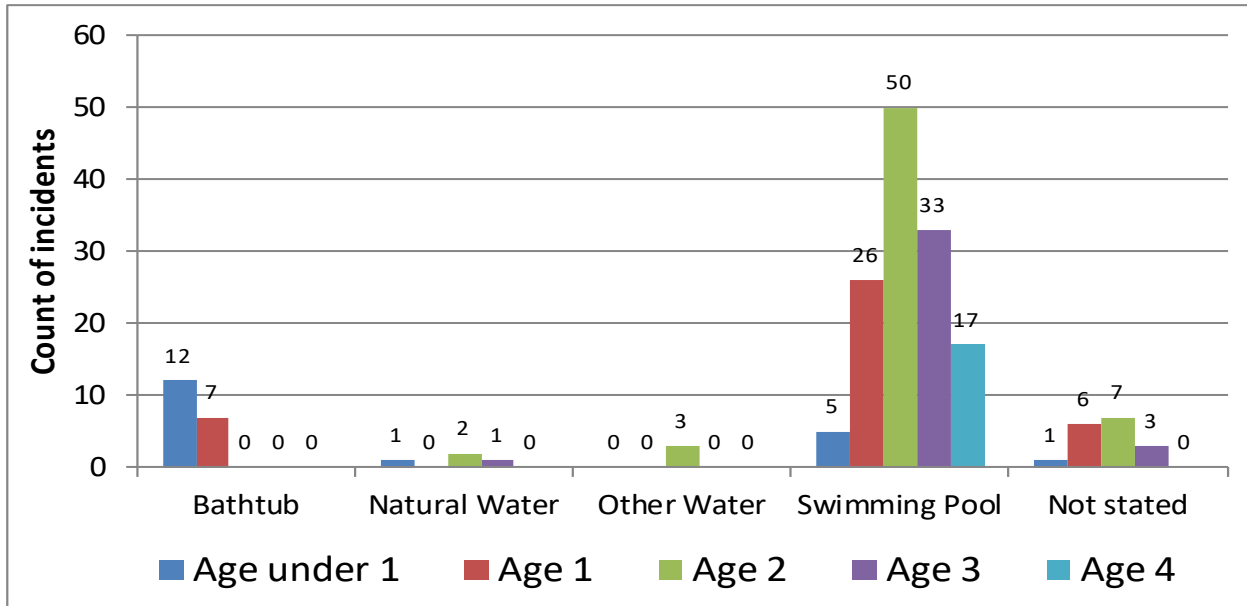
Water_Type	Activity_Victim	Age Group					All
		0-4	5-14	15-34	35-64	65+	
Unspecified	Not stated	13	3	3	2	1	22
	Other Specified	1	.	.	1	.	2
	Swimming	3	.	.	.	1	4
Bathtub	Not stated	3	.	1	1	.	5
	Bathing	16	.	1	.	1	18
Natural Water	Not stated	3	1	4	2	2	12
	Involving Watercraft	.	1	8	8	.	17
	Rafting/Tubing	.	.	.	2	1	3
	SCUBA	.	.	1	.	.	1
	Swimming	1	1	3	1	.	6
	Water Skiing	.	.	6	1	.	7
Other Water	Not stated	3	.	.	.	.	3
Swimming Pool	Not stated	82	11	3	10	2	108
	Maintenance	.	.	.	1	.	1
	Other Specified	12	.	.	1	.	13
	Rafting/Tubing	1	.	.	.	.	1
	Swimming	35	10	4	2	.	51
	Unspecified	1	.	.	.	.	1
All		174	27	34	32	8	275

Young Children

Children, ages 0-4 years, comprised the largest group experiencing a water-related incident. Although older individuals are equally important to consider in terms of loss of life, society generally feels a greater sense of responsibility to prevent injury to persons in the youngest, highly vulnerable, age group. The remainder of this report analyzes the findings among the 0-4 year old age group.

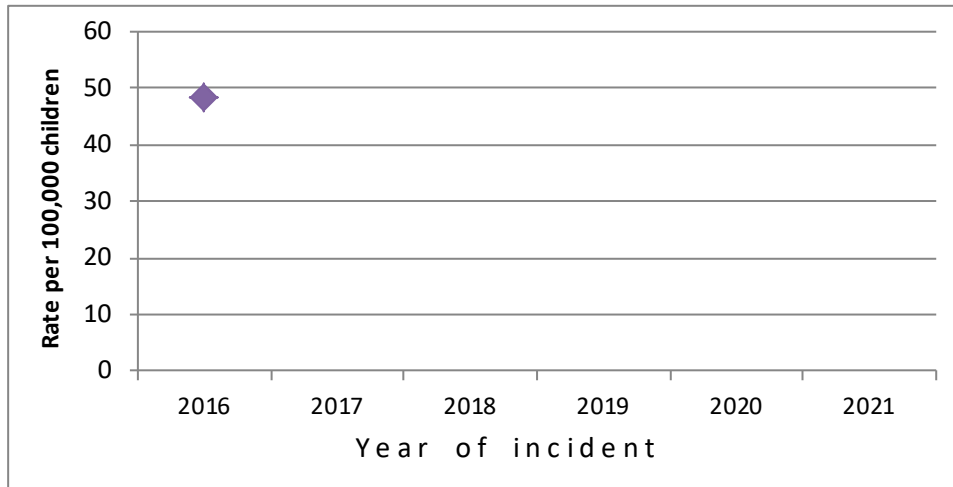
The distribution of cases among single ages of the 0-4 year old group is shown in **Figure 1**. Among children 1-4 years old, the count of incidents in swimming pools far overshadows the count in all other bodies of water combined. Among infants (i.e., under one year of age) bathtubs are the most common water body in which incidents occur.

Figure 1. Count of incidents according to the body of water in which incidents occurred, by single age category, reported in Maricopa County, 2016



Another way of considering the 131 incidents in swimming pools, is as a rate expressed per 100,000 children residing in Maricopa County. For 2016 the rate is calculated as $131 \div 270,572 \text{ children} = 48.4$ incidents per 100,000 resident toddlers (see **Figure 2**). The inverse of this rate ($100,000 / 48.8$) reveals that for every 2,065 children, at least one child experienced a pool incident requiring hospitalization in 2016 in Maricopa county. In future years the 2016 calculated rate shown in Figure 2 can serve as a new baseline for tracking the rate of hospitalization for incidents in swimming pools.

Figure 2. Rate of hospitalizations (per 100,000 children age 0-4 years) for Maricopa county incidents occurring in swimming pools



The incidents in Maricopa county swimming pools occurred among 59 young girls and 73 young boys. The higher count among boys was seen in many previous analyses of drowning data.

White Hispanic young children accounted for 32 (24%) of the 131 incidents, while white non-Hispanic accounted for 84 (63%). The remaining race categories together accounted for 11% of the incidents.

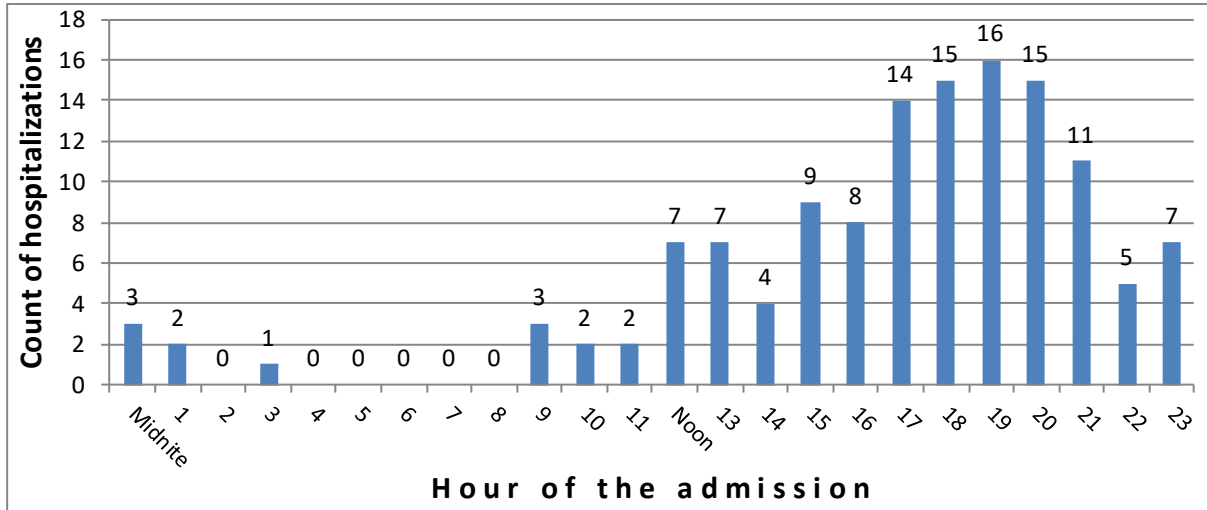
The hospitalization data for 0-4 year olds show a considerably higher risk for incidents in swimming pools on weekend days than on other days of the week **Table 5**. Almost half of all pool incidents occurred on weekends.

Table 5. Hospitalization Day of the Week

Water Type	Admission Day of the Week							All
	Sun	Mon	Tues	Wed	Thur	Fri	Sat	
Not stated	8	1	1	1	3	1	2	17
Bathtub	1	3	1	5	2	5	2	19
Natural Water	3	.	.	.	.	.	1	4
Other Water	2	.	.	.	.	1	.	3
Swimming Pool	30	16	11	12	19	11	32	131

The hour of hospitalization derived from incidents in Maricopa county swimming pools provides a rough sense of the time of day most at risk. **Figure 3** indicates that late afternoon is considerably riskier than other times of the day. Few hours were free of risk.

Figure 3. Hospital admission hour of the day, 2016 data for Maricopa county facilities



The hospitalizations of young children by month are shown in **Table 6**. We note the typical pattern seen in previous years, with the number of pool-related incidents peaking during the summer months of June, July, and August in many counties. In 2016 the count of incidents in Maricopa county pools in May, June, July, August, and September exceeded the Coalition’s goal of seeing fewer than 10 incidents in any month.

Table 6. Monthly sum of hospitalizations, 0-4 year olds, 2016

AZ_FAC_	Water_Type	Admission Month												All
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Cochise	Not stated	.	.	.	.	.	.	1	.	.	.	.	.	1
	Swimming Pool	1	.	.	.	.	1	1	.	.	.	.	.	3
Coconino	Natural Water	.	.	.	.	.	1	.	1	.	.	.	.	2
	Swimming Pool	1	.	.	.	.	.	.	.	.	1	.	.	2
Maricopa	Not stated	1	1	1	2	4	4	2	2	.	.	.	.	17
	Bathtub	1	.	3	3	2	1	3	.	.	2	3	1	19
	Natural Water	1	.	.	.	.	1	2	.	.	.	.	.	4
	Other Water	.	.	1	1	.	.	1	.	.	.	.	.	3
	Swimming Pool	2	6	7	8	12	22	34	17	13	4	5	1	131
Mohave	Not stated	.	.	.	.	.	1	.	.	.	.	.	.	1
	Bathtub	.	1	1	.	.	.	.	1	.	.	.	.	3
	Natural Water	.	.	.	.	.	.	.	.	1	.	.	.	1
	Swimming Pool	.	.	.	.	.	2	1	1	.	.	.	1	5
Navajo	Natural Water	.	.	.	.	.	1	.	.	.	.	.	1	
Pima	Not stated	.	1	.	.	.	.	3	.	.	.	.	.	4
	Bathtub	.	.	1	.	.	.	.	1	.	1	.	.	3
	Natural Water	.	.	.	1	.	.	.	.	.	.	.	.	1
	Other Water	.	.	.	.	.	.	.	.	1	.	.	.	1
	Swimming Pool	.	1	2	.	4	3	7	2	1	.	.	.	20
Pinal	Swimming Pool	.	.	.	.	1	3	.	2	.	1	.	7	
Yavapai	Swimming Pool	.	.	.	.	.	1	1	.	.	.	.	2	
Yuma	Swimming Pool	.	.	.	1	.	1	4	3	.	.	.	9	
All		7	10	16	16	23	42	60	30	17	9	8	3	240

The financial impact of the incidents can be measured partially in terms of the hospital charges for the admissions. By county, these are the incurred charges at the facilities in 2016 (see **Table 7**). Hospitals in Maricopa county charged a total of \$7.4 million for care related to drowning in 2016. Statewide, the hospital charges exceeded \$10.3 million.

Table 7. Sum of hospital charges, presented according to the county in which the hospital is located. The mean of the charges are shown by age group.

County of the Facility	0-4	5-14	15-34	35-64	65+	sum
Apache				\$2,583		\$2,583
Cochise	\$23,485	.	.	.	.	\$23,485
Coconino	\$16,455	\$7,340	\$17,509	\$15,473	\$17,585	\$74,362
La Paz	.	.	\$14,941	\$86,918	.	\$101,859
Maricopa	\$2,263,960	\$190,531	\$1,964,640	\$2,582,434	\$483,806	\$7,485,371
Mohave	\$825,069	\$48,816	\$167,369	\$296,701	\$8,494	\$1,346,449
Navajo	\$4,785	\$6,267	.	.	.	\$11,052
Pima	\$318,732	\$388,584	\$18,633	\$87,190	\$36,646	\$849,785
Pinal	\$22,499	\$7,651	\$9,255	\$215,975	\$3,002	\$258,382
Yavapai	\$4,446	\$1,430	\$7,137	.	\$7,818	\$20,831
Yuma	\$48,651	\$15,599	\$12,304	\$59,890	\$58,145	\$194,589
Sum	\$3,528,082	\$666,218	\$2,211,788	\$3,347,164	\$615,496	\$10,368,748
Mean	\$14,700	\$13,880	\$38,803	\$56,732	\$41,033	\$24,746

Outcome Status

For children 0-4 years of age we determined the outcome status at the time of discharge as presented in **Table 8**. Of the 174 children admitted, 14 died, with 12 of these deaths resulting from incidents in swimming pools. To count the “impaired” outcome status we assumed child was impaired if they were discharged other than to home (e.g., to a care facility), or if they stayed 7 or more total days in hospital. Four children were classified with the “impaired” outcome status. For the discharge status of “normal” outcome we assumed that children who stayed less than 7 total days in hospital were discharged with status of “normal”. The vast majority of children (150 [86%] of the 174) would be considered to have a “normal” outcome under our definition.

Currently, we do not have resources to conduct a longer term assessment of the needs or outcome status, such as educational achievement in school, of the surviving children.

Table 8. Outcome status of children 0-4 years of age hospitalized in Maricopa county for a drowning-related incident in 2016.

WATER TYPE	Presumed outcome status				All
	Died	Impaired	Normal	Unknown	
Not stated	2	.	14	1	17
Bathtub	.	1	18	.	19
Natural Water	.	.	4	.	4
Other Water	.	.	3	.	3
Swimming Pool	12	3	111	5	131
All	14	4	150	6	174

Limitations of Accuracy of Incidence Data

Cases that generally lack a hospital record include those that are obviously dead when the law enforcement or EMS first responders arrive on scene. Previous years’ reports often missed cases under the jurisdiction of the sheriff’s office or a tribal government. This shortcoming is no longer present because the cases are recorded at a hospital level.

Information from 16 death certificates (described below) reveals that just 1 child drowning death in 2016 from incidents in Maricopa county was not included in this report using the hospitalization dataset as the data source. For counting deaths by drowning, this match rate of 15/16 indicates a good agreement of the hospitalization data with the death certificate data.

DEATH CERTIFICATE DATA

Death certificates provide an independent data source to measure the counts, rates, and trend of child drownings. Thus, the mortality data can help to measure the accuracy and completeness of the incidence surveillance system for the cases who die. However, it should be noted that case definitions used for vital statistics differ slightly compared to those used in the incidence data.

Customarily, mortality data show deaths of the resident population during a given year. However, for this report we present an unconventional analysis that more precisely reflects the local, year-to-year findings. We reviewed Arizona death statistics to find cases of young children who died in Arizona, regardless of where they resided, and we include only the cases whose incident occurred in Maricopa county. Thus, we present the Maricopa county rate of drowning deaths, regardless of residency. To calculate the mortality rate, we divided the count of deaths by the estimated number of children age 0-4 each year residing in Maricopa county. This method improves the accuracy of identifying locally occurring events which is important for the Coalition that relies upon this surveillance system to provide yearly feedback about the effectiveness of their prevention programs.

Figure 4 (see next page) shows these drowning death rates for children under five years of age.⁷ The data are shown for drownings in all bodies of water, and separately for drownings that occurred in swimming pools (including spas), and in bodies of water other than pools and spas.⁸ In 2016, the Maricopa drowning rate for all bodies of water increased to 5.9 deaths per 100,000 resident children. Similarly, the death rate for pools increased to 5.2 deaths per 100,000 children. For comparison, the goal of *Healthy Arizona 2010* was to reduce drowning fatalities to no more than 0.9 deaths per 100,000 young children.^{9,10} Maricopa County's drowning rate in the 2010's remains about 4-6 times higher than the statewide goal. Nonetheless, we see an overall decline in the pool death rate since the 1980's and 1990's. However, the rate since the early 2000's has been relatively flat. The current Arizona injury prevention plan continues to include a section to reduce drowning.¹¹

⁷ To calculate this rate, the numerator includes non-residents and Arizona residents, age 0-4 years old, whose death occurred in Maricopa County. The denominator, however, is the Maricopa County population of children 0-4 years old. We chose this unconventional method for calculating the rate because we occasionally encounter nonresident visitors whose incident and death occurred in Maricopa county. We count these cases because the Drowning Prevention Coalition is focused on reducing the number of local incidents regardless of whether the child is a county resident or a visitor.

⁸ Here we consider a hot tub or spa in the same category as swimming pool.

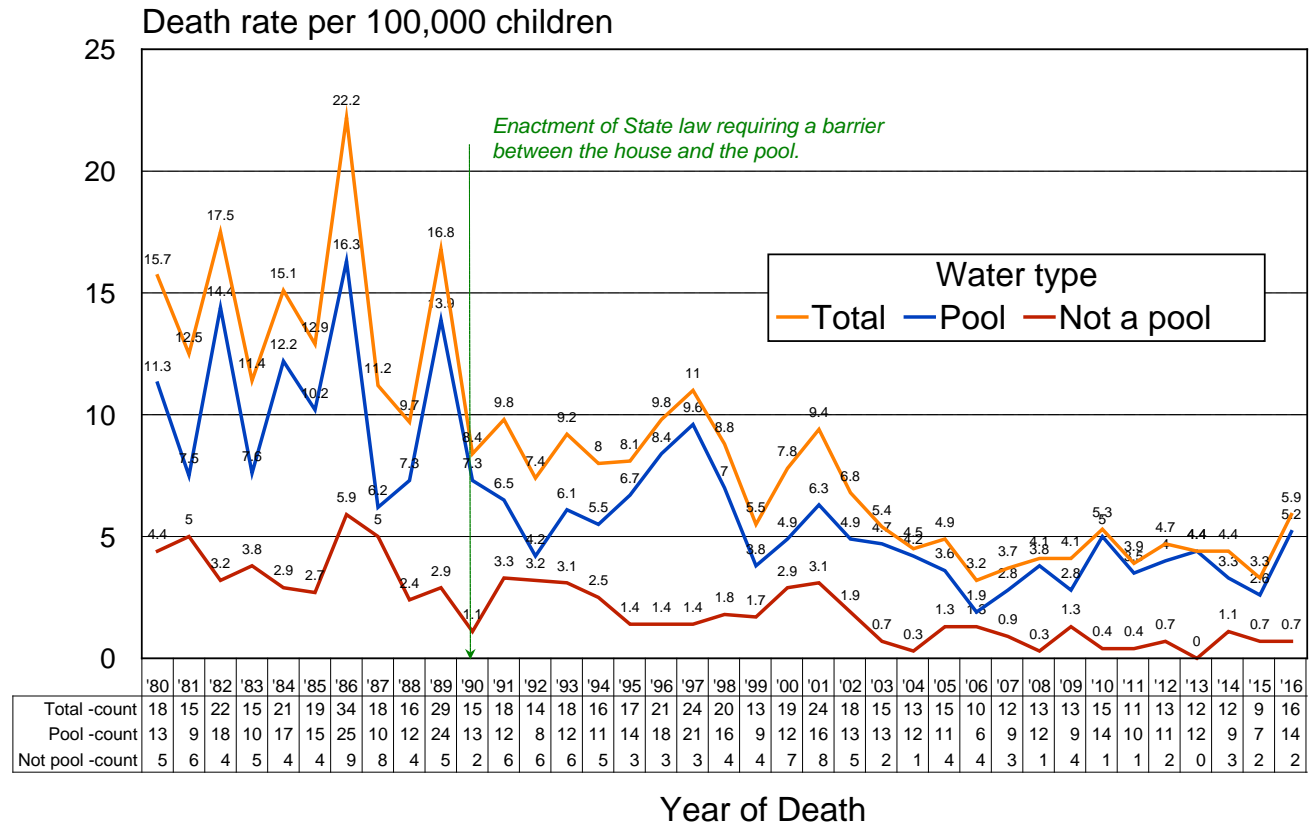
⁹ U.S. Department of Health and Human Services. *Healthy People 2010*, 2nd ed., Volume 2. Injury Prevention, Section 15-29: Reduce Drownings, page 15-40. U.S. Government Printing Office, November 2000.

¹⁰ ADHS Injury Surveillance and Prevention Plan, 2002-2005. The plan was developed within the Bureau of Emergency Medical Services.

¹¹ ADHS. [Arizona Injury Prevention Plan, 2012-2016](#).

Figure 4. Drowning death rate for children, 0-4 years of age, where the occurrence of the death and the incident was in Maricopa County. [Data Source: ADHS, Vital Statistics, death certificates coded with underlying cause of death as: E830, E832, or E910 (prior to year 2000); or T75.1, W65-W74, V90-V92, or Y21 (year 2000 and later). Manner of death: accidental or undetermined].

Child drowning rate and count in Maricopa County, Arizona Deaths occurring in 1980-2016; 0-4 years of age



DISCUSSION

This new approach to monitor drowning incidents using HDD is able generate many, but not all, of the data items previously reported to the DPCA with the system that relied on reports from fire departments. Significant differences include loss of specific water type (e.g., bucket, hot tub), and details such as the city in which the incident occurred, the type of dwelling, and whether the incident occurred at the victim's own home or a neighbor's home. It is not possible to use the HDD dataset to assign an attributed cause of an incident as we have done in the past by reading the fire department personnel's brief narrative description.

Nonetheless, several advantages are noted using the new approach. First, it could easily expand drowning surveillance to a statewide level, rather than only in Maricopa or Pima counties. Second, the ICD-10-CM codes are robust and allow the inclusion of drowning and immersion incidents that are related to water transportation, such as boat crashes or falls off boats and inflatable craft. Previously these incidents were rarely included in our statistics. Third, the HDD is documenting 3 times as many incidents as were being reported by relying upon fire department personnel using the paper collection form. While collecting epidemiologic data about individual incidents is important for designing primary prevention activities, fire department personnel's priority will always be in stabilizing injured patients and transporting them to care. This leaves little time for them to collect information about the risk factors associated with the incident.

While the ADHS personnel resources required to process the HDD data are not trivial, with a relatively modest investment of staff time it is possible to generate a summary report addressing drownings in a more automated and efficient manner. We welcome comments from the Coalition and community concerning the new monitoring approach.