

## WORK ZONES 2020

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### In 2020:

- There were 3,877 work zone collisions, down from 5,461 in 2019.
- 19 fatal collisions in work zones resulted in 22 fatalities.
- Overall work zone crashes peaked in July and August, on Thursdays, and in the 2 p.m. and 3 p.m. hours. The pattern for fatal and incapacitating collisions was similar except that they peaked in the 4 p.m. hour.
- 60 impaired driving and 106 speed-related collisions that occurred in work zones
- The highest fatality rates per 1,000 work zone collisions were:
  - In suburban (10.6) and rural (10.1) areas
  - On interstates (10.4)
  - Under dawn/dusk (13.2) light conditions
  - Under cloudy weather conditions (6.4)
  - On roads with a stop sign (5.6) as the traffic control type.

A work zone is an area of a trafficway where construction, maintenance, or utility work activities are identified by warning signs/signals/indicators that mark the beginning and end of a construction, maintenance, or utility work activity. Work zones also include roadway sections where there is ongoing, moving (mobile) work activity such as lane line painting or roadside mowing if the beginning of the ongoing, moving (mobile) work activity is designated by warning signs or signals.

This fact sheet contains information on work zone collisions 2016 to 2020 including details about the conditions under which these collisions occurred. Indiana collision data are collected by Indiana State Police officers and submitted to ARIES. All numbers in this report were current as of the ARIES data extract on March 29, 2021.

### **The pandemic and traffic safety in 2020**

The COVID-19 pandemic affected a traffic safety in 2020. Preliminary analyses of traffic safety fatalities by the National Highway Traffic Safety Administration (NHTSA)— using data from the Fatality Analysis Reporting System (FARS)—estimates that while vehicle miles travelled were down nationally in 2020 from 2019, the number of fatalities and the fatality rate per 100 million VMT were higher (NCSA, 2021a). Fatalities among passenger vehicle occupants, motorists, and pedalcyclists are estimated to be up 5%, 9%, and 5%, respectively (NCSA, 2021b). NHTSA’s analysis also suggests risky traffic behaviors increased in 2020 (OBSR, 2021). For example, national fatality counts for unrestrained occupants of passenger vehicles are estimated to be up 15% and deaths from occupant ejections up 20%.

The 2020 Indiana traffic safety data and analysis should be considered carefully in light of the potentially anomalous effects of the pandemic. Further analysis may be needed to evaluate whether the challenges in Indiana were similar to those identified nationally, whether those challenges continue, and whether the addition or adjustment of countermeasures is warranted.

#### Sources:

National Center for Statistics and Analysis. (2021a, (revised)). Early estimates of motor vehicle traffic fatalities and fatality rate by sub-categories in 2020 (Crash Stats Brief Statistical Summary. Report No. DOT HS 813 118). National Highway Traffic Safety Administration.

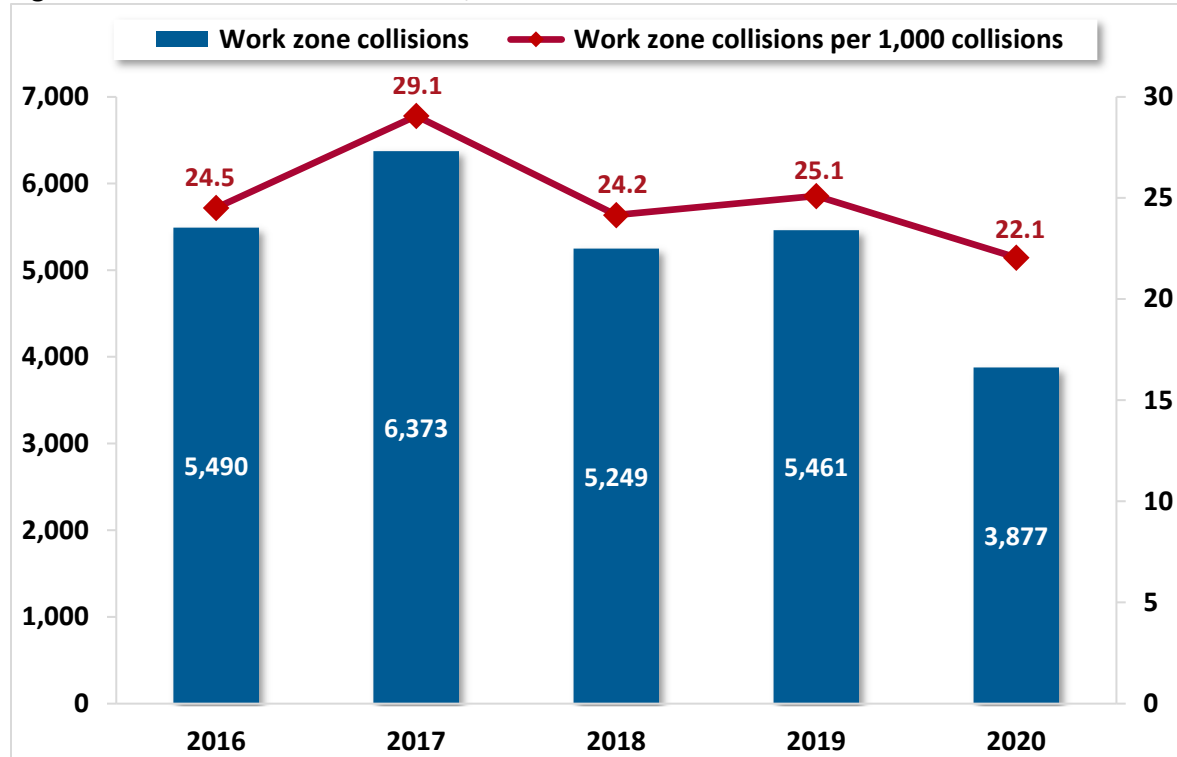
National Center for Statistics and Analysis. (2021b). Early estimate of motor vehicle traffic fatalities in 2020 (Crash Stats Brief Statistical Summary. Report No. DOT HS 813 115). National Highway Traffic Safety Administration.

Office of Behavioral Safety Research. (2021, June). Update to special reports on traffic safety during the COVID-19 public health emergency: Fourth quarter data (Report No. DOT HS 813 135). National Highway Traffic Safety Administration.

### General trends

Work zone collisions declined between 2019 (5,461) and 2020 (3,877) (Figure 1). There is no clear trend for these collisions over the last five years (2016–20). The number of work zone collisions peaked in 2017 (6,373) and was at the lowest point in 2020. The pattern for work zone collisions per 1,000 collisions is similar, peaking in 2017 (29.1) and reaching the lowest point in 2020 (22.1).

Figure 1. Indiana work zone collisions, 2016–20



Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Between 2016 and 2020, less than 1% of work zone collisions resulted in fatalities, and about 15% resulted in nonfatal injuries (calculated from Table 1). The vast majority of collisions (85%) resulted in only property damage.

**Table 1. Indiana collisions, by work zone and collision severity, 2016–20**

	Year					Annual rate of change	
	2016	2017	2018	2019	2020	2019–20	2016–20
<b>Total collisions</b>	<b>223,961</b>	<b>219,317</b>	<b>217,276</b>	<b>217,578</b>	<b>175,821</b>	<b>-19.2%</b>	<b>-5.9%</b>
Fatal	781	848	795	748	808	8.0%	0.9%
Nonfatal injury	35,337	34,226	32,412	31,213	26,303	-15.7%	-7.1%
Property damage	187,843	184,243	184,069	185,617	148,710	-19.9%	-5.7%
<b>Work zone collisions</b>	<b>5,490</b>	<b>6,373</b>	<b>5,249</b>	<b>5,461</b>	<b>3,877</b>	<b>-29.0%</b>	<b>-8.3%</b>
Fatal	15	24	17	25	19	-24.0%	6.1%
Nonfatal injury	804	924	793	806	570	-29.3%	-8.2%
Property damage	4,671	5,425	4,439	4,630	3,288	-29.0%	-8.4%
<b>Work zone collisions as % of total</b>	<b>2.5%</b>	<b>2.9%</b>	<b>2.4%</b>	<b>2.5%</b>	<b>2.2%</b>	<b>-12.1%</b>	<b>-2.6%</b>
Fatal	1.9%	2.8%	2.1%	3.3%	2.4%	-29.6%	5.2%
Nonfatal injury	2.3%	2.7%	2.4%	2.6%	2.2%	-16.1%	-1.2%
Property damage	2.5%	2.9%	2.4%	2.5%	2.2%	-11.4%	-2.9%

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

**Table 2. Injuries in Indiana collisions, by work zone collisions and injury status, 2016–20**

	Count of injuries					Annual rate of change	
	2016	2017	2018	2019	2020	2018–19	2015–19
<b>Total injuries in all collisions</b>	<b>364,358</b>	<b>358,134</b>	<b>352,419</b>	<b>350,900</b>	<b>275,671</b>	<b>-21.4%</b>	<b>-6.7%</b>
Fatal	834	925	880	808	896	10.9%	1.8%
Nonfatal	52,617	50,915	48,306	46,337	38,913	-16.0%	-7.3%
Not injured	310,907	306,294	303,233	303,755	235,862	-22.4%	-6.7%
<b>Work zone collision injuries</b>	<b>10,243</b>	<b>12,033</b>	<b>9,722</b>	<b>10,244</b>	<b>7,073</b>	<b>-31.0%</b>	<b>-8.8%</b>
Fatal	15	27	18	29	22	-24.1%	10.0%
Nonfatal	1,237	1,469	1,194	1,192	857	-28.1%	-8.8%
Not injured	8,991	10,537	8,510	9,023	6,194	-31.4%	-8.9%
<b>Work zone collision injuries as % of total</b>	<b>2.8%</b>	<b>3.4%</b>	<b>2.8%</b>	<b>2.9%</b>	<b>2.6%</b>	<b>-12.1%</b>	<b>-2.3%</b>
Fatal	1.8%	2.9%	2.0%	3.6%	2.5%	-31.6%	8.1%
Nonfatal	2.4%	2.9%	2.5%	2.6%	2.2%	-14.4%	-1.6%
Not injured	2.9%	3.4%	2.8%	3.0%	2.6%	-11.6%	-2.4%

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

**Month, day of the week, and time**

In 2020 and in the four previous years, work zone collisions peaked in July and August (Table 3). The number of collisions per month between April and November were substantially higher than those occurring December through March.

**Table 3. Total and work zone collisions, by month, 2016–20**




Month	Total collisions					Work zone collisions				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
Jan	19,376	17,277	20,788	19,458	15,786	160	121	135	131	83
Feb	17,785	14,574	16,180	16,981	16,848	120	128	124	158	81
Mar	16,387	16,970	16,980	15,966	11,814	221	235	194	250	138
Apr	17,534	17,028	15,776	16,389	8,012	458	461	362	479	147
May	18,057	19,457	18,422	18,327	12,247	543	677	579	606	379
Jun	17,889	19,009	17,288	17,684	14,572	648	769	573	635	536
Jul	17,692	17,157	17,270	17,653	15,447	774	774	637	747	546
Aug	19,340	17,726	17,860	18,093	15,418	738	828	676	684	547
Sep	18,639	17,961	17,750	17,525	15,190	644	762	696	611	481
Oct	19,487	19,999	20,311	20,153	17,673	603	765	661	661	479
Nov	20,528	20,081	20,156	20,539	16,875	439	592	401	362	307
Dec	21,247	22,078	18,495	18,810	15,939	142	261	211	137	153
<b>Total</b>	<b>223,961</b>	<b>219,317</b>	<b>217,276</b>	<b>217,578</b>	<b>175,821</b>	<b>5,490</b>	<b>6,373</b>	<b>5,249</b>	<b>5,461</b>	<b>3,877</b>
<b>High</b>	<b>Dec</b>	<b>Dec</b>	<b>Jan</b>	<b>Nov</b>	<b>Oct</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Jul</b>	<b>Aug</b>
<b>Low</b>	<b>Mar</b>	<b>Feb</b>	<b>Apr</b>	<b>Mar</b>	<b>Apr</b>	<b>Feb</b>	<b>Jan</b>	<b>Feb</b>	<b>Jan</b>	<b>Feb</b>

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Note: Color-scales are illustrated to show months from low to high for the entire 5-year period, 2016–20.

In 2020, work zone collisions were concentrated generally on weekdays between 11:00 a.m. and 5:59 p.m. (Table 4). The most work zone collisions occurred on Thursdays (486 and 17%) and in the 2 p.m. and 3 p.m. hours (245 and 241; 9% each). The peak for the proportion of work zone collisions that results in fatal and incapacitating injuries was roughly between 11:00 p.m. and 5:00 a.m. (Figure 2).

**Table 4. Work zone collisions in Indiana by time of day, day of week, and injury status, 2020**

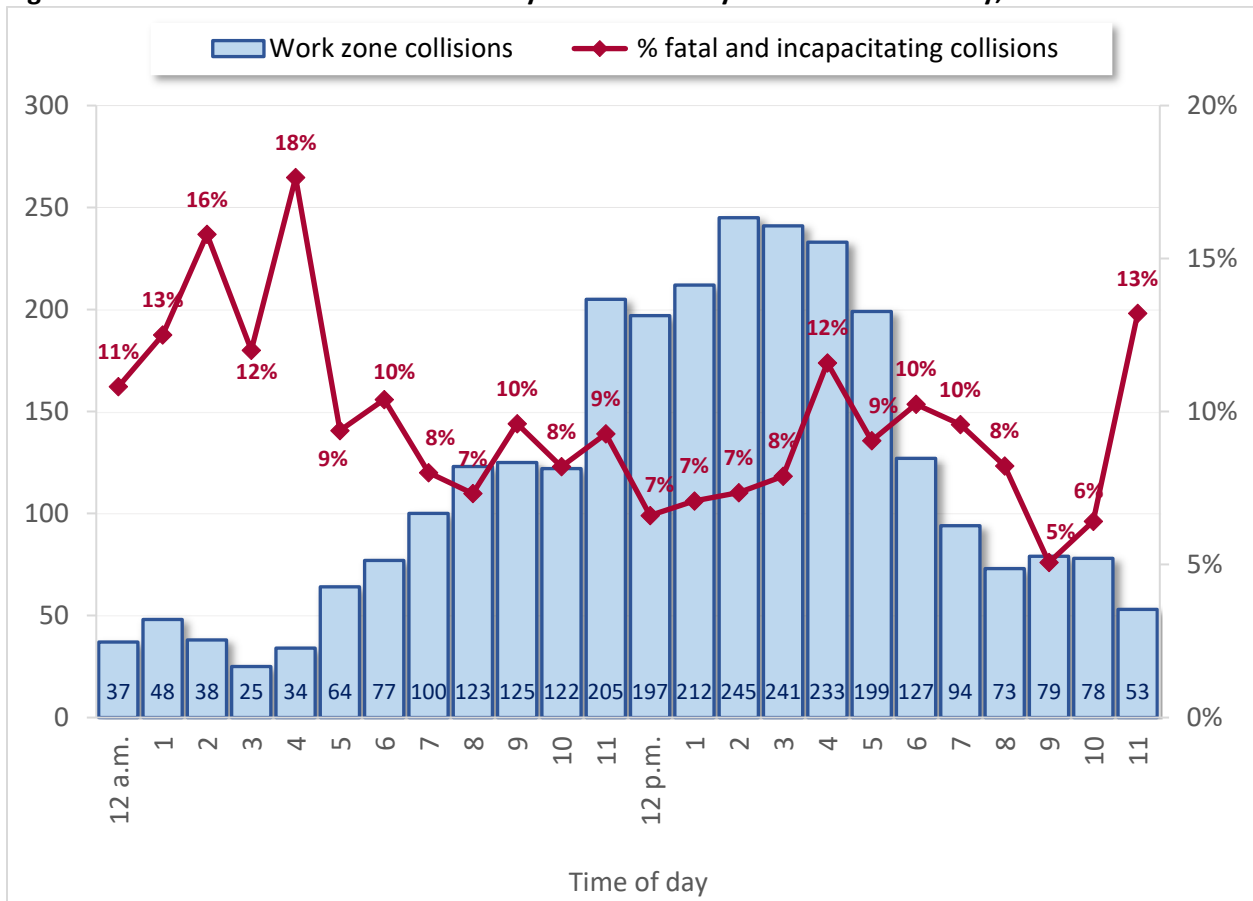


All work zone collisions									
Time of day	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total by time of day	% by time of day
Midnight - 12:59	9	3	2	5	1	12	5	37	1.3%
1:00 - 1:59 AM	9	7	9	7	4	5	7	48	1.7%
2:00-2:59 AM	7	3	8	3	8	3	6	38	1.3%
3:00-3:59 AM	3	1	3	4	4	6	4	25	0.9%
4:00-4:59 AM	4	6	6	7	4	2	5	34	1.2%
5:00-5:59 AM	5	8	10	13	6	11	11	64	2.3%
6:00-6:59 AM	5	12	10	12	19	12	7	77	2.7%
7:00-7:59 am	7	15	10	24	24	16	4	100	3.5%
8:00-8:59 AM	6	16	17	20	33	22	9	123	4.3%
9:00-9:59 AM	3	21	17	34	25	14	11	125	4.4%
10:00-10:59 AM	6	17	25	18	20	23	13	122	4.3%
11:00-11:59 AM	8	41	26	38	37	33	22	205	7.2%
Noon - 12:59 PM	14	43	37	30	25	30	18	197	7.0%
1:00 - 1:59 PM	19	38	35	32	38	31	19	212	7.5%
2:00 - 2:59 PM	5	52	45	43	38	41	21	245	8.7%
3:00-3:59 PM	11	49	41	39	44	40	17	241	8.5%
4:00-4:59 PM	12	34	43	40	51	38	15	233	8.2%
5:00-5:59 PM	14	31	30	35	29	41	19	199	7.0%
6:00 - 6:59 PM	10	19	21	18	18	21	20	127	4.5%
7:00 - 7:59 PM	9	13	18	9	16	21	8	94	3.3%
8:00-8:59 PM	7	14	11	6	13	9	13	73	2.6%
9:00-9:59 PM	10	12	12	11	13	11	10	79	2.8%
10:00-10:59 PM	9	10	13	11	11	10	14	78	2.8%
11:00-11:59 PM	5	9	4	7	5	9	14	53	1.9%
<b>Total</b>	<b>197</b>	<b>474</b>	<b>453</b>	<b>466</b>	<b>486</b>	<b>461</b>	<b>292</b>	<b>2,829</b>	<b>100.0%</b>
<b>% by day</b>	<b>7.0%</b>	<b>16.8%</b>	<b>16.0%</b>	<b>16.5%</b>	<b>17.2%</b>	<b>16.3%</b>	<b>10.3%</b>	<b>100%</b>	

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Note: Data limited to collisions when day and time were reported.

**Figure 2. Work zone collisions in Indiana by hour of the day and collision severity, 2020**



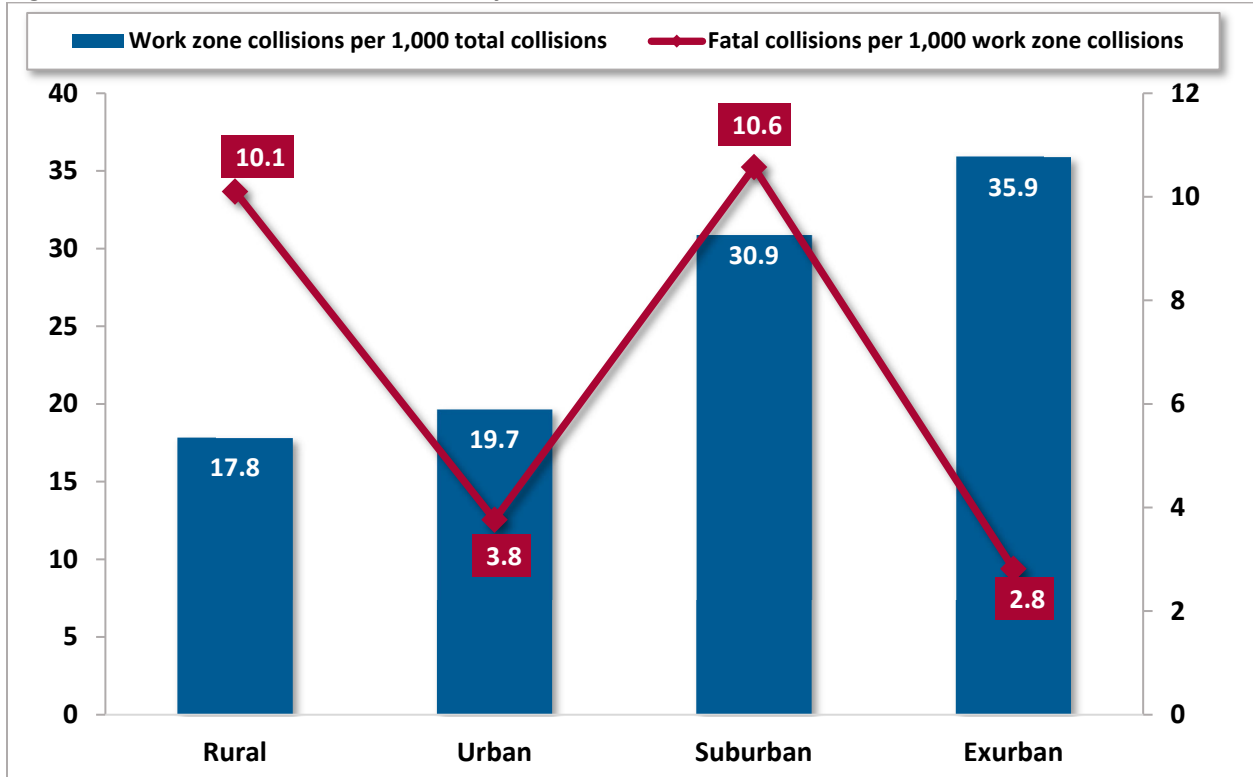
Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Note: Excludes collisions where hour or injury status was unknown or not reported.

### Census locale and road class

In 2020, the rate of collisions per 1,000 total collisions was highest in exurban (35.9) and suburban (30.9) areas (Figure 3). However, the fatality rate was highest in suburban (10.6) and rural areas (10.1).

**Figure 3. Indiana work zone collisions, by census locale, 2020**



Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

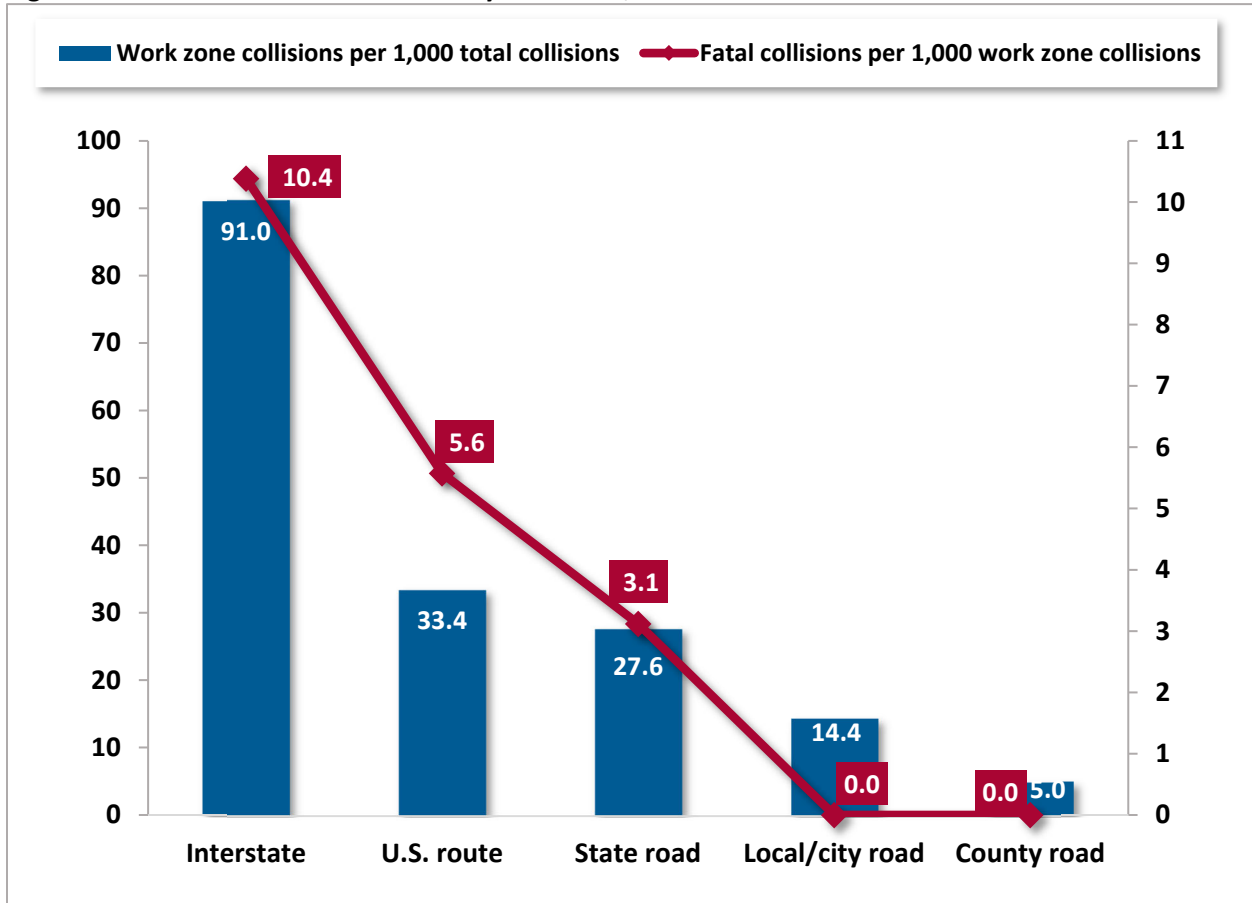
Notes:

- 1) Includes only collisions with valid locale reported.
- 2) See glossary for census locale definitions.



The rate of work zone crashes and fatal crashes in work zones tracked with the intensity of road class in 2020. The rate of collisions on interstates was 91 per 1,000 total crashes (Figure 4). The fatality rate was 10.4 per 1,000 work zone crashes. The rates of work zone crashes for local/city roads and county roads were 14.4 and 5.0 respectively. There were no fatalities in these work zones in 2020.

**Figure 4. Indiana work zone collisions by road class, 2020**



Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Note: Includes only collisions with valid road class reported.

### Construction type

The rate of fatal collisions per 1,000 work zone collisions was slightly higher (4.9) than the rate for collisions that were not in work zones (4.6) (Table 5). Among types of construction zone, the highest rates of fatal collisions were for work zones involving shoulder work (7.5) and lane closures (4.2).

**Table 5. Indiana collisions in work zones, by severity and construction type, 2020**

	Collisions by severity				Fatal collisions per 1,000 work zone collisions
	Total	Fatal	Non-fatal	Property damage	
<b>All collisions</b>	<b>175,821</b>	<b>808</b>	<b>26,303</b>	<b>148,710</b>	<b>4.6</b>
All construction types	3,877	19	570	3,288	4.9
Not in construction zone	171,944	789	25,733	145,422	4.6
<b>Construction zone type</b>					
Lane closure	2,134	9	293	1,830	4.2
Work on shoulder	671	5	120	545	7.5
Crossover/lane shift	543	2	73	468	3.7
Intermittent or moving work	2,132	3	84	437	1.4
Unknown	8	0	0	8	0.0

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Note: Fatal collision rate is calculated per 1,000 total collisions in each construction zone type.

### Environmental and traffic control conditions

Most work zone collisions occurred under daylight, clear weather, and dry pavement conditions in 2020 (Table 6). However, the fatality rate per 1,000 work zone collisions was highest under dawn/dusk (13.2) and dark—not lighted (8.8) light conditions. The fatality rate also was highest for cloudy (6.4) weather conditions and for dry road surface conditions (5.3).

**Table 6. Indiana work zone collisions by severity and environmental conditions, 2020**

	Work zone collisions by severity				Fatal collisions per 1,000 work zone collisions
	Total	Fatal	Non-fatal	Property damage	
<b>All work zone collisions</b>	<b>3,877</b>	<b>19</b>	<b>570</b>	<b>3,288</b>	<b>4.9</b>
<b>By light conditions</b>					
Daylight	2,840	11	430	2,399	3.9
Dark (lighted)	418	2	59	357	4.8
Dark (not lighted)	456	4	66	386	8.8
Dawn/dusk	152	2	13	137	13.2
Unknown	11	0	2	9	0.0
<b>By weather conditions</b>					
Clear	2,899	14	431	2,454	4.8
Cloudy	629	4	87	538	6.4
Rain	292	1	42	249	3.4
Snow	21	0	4	17	0.0
Fog/smoke/smog	15	0	4	11	0.0
Sleet/hail/freezing rain	4	0	0	4	0.0
Blowing sand/soil/snow	9	0	2	7	0.0
Severe cross wind	7	0	0	7	0.0
Unknown	1	0	0	1	0.0
<b>By road surface conditions</b>					
Dry	3,380	18	504	2,858	5.3
Wet	427	1	55	371	2.3
Ice	15	0	0	15	0.0
Loose material on road	26	0	9	17	0.0
Snow/slush	7	0	7	7	0.0
Water (standing or moving)	16	0	1	15	0.0
Muddy	5	0	1	4	0.0
Unknown	1	0	0	1	0.0

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Note: Fatal collision rate is calculated per 1,000 total work zone collisions in each environmental condition category.

Among work zone collisions for which a traffic control type was reported, lane control (927) and no traffic control type (797) were most common (Table 7). The fatality rate per 1,000 work zone collisions, however, was highest when the traffic control mechanism was a stop sign (5.6).

**Table 7. Indiana work zone collisions by severity and traffic control type, 2020**

	Work zone collisions by severity				Fatal collisions per 1,000 work zone collisions
	Total	Fatal	Non-fatal	Property damage	
<b>All work zone collisions</b>	<b>3,877</b>	<b>19</b>	<b>570</b>	<b>3,288</b>	<b>4.9</b>
<b>Traffic control type</b>					
Lane control	927	2	141	784	2.2
Traffic control signal	655	1	131	523	1.5
Stop sign	178	1	33	144	5.6
Other regulatory sign/markings	76	0	18	58	0.0
Yield sign	32	0	6	26	0.0
Person directing traffic	74	0	20	54	0.0
No passing zone	17	0	1	16	0.0
Flashing signal/overhead beacon	4	0	0	4	0.0
Railroad crossing	3	0	0	3	0.0
Roundabout intersection	3	0	0	3	0.0
Other	61	0	8	53	0.0
None	797	2	100	695	2.5
Unknown	1,050	13	112	925	12.4

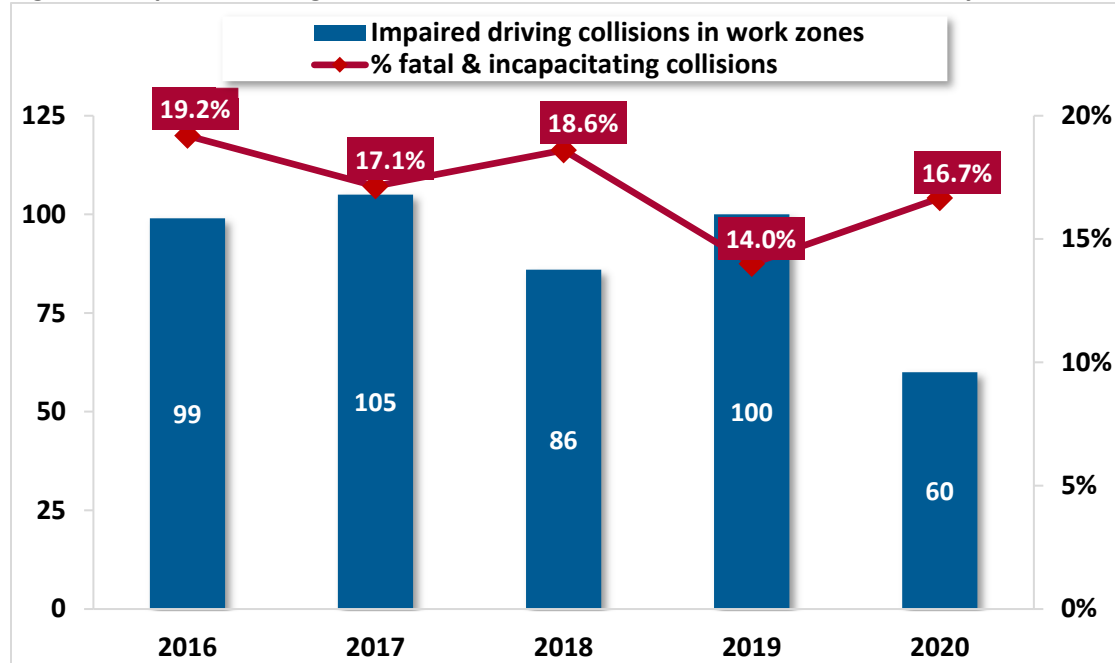
Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Note: Fatal collision rate is calculated per 1,000 total work zone collisions in each traffic control type category.

### Impaired driving and speeding

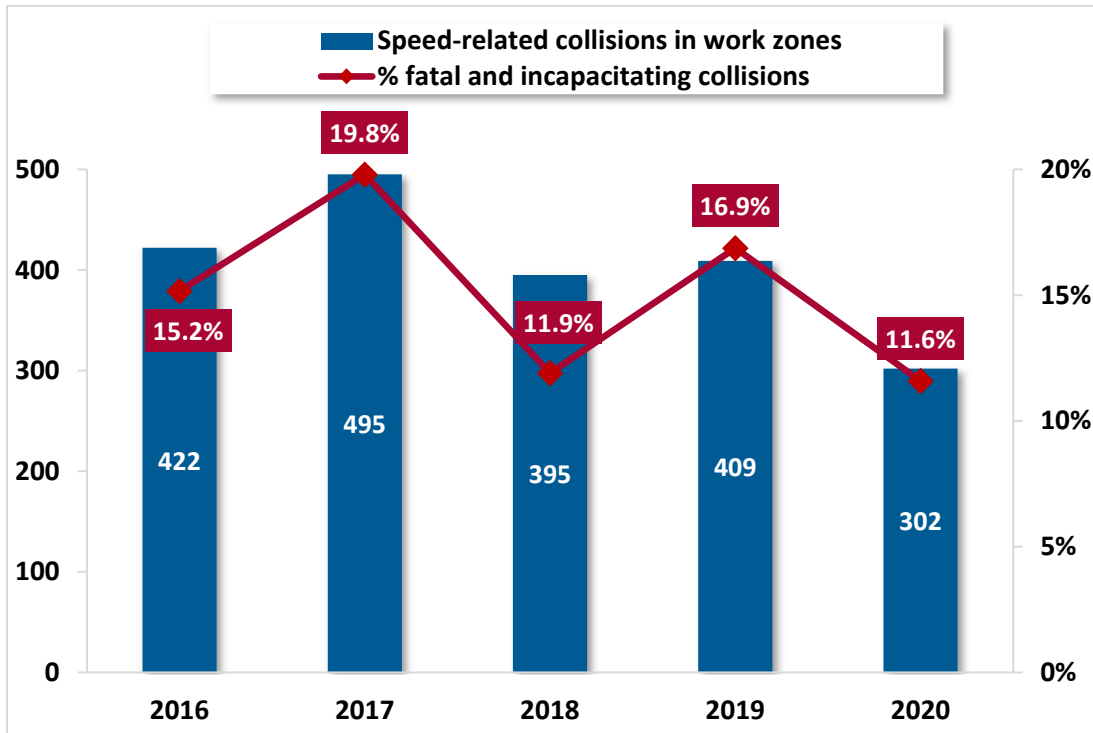
In 2020, there were 60 work zone collisions that involved at least one impaired driver (Figure 5), the lowest number during the 2016-2020 time period. During the 5-year period, approximately 14% to 19% of impaired driving collisions in work zones have resulted in fatal and/or incapacitating injuries. There were no fatal collisions that met these criteria. Similarly, work zone collisions that involved a speeding driver reached a 5-year low (302) in 2020, down from 409 in 2019. In 2020, 12% of speed-related collisions that occurred in work zones resulted in fatal and/or incapacitating injuries.

**Figure 5. Impaired driving collisions in Indiana work zones and collision severity, 2016–20**



Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

**Figure 6. Speed-related collisions in Indiana work zones and collision severity, 2016–20**



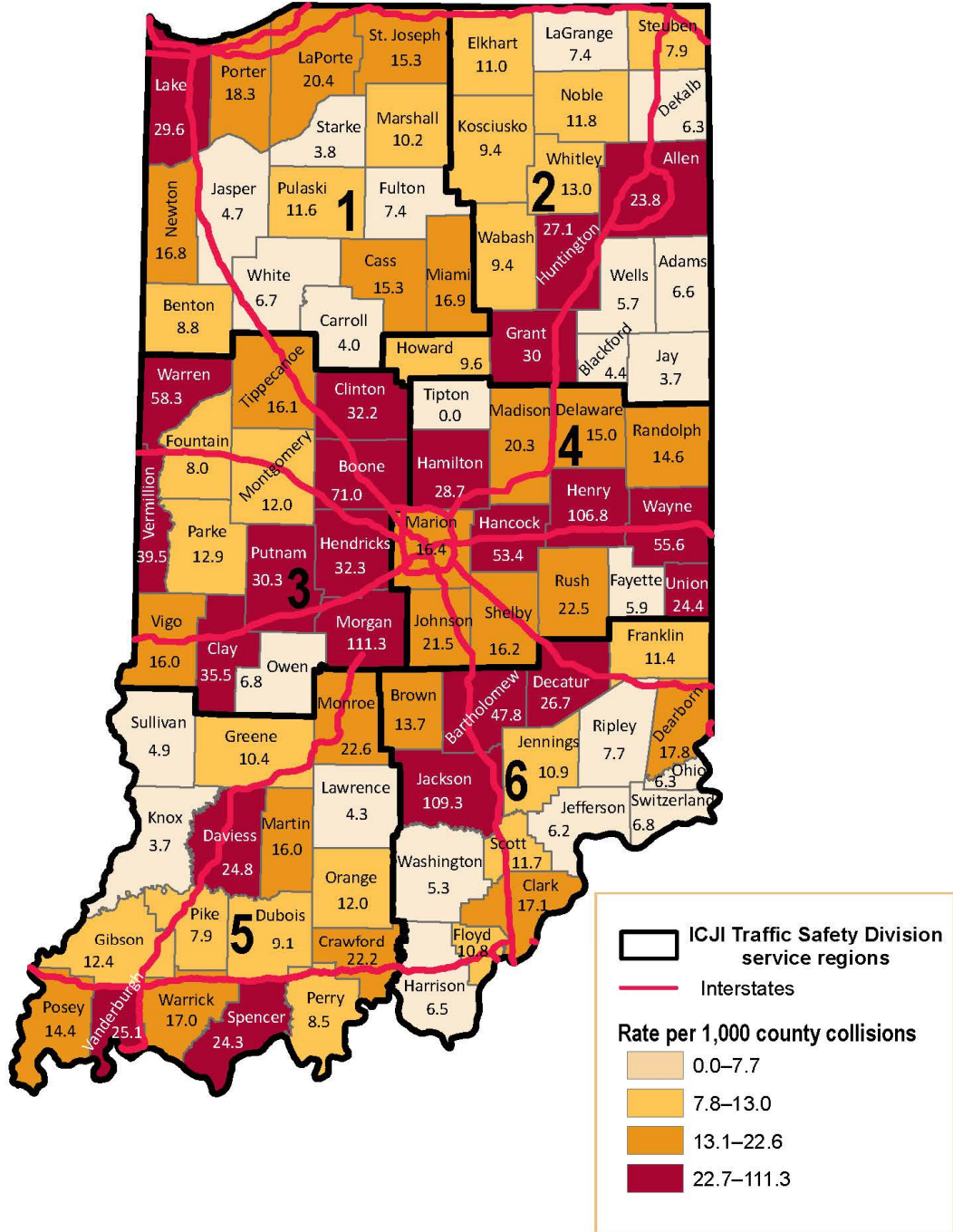
Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

### Geography

There were 3,877 work zone collisions in Indiana in 2020 (Map 1). The mean county rate of work zone collisions per 1,000 total collisions was 20, and the median rate was 13. Given that work zone locations are constantly changing throughout the state, counties with the highest work zone collision rates tend to vary from year to year. In 2020, Morgan (111), Jackson (109), Henry (107), and Boone (71) counties had the highest rates of work zone collisions per 1,000 collisions.

**Map 1. Work zone collisions per 1,000 total county collisions, by ICJI Traffic Safety Division service region, 2020**

Median rate = 13.3      Mean rate = 19.7      n = 3,877 work zone collisions



Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

## Definitions

- **Alcohol-impaired:** The National Highway Traffic Safety Administration (NHTSA) defines drivers as being alcohol-impaired when they test for a blood alcohol concentration (BAC) of at least 0.08 grams per deciliter (g/dL). Any fatal crash involving a driver at that BAC level is categorized as an alcohol impaired-driving crash, thus any fatalities that happen in a crash that meets that criterion is deemed an alcohol-impaired fatality (NHTSA DOT HS 812 917, 2020, p. 1). By law, drivers in Indiana who have a BAC of at least 0.08 g/dL should receive—at minimum—a Class C misdemeanor (IC9-30-5-1). Indiana Code also says that drivers with BAC of at least 0.15 g/dL should receive a Class A misdemeanor (IC9-30-5-1). If the driver had a passenger under the age of 18 in the vehicle, they could face a Class D felony. This fact sheet does not explicitly consider these cases but does include them in summary statistics.
- **Annual rate of change (ARC):** The rate that a beginning value must increase/decrease each period (e.g., month, quarter, or year) in a time series to arrive at the ending value in the time series. ARC is a smoothed rate of change because it measures change in a variable as if the change occurred at a steady rate each period with compounding. For example, to measure change in a variable from 2016 to 2020, it is calculated as  $(\text{value in 2020}/\text{value in 2016})^{1/4} - 1$ .
- **Census-based locale:** Urban is defined as Census 2010 Urban Areas, suburban as areas within 2.5 miles of urban boundaries, *exurban* as areas within 2.5 miles of suburban boundaries, and rural as areas beyond exurban boundaries (i.e., everything else).
- **Nonfatal:** crashes are given this label when they involve no fatalities but at least one incapacitating, non-incapacitating, or possible injury.
- **Nonfatal injuries:** these injuries include those in the incapacitating, non-incapacitating, possible, not reported, and refused (treatment) injury categories
- **Work zone:** An area of a trafficway where construction, maintenance, or utility work activities are identified by warning signs/signals/indicators, including those on transport devices (e.g., signs, flashing lights, channelizing devices, barriers, pavement markings, flagmen, warning signs, and arrow boards mounted on the vehicles in a mobile maintenance activity) that mark the beginning and end of a construction, maintenance, or utility work activity. Work zones also include roadway sections where there is ongoing, moving (mobile) work activity such as lane line painting or roadside mowing only if the beginning of the ongoing, moving (mobile) work activity is designated by warning signs or signals. Work zones extends from the first warning sign, signal, or flashing lights to the End Road Work sign or the last traffic control device pertinent for that work activity.

## Data sources

Indiana State Police, Automated Reporting Information Exchange System (ARIES), current as of March 29, 2021.