

2017 INDIANA FIREWORK-RELATED INJURY REPORT

October 2017



Division of Trauma and Injury Prevention

Indiana State Department of Health

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All hospitals, medical facilities and private medical practices are mandated by law to report all firework injuries and deaths to the Indiana State Department of Health (ISDH); however, it is estimated that the number of injury reports received is an underestimation of the true burden of fireworks injuries. This report presents firework-related injury data compiled from submitted fireworks forms for the 2016 reporting cycle (Sept. 13, 2016 – Sept. 12, 2017). Figure 1 indicates the number of firework-related injuries from 2003 to 2004 and 2006 to 2017.

Figure 1. Firework-related injuries by reporting cycle year, Indiana, 2003–2017*



*2017 reporting cycle included cases Sept. 13, 2016 – Sept. 12, 2017.

Source: Indiana State Department of Health, Division of Trauma and Injury Prevention.

2017 Highlights

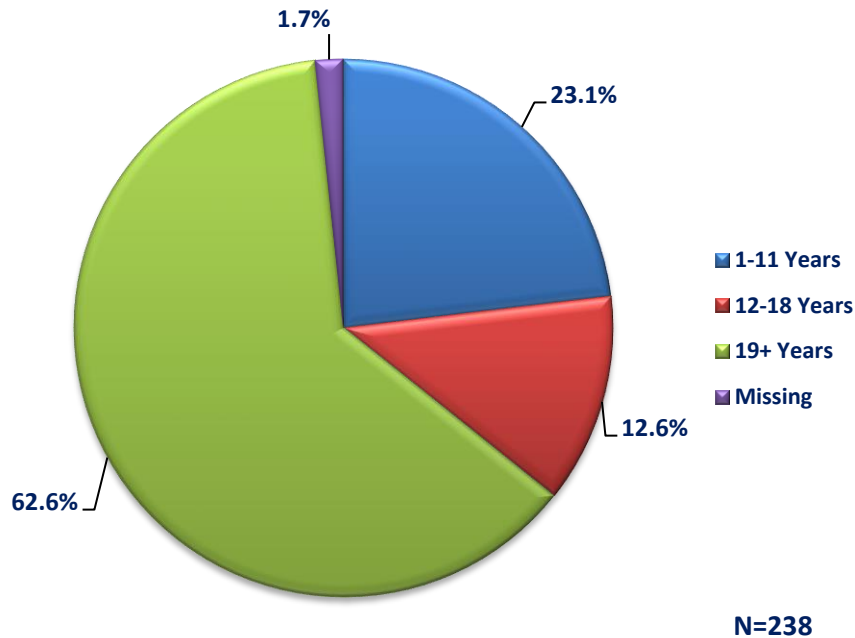
- ❑ There were 238 unduplicated cases of firework-related injuries reported to ISDH.
- ❑ More than one-third of all reported firework-related injuries involved individuals 18 years of age and younger. The youngest injured person was one year old.
- ❑ Ninety-four cases occurred on July 4, 2017, which represents 39.5 percent of all reported cases.
- ❑ Thirty percent of firework-related burn injuries were to the hands and/or fingers.
- ❑ Ten percent of cases were hospitalized or transferred to another hospital for treatment.
- ❑ Eye injuries accounted for 11.7 percent of the total number of injuries; nearly 82.1 percent of these cases did not use eye protection.
- ❑ Forty-nine percent of the injuries were caused by firecrackers, rockets and sparklers.
- ❑ Malfunctioning or mishandling of fireworks accounted for nearly 57 percent of reported fireworks injury mechanisms.
- ❑ Firework use on private property accounted for 61.3 percent of reported injury cases.

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Demographics

- The median age of persons with a firework-related injury was 25 years. The average age of all injured persons was 25.5 years old; ages ranged from 1 to 71. Four cases did not report age.
- Nearly 35.7 percent of those injured were age 18 or younger, with 23.1 percent of those injured under the age of 12 (Figure 2).
- Across all age groups, males reported more firework-related injuries than females. Of reported injuries, 67.2 percent involved males. Six cases did not report gender (Figure 3).
- Seventy-nine percent of persons injured were white, 13.0 percent were black or African-American, 0.8 were Asian and 0.4 percent were multiracial (Figure 4). Race was not known or not reported in 6.3 percent of the injury reports. White males represented 54.2 percent of cases.
- Of those who reported ethnicity, Hispanic ethnicity was reported in 3.8 percent of cases.
- Eighty-four percent of injured people provided a home address in Indiana, 6.3 percent reported out-of-state addresses and 9.2 percent did not provide an address. Marion, Lake and Vanderburgh counties reported the most cases of firework-related injuries, with 24, 15 and 12 cases, respectively.

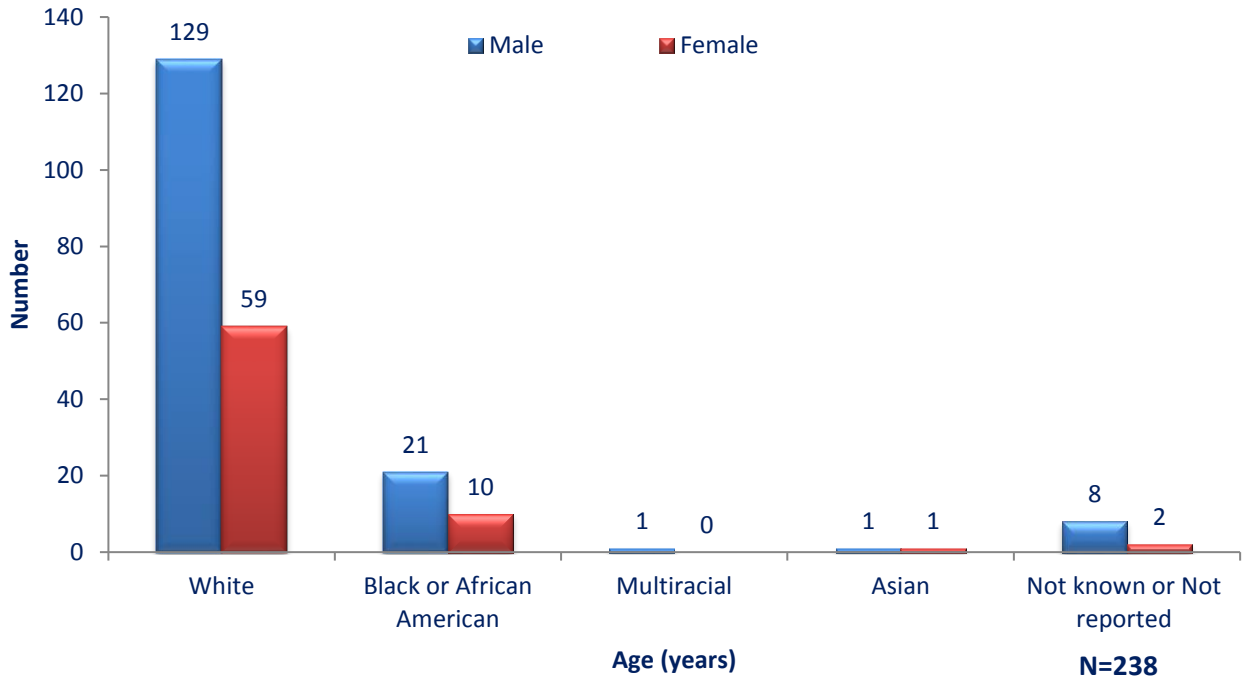
Figure 2. Firework-related injuries by age group, Indiana, 2017*



*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.
Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

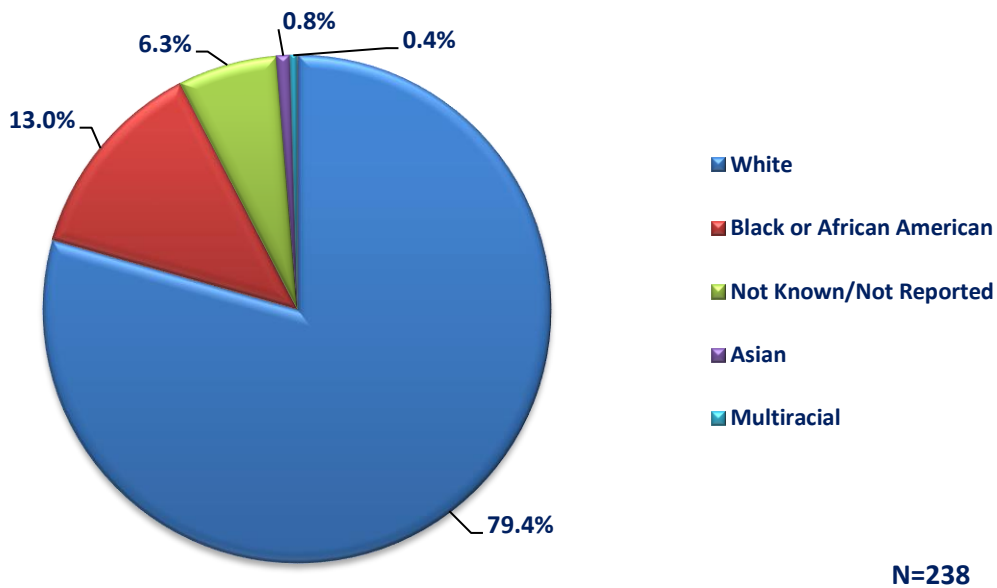
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Figure 3. Firework-related injuries by age and sex, Indiana, 2017*



*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.
 Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

Figure 4. Firework-related injuries by race, Indiana, 2017*



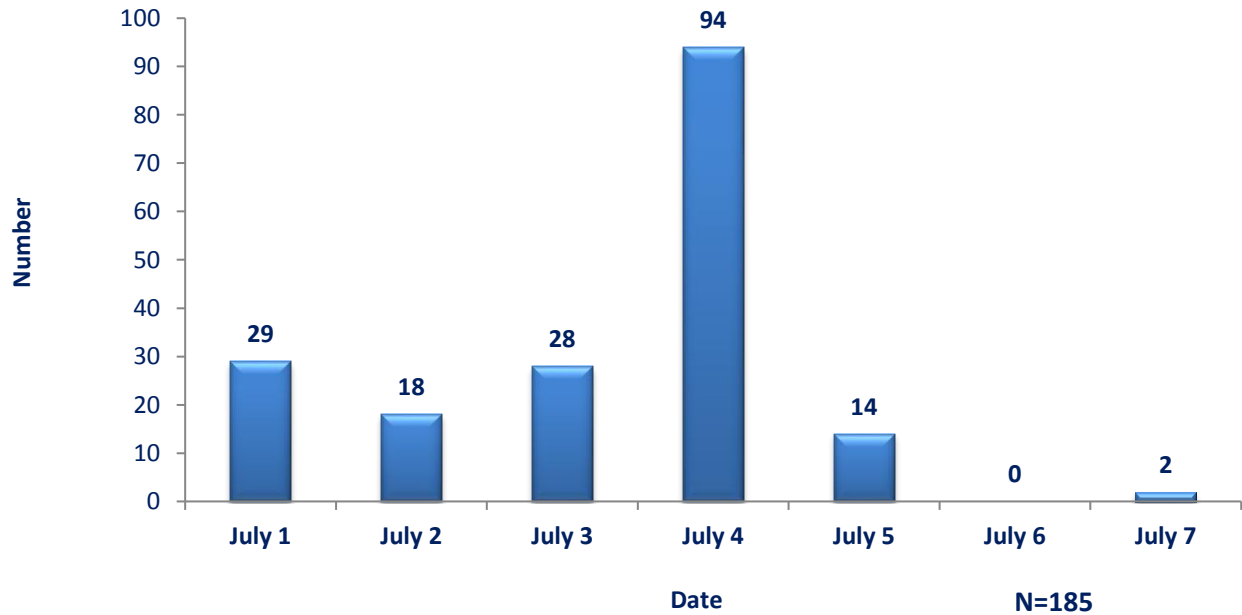
*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.
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Date and time of injuries

- Seventy-seven percent of all reported injuries in 2017 occurred from July 1 to 7, and 39.5 percent of all fireworks injuries in 2017 occurred on July 4 (Figure 5).
- Two firework-related injuries were reported between Sept. 12 and Dec. 31, 2016. Twenty-one firework-related injuries were reported between Jan. 1 and June 30, 2017. Fourteen cases occurred from July 8 to Sept. 12, 2017. Sixteen cases did not have information about the date the injury occurred.
- Sixty-one percent of reported firework-related injuries occurred between 8 p.m. and midnight, with 72 cases occurring between 10:00 and 10:59 p.m. (Figure 6).
- Forty-three cases failed to report the time the injury occurred, of which 31 failed to report whether the injury occurred before or after noon.

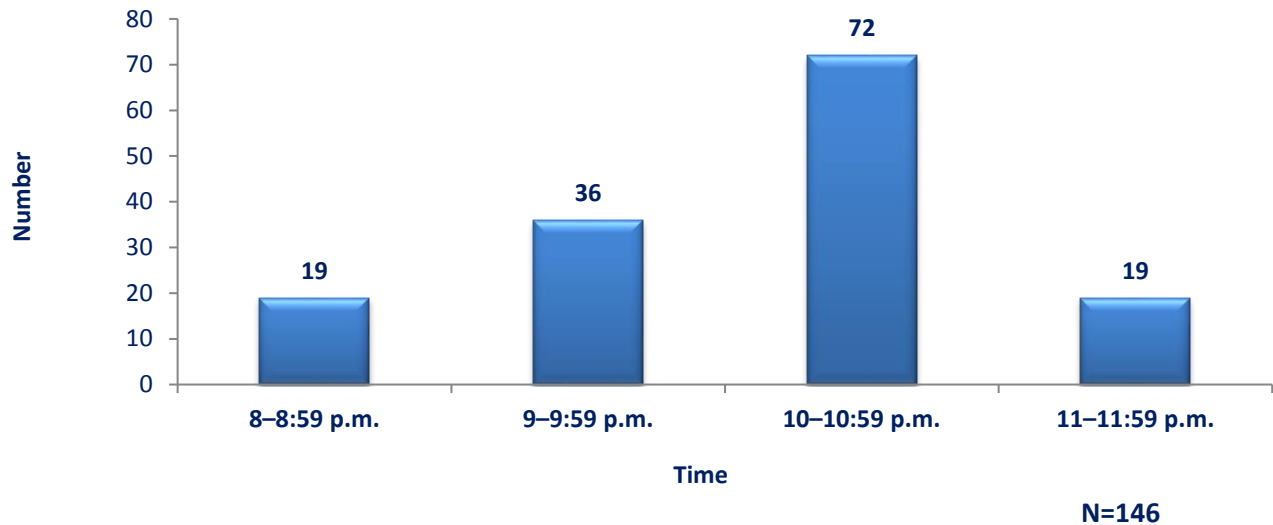
Figure 5. Firework-related injuries by date, July 1 – July 7, Indiana, 2017*



*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.
Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

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Figure 6. Most frequent times of day when firework-related injuries occurred, Indiana, 2017*



*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.

Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

Types of fireworks involved in injuries

- ❑ Rockets, firecrackers and sparklers accounted for nearly half (49.2 percent) of the reported injuries (Table 1).
- ❑ Two individuals were noted to be injured by more than one firework. These individuals were reportedly injured from holding numerous sparklers that were lit at once and burned quickly.
- ❑ At least 15 fireworks injuries were indicated to have involved mortars (tube-shaped devices used as launching mechanisms for shells in aerial fireworks displays).
- ❑ Malfunctioning or mishandling of fireworks accounted for 56.7 percent of reported fireworks injury mechanisms (Figure 7). For 24 reports, there was more than one cause of firework-related injury, leading to 263 causes for 238 reported injuries.

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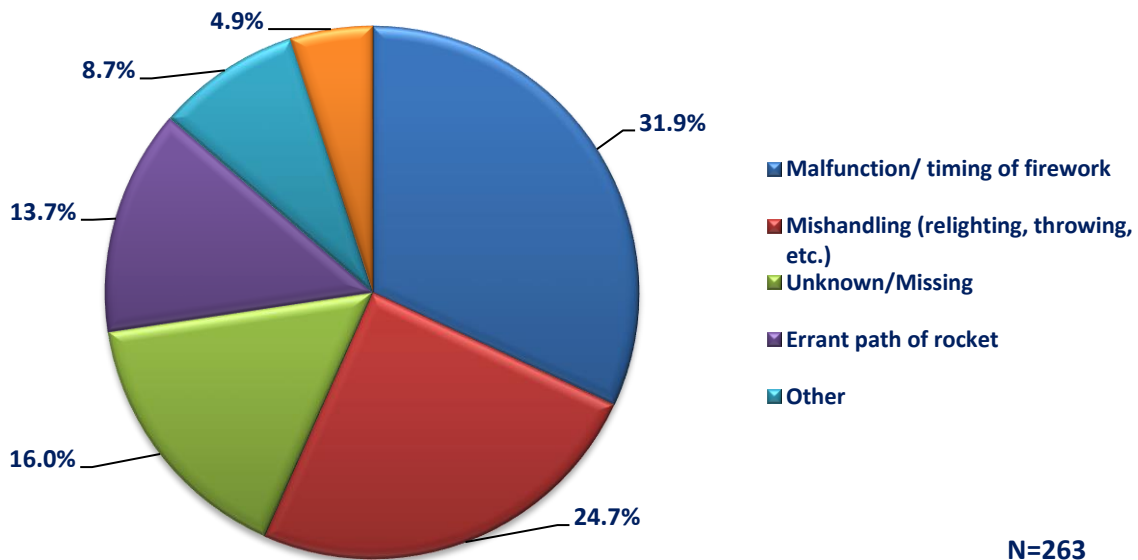
Table 1. Frequency and percent of firework type involved in injury, Indiana, 2017*

Firework Type	Frequency	Percent
Other, specified	46	19.3
Sparklers	43	18.1
Firecrackers	38	16.0
Rockets	36	15.1
Aerial devices	33	13.9
Unknown	32	13.4
Twisters	4	1.7
Lighting gunpowder	4	1.7
Homemade fireworks	2	0.8
Pyrotechnics	0	0.0
Total	238	100.0%

*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.

Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

Figure 7. Cause of firework-related injury, Indiana, 2017*



*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.

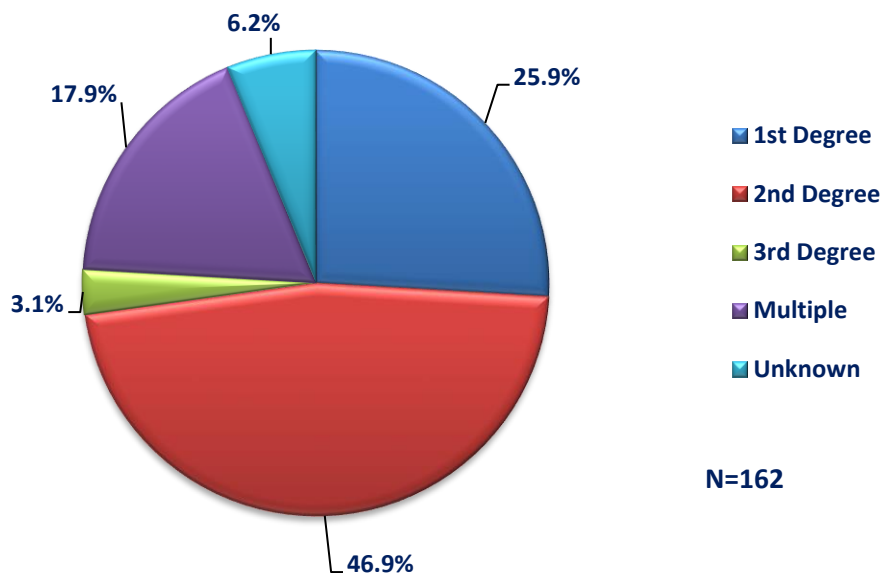
Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

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Type of injuries

- During the 2017 reporting cycle, 304 firework-related injuries occurred among 238 individuals. Fifty-one individuals experienced multiple types of injuries.
- Burns were the most commonly reported injury; 34.2 percent of burns were of the hands and/or fingers, and 16.0 percent of burns were of the arm.
- Burn injuries were reported in 162 individuals of varying degrees of severity and affected 237 body parts:
 - 42 were first-degree burns.
 - 76 were second-degree burns.
 - 5 were third-degree burns.
 - 29 were multiple-degree burns.
 - 10 did not indicate degree of burn (Figure 8).
- Other types of injuries included contusions/lacerations/abrasions (23.4 percent), penetrating foreign body/missiles (4.9 percent), puncture wounds (3.6 percent), sprains/fractures (2.6 percent), and other injuries (8.9 percent); the injury was not known or not recorded in 3.3 percent of cases (Figure 9).
- Three injuries were documented to have resulted in amputation.

Figure 8. Degree of burn experienced from firework-related injury, Indiana, 2017*

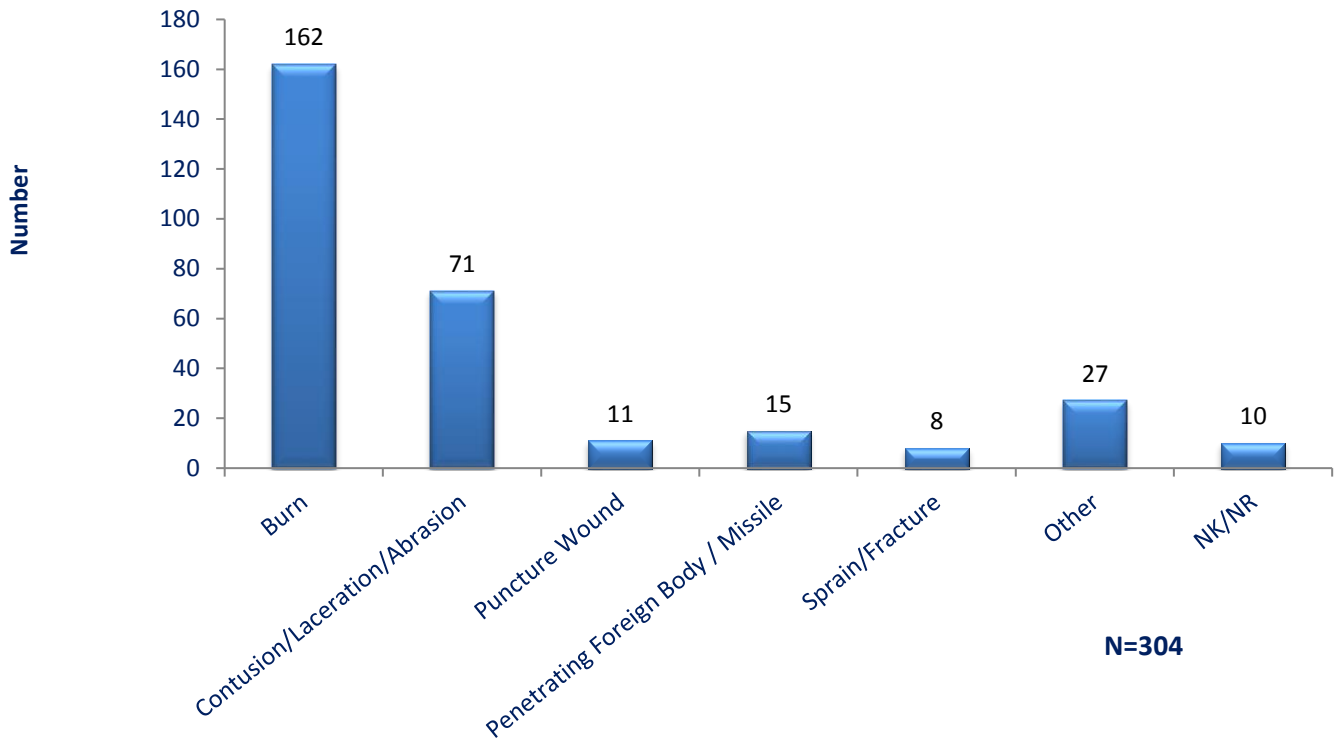


*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.

Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

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Figure 9. Type of firework-related injury, Indiana, 2017*



*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.

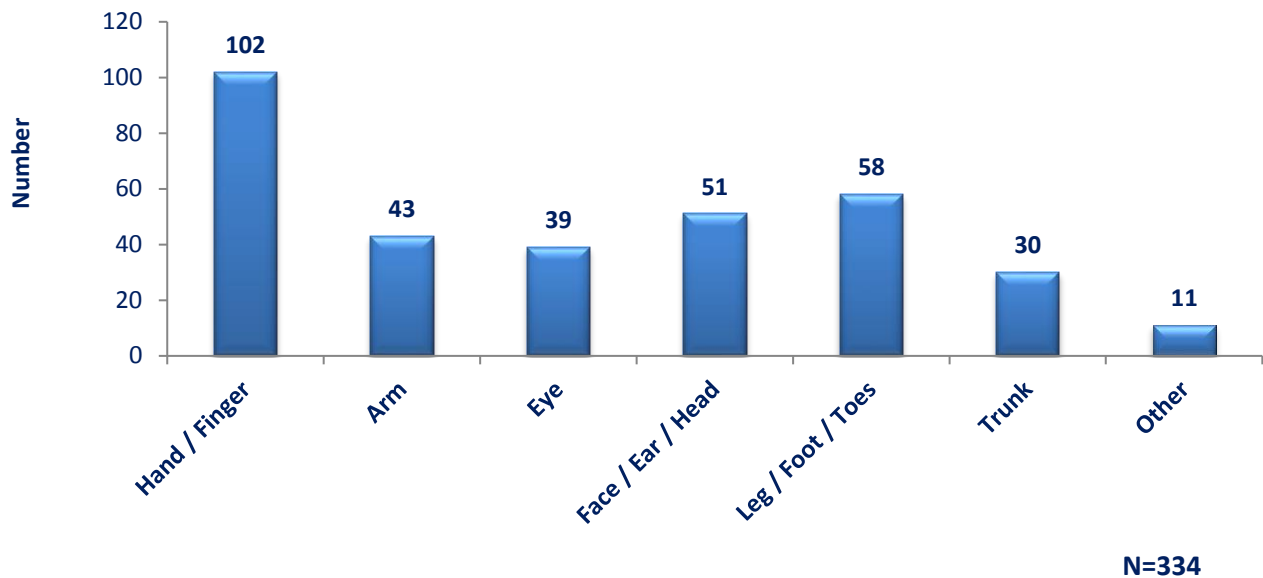
Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

Body part injured

- In 2017, of the 238 total cases, 66 individuals experienced injuries to multiple body parts.
- The most common type of injury was to the hand or finger (Figure 10):
 - 43.4 percent of injuries involved the hand, finger or arm.
 - 15.3 percent of injuries involved the face, ear or head.
 - 17.4 percent of injuries involved the leg, foot or toes.
 - 11.7 percent of injuries involved the eyes.
 - 9.0 percent of injuries involved the trunk.
 - 3.3 percent of injuries involved other body parts, including the neck, back and buttock.
- Of the 39 individuals who had eye injuries, 82.1 percent (35 cases) did not have or use eye protection and two wore contact lenses. Five cases with eye injury did not indicate whether eye protection was used.

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Figure 10. Body part affected by firework-related injury, Indiana, 2017*



*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.

Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

Source of care and injury outcomes

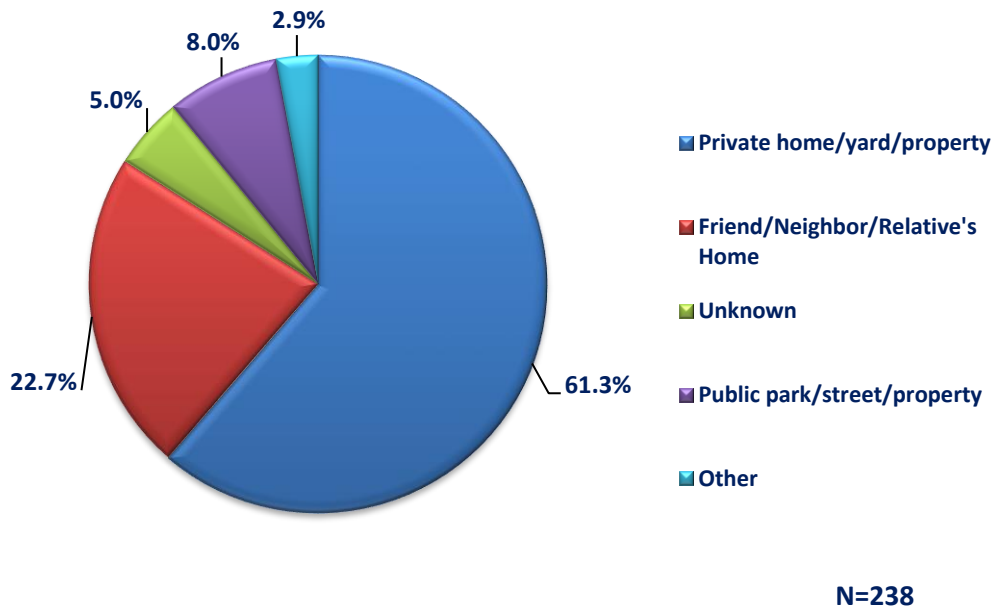
- The majority of people injured by fireworks sought care at an emergency department or urgent care center (96.2 percent). The remaining cases received care from provider offices (i.e. optometrist).
- Of those seeking treatment, 77.3 percent were evaluated and released to go home. Eleven cases indicated the patient was admitted to the hospital. Thirty records did not provide information regarding the patient's outcome.
- There were 13 transfers from one hospital to another, most often to a trauma center. One patient was transferred to another hospital outside of Indiana. Three individuals visited more than one facility to be evaluated and treated for firework-related injuries.
- No reported firework-related injury resulted in death.

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Additional information

- Geographical location:
 - 61.3 percent of people were injured at a private home, yard or property.
 - 22.7 percent were injured at someone else's home, yard or property.
 - Public property was noted as the site for nearly 8 percent of injury occurrences.
 - Injury location information was unknown for 12 cases (5.0 percent) (Figure 11).
- Alcohol use:
 - Alcohol use was recorded in 41 instances.
 - Alcohol was consumed by 33 injured individuals, of which 23 cases reported consuming alcohol within three hours of injury, and 9 others were reported to be consuming alcohol at the scene (Figure 12).
- Adult supervision:
 - Among the 85 individuals injured who were 18 years old or younger at the time of the injury, 70 were injured while in the presence of an adult and four had no adult supervision. Information regarding adult supervision was not reported in 11 cases (Figure 13).
- Bystanders:
 - There were 36 firework-related injuries reported among bystanders, of which 15 were 18 years old or younger.

Figure 11. Location of firework-related injury, Indiana, 2017*

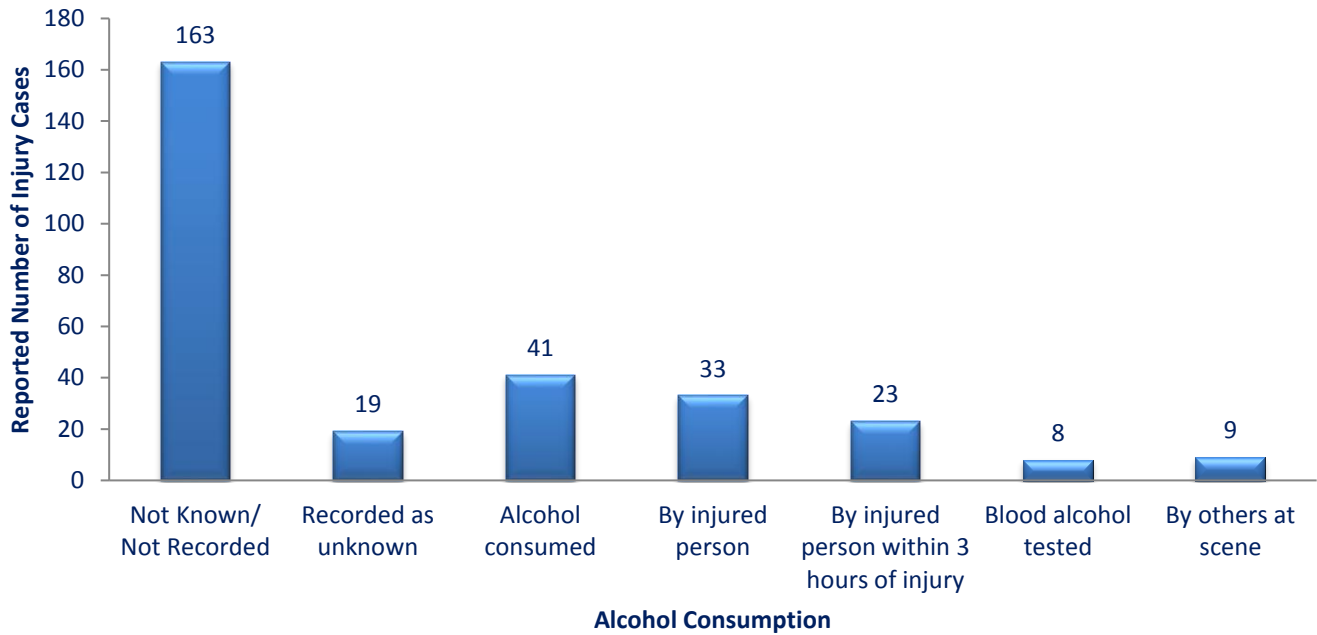


*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.

Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

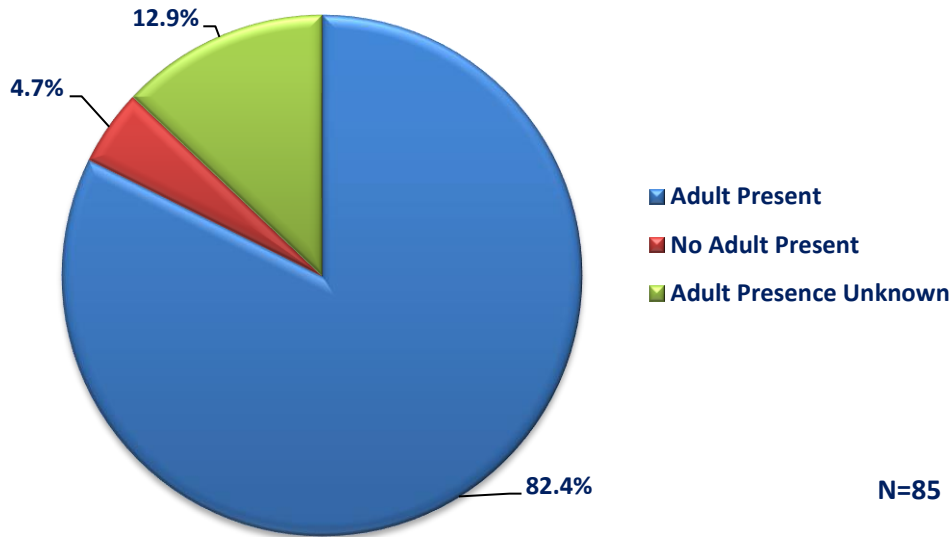
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Figure 12. Alcohol use of those injured by fireworks, Indiana, 2017*



*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.
 Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

Figure 13. Adult supervision of individuals 18 years of age or younger, Indiana, 2017*



*2016 reporting cycle includes cases Sept. 13, 2016 – Sept. 12, 2017.
 Source: Indiana State Department of Health, Division of Trauma and Injury Prevention

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Summary of firework-related injuries for 2017

There were 238 unduplicated cases of firework-related injuries reported to the ISDH during the 2017 reporting cycle. Eight more cases were reported in 2017 compared to the previous year's report. Although the ages of those injured ranged in age from one year to 71, children and adolescents comprised 35.7 percent of reported firework-related injury cases. Males were injured more frequently than females across all age groups, and 54.2 percent of all injured persons were white males. Seventy-nine percent of the individuals were white, and 13.0 percent were black. Race was not known or not reported for 15 individuals. Indiana residents accounted for 201 cases, with 15 cases from other states and 22 with unknown or unrecorded home addresses.

More than half (55.1 percent) of the injuries involved the hands, fingers, eyes or arms. Burns were the most common type of injury, occurring in 162 injured persons and affecting 237 parts of the body. The majority (96.2 percent) of people injured by fireworks sought care at an emergency department or urgent care center, with the remaining cases seeking medical care from another type of provider. Of those seeking medical care, 77.3 percent were evaluated and released to go home and 10.1 percent were admitted to the hospital or transferred to another hospital.

For the 238 cases of firework-related injuries reported to ISDH during the entire reporting cycle, 77.7 percent occurred between July 1 and July 7 and 39.5 percent took place on July 4, 2017. Sixty-one percent of injuries occurred on private property. Firecracker, rocket and sparkler use resulted in 49.2 percent of firework-related injuries. The mechanism of injury was most commonly malfunctioning or timing of firework, followed by mishandling of fireworks.

This report has several implications. First, the knowledge of the most commonly affected body parts in firework-related injury can help focus prevention efforts to eliminate injuries. Second, identifying the day and time of most firework-related injuries can help medical personnel better prepare to treat these injuries. Third, this report can help inform policy surrounding which firework types appear to be most dangerous.

There are several limitations of this report, which include the near certainty of underreporting and underrepresenting the true burden of firework-related injuries in Indiana because some medical facilities and providers may not report all of their firework injuries to ISDH. It may be because physicians or staff is not aware of the reporting requirement or because the patient does not acknowledge that he was injured by fireworks. Also, some injuries due to fireworks may not have required formal medical evaluation or treatment. Additionally, not every report submitted to the state was completed fully or accurately. Some reports were sent numerous times, and this report contains only unduplicated records.

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APPENDIX

Firework-related injury year comparisons

The Indiana State Department of Health began receiving firework injury reports in 2003 after the collection of this information was mandated by law. After two years, the law expired, and no reports were collected in 2005. In 2006, the law was reinstated with requirements identical to the previous law. Table 2 shows the comparison of firework-related injuries for the years in which reporting was mandated (2003, 2004, and 2006 – 2017).

Table 2. Comparison of firework-related injuries, Indiana, 2003 – 2004 and 2006 – 2017

Year	2003	2004	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Number of cases reported	261	233	251	156	141	116	134	141	83	159	141	181	230	238
Demographics														
Median Age	18	18	17	20	21	19	20	21	23	23.5	25	24	22	25
Age Range (in years)	0-74	0-72	0-67	0-70	0-70	0-81	1-69	0-65	2-64	1-78	0-63	1-78	0-84	1-71
Children/Adolescents	53%	52%	55%	48%	50%	50%	47%	42%	36%	41%	32%	36%	41%	35%
Males	73%	76%	70%	67%	70%	72%	75%	72%	87%	70%	75%	68%	70%	67%
Females	27%	24%	30%	33%	30%	28%	25%	28%	13%	29%	23%	31%	29%	30%
White	84%	87%	82%	87%	73%	82%	73%	84%	77%	79%	76%	74%	69%	79%
Black or African American	10%	8%	13%	7%	14%	7%	16%	12%	16%	11%	12%	15%	17%	13%
Injury Type														
Burns	76%	67%	73%	69%	65%	61%	62%	55%	50%	56%	54%	53%	48%	53%
Body Part Injured														
Hand	34%	32%	36%	41%	33%	37%	27%	31%	42%	30%	33%	38%	29%	30%
Eye	17%	25%	29%	24%	21%	16%	17%	18%	13%	17%	16%	16%	12%	12%
No Eye Protection	82%	88%	97%	92%	76%	91%	91%	93%	93%	75%	77%	90%	83%	82%
Injury Circumstances														
Injured on Private Property	83%	89%	86%	83%	87%	84%	79%	67%	61%	60%	68%	69%	59%	61%
Children Injured with Adults Present	60%	50%	64%	61%	62%	41%	57%	87%	57%	64%	59%	64%	61%	82%
Hospitalized or Transferred to a Hospital	3%	6%	11%	8%	9%	10%	14%	12%	24%	11%	18%	18%	22%	10%
Died	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%	1%	0%	0%

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Year	2003	2004	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Fireworks Circumstances														
Injuries from Sparklers, Rockets and Firecrackers	63%	64%	57%	52%	53%	52%	51%	51%	47%	59%	54%	53%	48%	49%
Injuries from Mishandling Fireworks	27%	23%	29%	30%	28%	24%	23%	26%	24%	27%	29%	33%	23%	25%
Errant Path or Malfunctioning Fireworks	21%	37%	41%	35%	40%	41%	43%	43%	37%	44%	14%	43%	43%	46%

Source: Indiana State Department of Health, Division of Trauma and Injury Prevention