



## OCCUPANT PROTECTION 2018

APRIL 2019 • ISSUE 19-C12

### Reported crashes in Indiana in 2018:

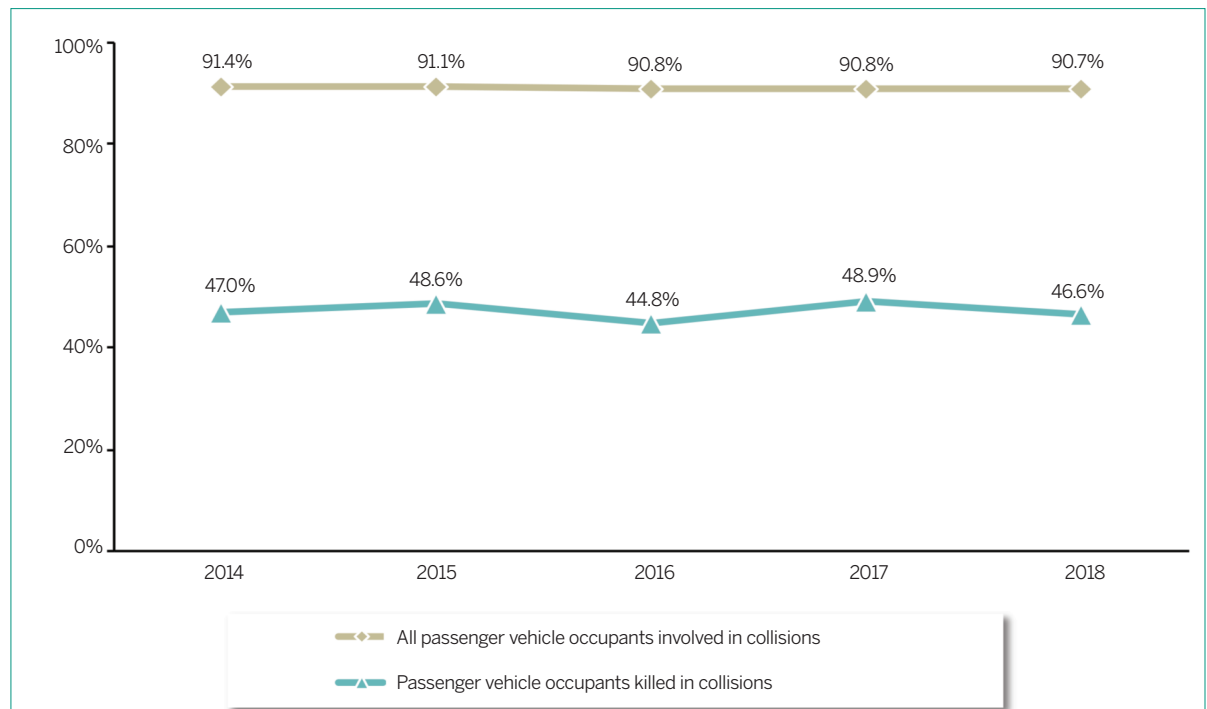
- Of the 326,202 passenger vehicle occupants involved in traffic collisions, 91 percent were wearing seat belts.
- Of the 582 passenger vehicle occupants killed in crashes, 53 percent were not wearing seat belts.
- Unrestrained pickup truck occupants in Indiana crashes were 14 times more likely to die than occupants who were wearing seat belts.
- The rate of unrestrained injuries per 1,000 individuals involved in crashes was 12. That's compared to 40 per 1,000 in vehicles with a speeding driver and 71 per 1,000 in vehicles with a legally impaired driver.
- Male drivers accounted for 56 percent of all passenger vehicle drivers in collisions and had lower rates of seat belt usage than female drivers (89 percent and 92 percent, respectively).

Research has repeatedly demonstrated the safety benefits of seat belts, and the dangerous consequences when people do not use them. In Indiana and elsewhere, individuals who do not wear seat belts are over-represented in fatal and serious injury crashes, and rates of seat belt usage are consistently and significantly lower for people killed in crashes than overall usage rates. While the overall seat belt usage rate in Indiana is generally high, among the 582 passenger vehicle occupants killed in 2018 Indiana collisions, less than half were wearing seat belts (Figure 1). This fact sheet summarizes data trends related to seat belt usage at state and county levels in Indiana crashes. Seat belt use and injury analyses are limited to those occurring in passenger vehicles (defined as passenger cars, pickup trucks, sport utility vehicles, and vans). Analyses include data and definitions from several sources listed on the last page of this report. Indiana data comes primarily from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 18, 2019.

#### Notes:

1. Vehicle occupants injured in Indiana collisions are counted as restrained when the investigating officer selects any one of the following passenger vehicle safety equipment categories on the Indiana Crash Report: (1) lap belt only; (2) harness; (3) airbag deployed and harness; (4) child restraint; or (5) lap and harness. For the purposes of this fact sheet, the term seat belt will include all five categories. A summary of Indiana Occupant Protection Laws is included on page 3.
2. Fatality counts reflect current ARIES data as entered by reporting officers and are not yet verified by the nationwide Fatality Analysis Reporting System (FARS).
3. Data discrepancies may exist between the 2018 Indiana traffic safety reports and previous traffic safety publications due to updates to the Indiana State Police ARIES data since the original publication dates.

Figure 1. Seat belt use among passenger vehicle occupants involved in Indiana collisions, by injury status, 2014-2018



Source: Indiana State Police Automated Reporting Information Exchange System, as of March 18, 2019

In partnership with:

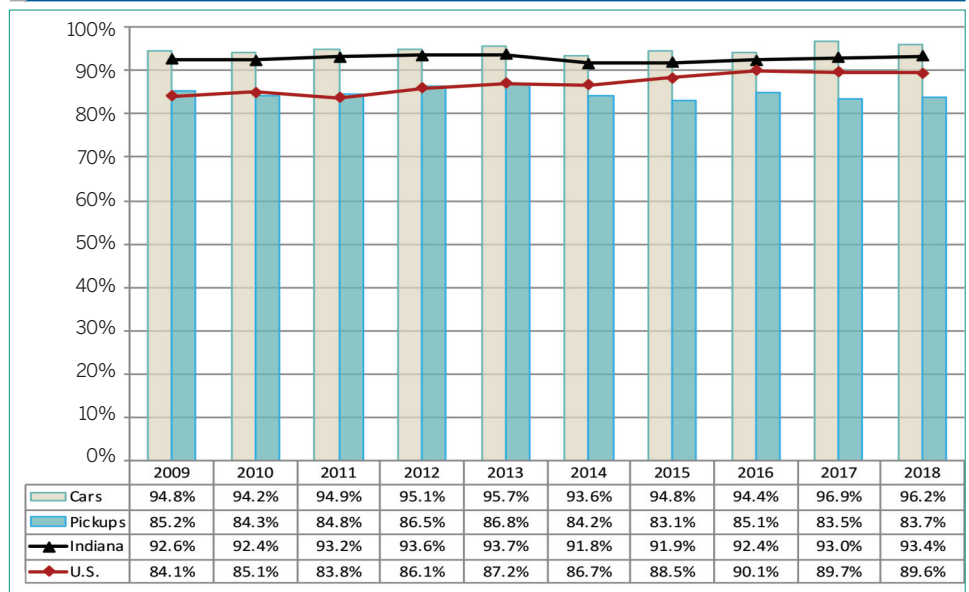


The National Highway Traffic Safety Administration (NHTSA) reports that 90 percent of vehicle occupants nationwide wore seat belts in 2018, a rate virtually unchanged from 2017 (DOT HS 812 662) (Figure 2). Each year, the Indiana Criminal Justice Institute (ICJI) and the Purdue University Center for Road Safety conduct observational studies of seat belt usage in Indiana. Their research shows that Indiana's overall seat belt usage rates have exceeded national rates since 2009. In fact, nearly all Indiana passenger vehicle occupants (93 percent) wore seat belts in 2018. The rate was slightly higher for car occupants at 96 percent but lower for pickup truck occupants at 84 percent.

NHTSA identifies seat belt use as an essential tool in protecting vehicle occupants from death and injury resulting from traffic collisions. Research shows that rates of restraint use are consistently higher in states with primary enforcement laws, which allow a law enforcement officer to stop a vehicle and issue a citation for the sole purpose of observing an unrestrained driver or passenger. As of January 2019, Indiana was one of 35 states that have primary enforcement laws in effect.

Table 1 shows that 91 percent of passenger vehicle occupants involved in crashes in Indiana in 2018 wore seat belts. Between 2014 and 2018, rates of seat belt usage among passenger vehicle occupants injured in collisions in Indiana decreased as the severity of injuries increased. While the number of vehicle occupants killed in crashes dropped more than 4 percent from 2017 to 2018, less than half of these individuals were wearing seat belts. Approximately 86 percent of occupants suffering incapacitating injuries were wearing seat belts.

Figure 2. Observed Indiana and U.S. seat belt use rates in passenger vehicles, 2009 to 2018



Sources:  
 Indiana - *Indiana Roadside Observational Survey of Safety Belt and Motorcycle Helmet Use*, Center for Road Safety, Purdue University, 2018  
 U.S. - DOT HS 812 662, January 2019

Note: Car and pickup truck restraint usage rates are specific to Indiana only.

Table 1. Seat belt use and injury status among passenger vehicle occupants involved in Indiana collisions, 2014-2018

Injury status	2014	2015	2016	2017	2018	Annual rate of change	
						2017-18	2014-18
<b>All occupants</b>	<b>304,665</b>	<b>325,875</b>	<b>338,240</b>	<b>332,210</b>	<b>326,202</b>	<b>-1.8%</b>	<b>1.7%</b>
Properly restrained	278,386	296,916	307,249	301,571	295,758	-1.9%	1.5%
Restraint use rate	91.4%	91.1%	90.8%	90.8%	90.7%	-0.1%	-0.2%
<b>Fatalities</b>	<b>500</b>	<b>568</b>	<b>587</b>	<b>609</b>	<b>582</b>	<b>-4.4%</b>	<b>3.9%</b>
Properly restrained	235	276	263	298	271	-9.1%	3.6%
Restraint use rate	47.0%	48.6%	44.8%	48.9%	46.6%	-4.8%	-0.2%
<b>Incapacitating injuries</b>	<b>4,342</b>	<b>15,905</b>	<b>17,889</b>	<b>17,258</b>	<b>17,159</b>	<b>-0.6%</b>	<b>41.0%</b>
Properly restrained	3,458	13,414	15,165	14,693	14,676	-0.1%	43.5%
Restraint use rate	79.6%	84.3%	84.8%	85.1%	85.5%	0.5%	1.8%
<b>Non-incapacitating</b>	<b>37,691</b>	<b>29,259</b>	<b>28,437</b>	<b>27,807</b>	<b>25,599</b>	<b>-7.9%</b>	<b>-9.2%</b>
Properly restrained	33,970	26,653	25,893	25,453	23,389	-8.1%	-8.9%
Restraint use rate	90.1%	91.1%	91.1%	91.5%	91.4%	-0.2%	0.3%
<b>Not injured</b>	<b>262,132</b>	<b>280,143</b>	<b>291,327</b>	<b>286,536</b>	<b>282,862</b>	<b>-1.3%</b>	<b>1.9%</b>
Properly restrained	240,723	256,573	265,928	261,127	257,422	-1.4%	1.7%
Restraint use rate	91.8%	91.6%	91.3%	91.1%	91.0%	-0.1%	-0.2%

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 18, 2019

Notes:

- 1) Totals include individuals with 'NULL' and unknown restraint use.
- 2) Non-incapacitating injuries include those injuries reported as *non-incapacitating, possible, not reported, unknown, and refused (treatment)* injury status codes.

# SEAT BELT USE BY VEHICLE TYPE

Table 2 shows the relative risk of fatal injury when passenger vehicle occupants in crashes were not wearing seat belts. In 2018, one-tenth of a percent or fewer of restrained individuals in each of the four passenger vehicle types involved in collisions were killed. That same year, car and SUV occupants involved in a crash were 10 times more likely to die if they were not buckled up compared to those who were. Unrestrained occupants of pickup trucks were 14 times more likely to be killed than their restrained counterparts. Unrestrained occupants of vans were 16 times more likely to be killed in collisions compared to restrained occupants in the same vehicle type. These relative risk ratios were all statistically significant.

**Table 2. Passenger vehicle occupants involved in Indiana collisions, by vehicle type, seat belt use, and injury status, 2018**

Seat belt use and injury status	Passenger cars		Pickup trucks		SUVs		Vans	
	Count	% Total	Count	% Total	Count	% Total	Count	% Total
<b>Restrained (R)</b>	<b>205,196</b>	<b>100%</b>	<b>32,698</b>	<b>100%</b>	<b>44,619</b>	<b>100%</b>	<b>13,245</b>	<b>100%</b>
Fatal	194	0.1%	30	0.1%	35	0.1%	12	0.1%
Incapacitating	10,477	5.1%	1,239	3.8%	2,266	5.1%	694	5.2%
Non-incapacitating	16,518	8.1%	2,026	6.2%	3,801	8.5%	1,044	7.9%
No injury	178,007	86.8%	29,403	89.9%	38,517	86.3%	11,495	86.8%
<b>Not restrained (NR)</b>	<b>21,199</b>	<b>100%</b>	<b>4,076</b>	<b>100%</b>	<b>3,970</b>	<b>100%</b>	<b>1,199</b>	<b>100%</b>
Fatal	210	1.0%	53	1.3%	31	0.8%	17	1.4%
Incapacitating	1,688	8.0%	356	8.7%	354	8.9%	85	7.1%
Non-incapacitating	1,617	7.6%	234	5.7%	276	7.0%	83	6.9%
No injury	17,684	83.4%	3,433	84.2%	3,309	83.4%	1,014	84.6%
<b>Relative risk of fatal injury</b>	<b>10.5</b>		<b>14.2</b>		<b>10.0</b>		<b>15.6</b>	

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 18, 2019

Notes:

- 1) Relative risk of fatal injury is calculated as % NR / % R. All relative risk ratios are significant (p<0.01). Excludes NULL values.
- 2) Non-incapacitating injuries include those injuries reported as *non-incapacitating*, *possible*, *not reported*, *unknown*, and *refused (treatment)* injury status codes.

## Indiana Occupant Protection Laws

Effective July 1, 2007, Indiana law requires all passenger vehicle occupants 16 and older to ride properly restrained in a vehicle. This law applies to all seating positions in all vehicles, including pick-up trucks and SUVs<sup>1</sup> The current Indiana child passenger restraint law requires all child occupants (ages 15 and younger) to be properly restrained in a child restraint device or seat belt in all seating positions in all vehicles.<sup>2</sup> In addition to legislative efforts, child passenger safety experts have developed recommended safety standards and best practices that include the use of rear facing child safety seats as long as possible, or, at a minimum, until a child is 2 years old and weighs at least 20 pounds. These guidelines also include the use of booster safety seats for children who have outgrown child safety seats with harnesses. Children then may transition to the use of adult seat belts. It is recommended that all children under the age of 13 ride in the back seat of the vehicle.

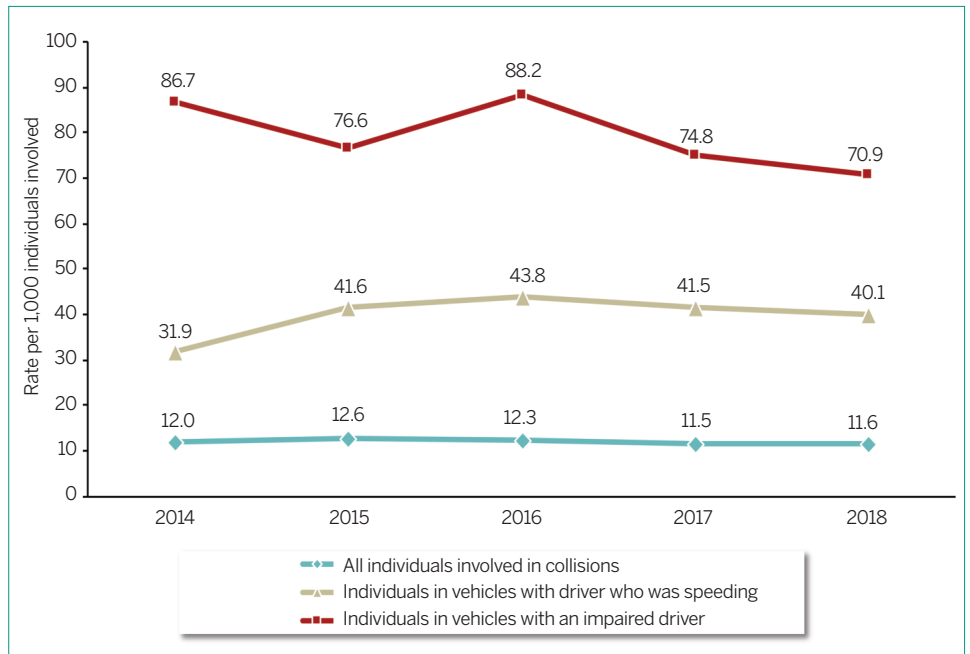
<sup>1</sup>Passenger Restraint Systems, IC 9-19-10-2; available at <http://www.ai.org/legislative/ic/code/title9/ar19/ch10.html>

<sup>2</sup>Passenger Restraint Systems, IC 9-19-10-2; available at <http://www.ai.org/legislative/ic/code/title9/ar19/ch10.html>

# SPEEDING, IMPAIRED DRIVING, AND SEAT BELT USE

Rates of unrestrained injuries in Indiana collisions were consistently higher between 2014 and 2018 in vehicles with a driver who was speeding and in vehicles with an alcohol-impaired driver (Figure 3). In 2018, the rate of injury per 1,000 individuals involved in crashes was 11.6, compared to 40.1 per 1,000 in vehicles with a speeding driver and 70.9 per 1,000 in vehicles with a legally impaired driver.

Figure 3. Unrestrained injury rates per 1,000 passenger vehicle occupants in Indiana collisions, by drivers speeding and driver impairment, 2014-2018

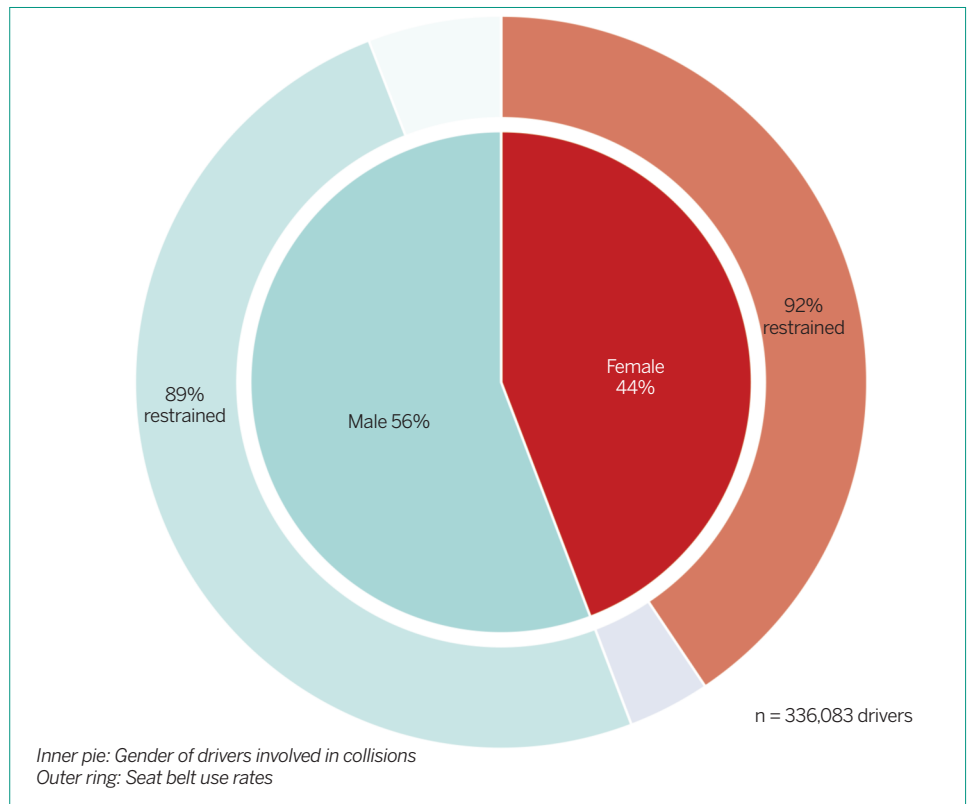


Source: Indiana State Police Automated Reporting Information Exchange System, as of March 18, 2019

# SEAT BELT USE BY AGE AND GENDER

Figure 4 shows that male drivers accounted for 56 percent of all passenger vehicle drivers in collisions and had lower rates of seat belt usage than female drivers. When looking at restraint use by age and gender between 2014 and 2018, male drivers in collisions were consistently more likely to be unrestrained than their female counterparts (Table 3). During this same time period, male drivers ages 34 and under, represented the highest proportion of passenger vehicle drivers not wearing seat belts in a crash. Among female drivers in 2018 crashes, those 25 to 34 years old represented the highest proportion of unrestrained drivers.

Figure 4. Seat belt usage among drivers of passenger vehicles in Indiana collisions, by gender, 2018



Source: Indiana State Police Automated Reporting Information Exchange System, as of March 18, 2019

Notes:

- 1) Includes drivers of passenger vehicles include vehicles reported as a (passenger car, pickup truck, van, or sport utility vehicle).
- 2) Includes cases with valid gender reported.

Table 3. Proportion of passenger vehicle drivers in Indiana collisions who were unrestrained, by age group and gender, 2014-2018

Age group	2014		2015		2016		2017		2018	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
15-20	10.2%	7.6%	10.2%	7.5%	10.0%	8.4%	10.2%	8.1%	10.7%	7.7%
21-24	11.0%	7.3%	11.1%	7.6%	11.2%	7.8%	10.9%	8.2%	10.8%	7.9%
25-34	11.1%	7.6%	11.2%	8.0%	11.3%	8.0%	11.3%	8.3%	11.2%	8.7%
35-44	10.2%	7.3%	10.2%	7.5%	10.6%	8.0%	10.7%	7.9%	10.8%	8.4%
45-54	10.1%	7.1%	10.2%	7.6%	10.4%	8.1%	10.3%	8.0%	10.5%	8.0%
55-64	9.2%	7.1%	9.5%	7.0%	9.8%	7.7%	10.1%	7.7%	9.9%	7.9%
65-74	8.8%	6.8%	9.6%	7.1%	9.0%	7.3%	9.4%	8.4%	9.3%	8.0%
75 +	8.6%	7.6%	8.9%	7.8%	9.5%	8.3%	9.9%	8.0%	9.4%	8.4%
<b>All ages</b>	<b>10.2%</b>	<b>7.3%</b>	<b>10.3%</b>	<b>7.5%</b>	<b>10.4%</b>	<b>8.0%</b>	<b>10.5%</b>	<b>8.1%</b>	<b>10.5%</b>	<b>8.2%</b>

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 18, 2019

Notes:

- 1) Data limited to drivers of passenger vehicles with valid gender and age reported.
- 2) Percent unrestrained includes individuals reported with no restraint and NULL values in the restraint use code field.

# TIME OF DAY, DAY OF WEEK, AND SEAT BELT USE

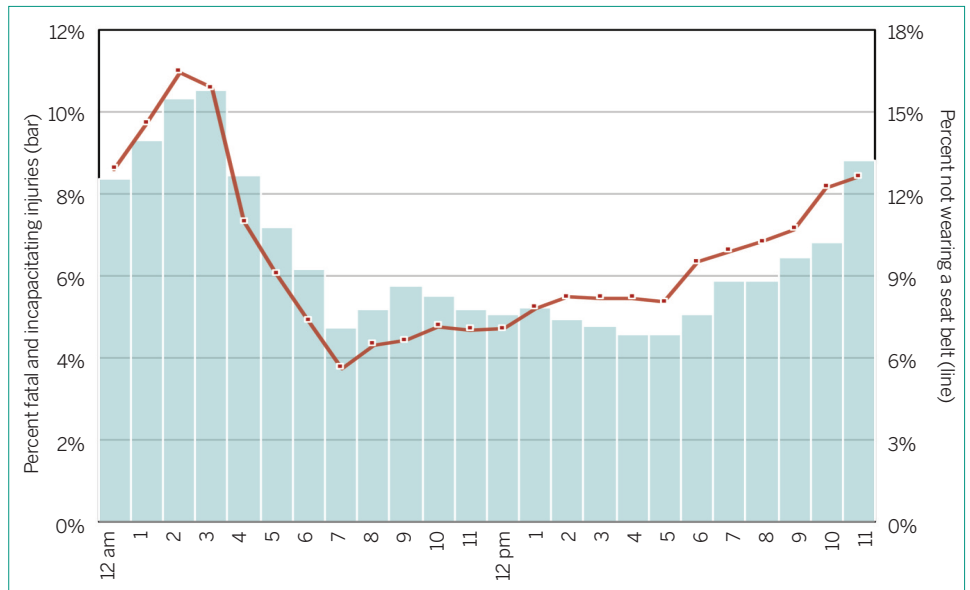
In 2018, rates of fatal and incapacitating injuries in crashes were highest between 11 p.m. and 4 a.m., the same time when the percentage of unrestrained occupants in crashes was at its highest (Figure 5). The highest rate of unrestrained individuals in crashes appeared from 2–4 a.m. with the 3–4 a.m. hour having the highest percentage of fatal and incapacitating injuries.

On average, daily counts of unrestrained passenger vehicle occupants in daytime collisions are higher than counts in nighttime collisions. In 2018, on average, there were 377 unrestrained passenger vehicle occupants injured in daytime crashes, compared to 289 at night (Figure 6). Nighttime counts of injured, unrestrained passenger vehicle occupants exceeded daily averages on Fridays, Saturdays, and Sundays.

# GEOGRAPHY OF INDIANA SEAT BELT USE

Map 1 illustrates 2018 Indiana county-level percentages of unrestrained passenger vehicle occupants in collisions. The median county percentage of unrestrained passenger vehicle occupants injured in collisions was 13 percent. The mean was 15 percent. Many counties with higher rates (at or above the median) of unrestrained injured passenger vehicle occupants in crashes were in more rural parts of the state. Warren (50.2 percent) and Orange (38.9 percent) counties had the highest percentages of unrestrained occupants who were injured in crashes. Tippecanoe (2.3 percent) and Whitley (2.6 percent) counties had the lowest percentages.

Figure 5. Indiana fatal and incapacitating injuries and seat belt use in passenger vehicles, by time of day, 2018

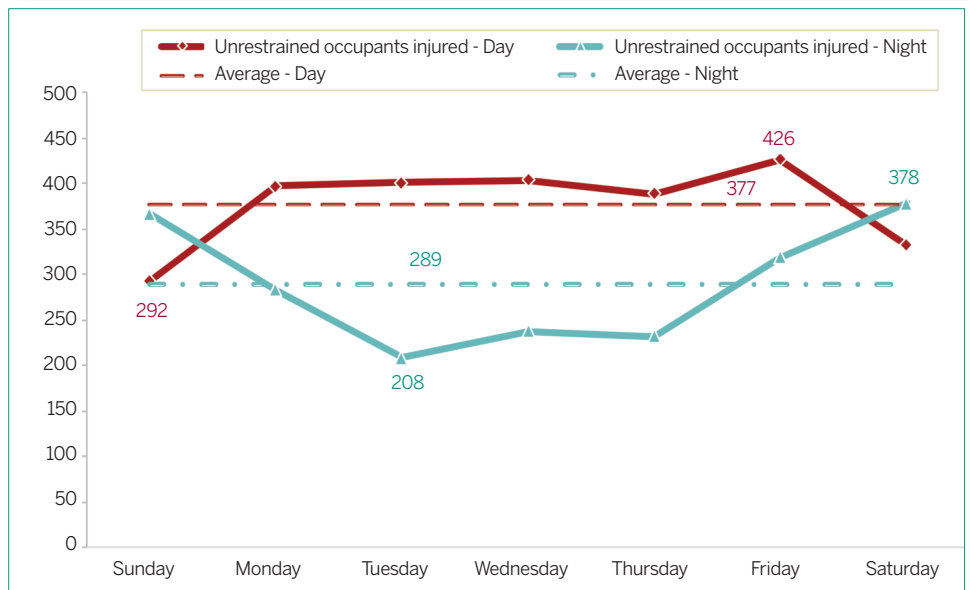


Source: Indiana State Police Automated Reporting Information Exchange System, as of March 18, 2019

Notes:

- 1) Percent fatal and incapacitating injuries represents fatal or incapacitating injuries as a proportion of all individuals involved in collisions.
- 2) Percent not wearing a seat belt includes individuals reported with unknown and invalid safety equipment type.

Figure 6. Unrestrained passenger vehicle occupants injured in Indiana collisions, by day of week and day/night, 2018

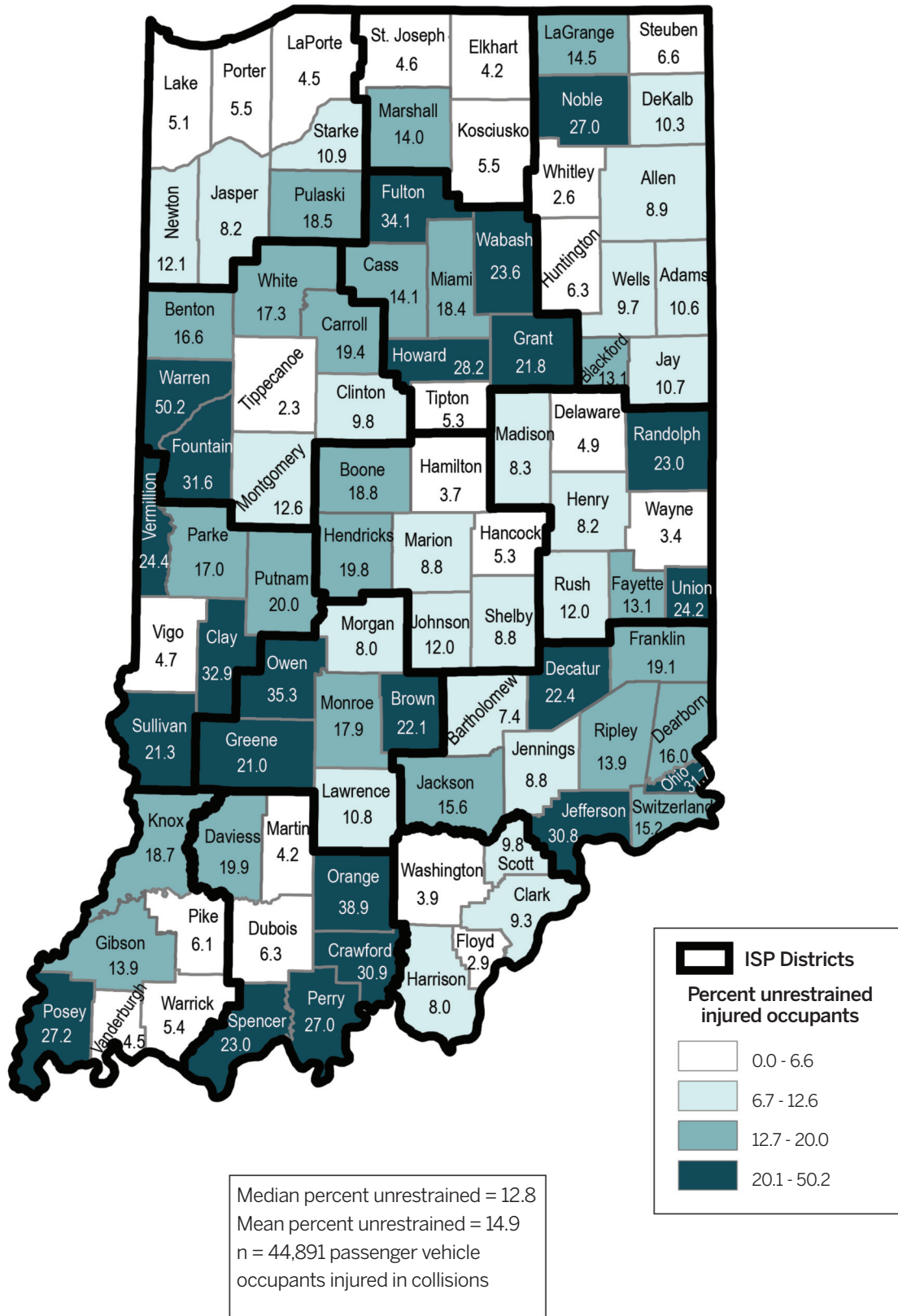


Source: Indiana State Police Automated Reporting Information Exchange System, as of March 18, 2019

Notes:

- 1) Day is defined as 6 a.m. - 5:59 p.m. Night is defined as 6 p.m. - 5:59 a.m.
- 2) Includes passenger vehicle occupants with fatal, incapacitating, non-incapacitating, and possible injuries.

Map 1. Percentage of passenger vehicle occupants in collisions who were not wearing a seat belt, by county and Indiana State Police district, 2018



Source: Indiana State Police Automated Reporting Information Exchange System, March 18, 2019

## DEFINITIONS

- **Annual Rate of Change (ARC)** is the rate that a beginning value must increase/decrease each period (e.g., month, quarter, 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 2014 to 2018, it is calculated as  $(\text{Value in 2018} / \text{Value in 2014})^{1/4} - 1$ .
- **Not injured** status includes individuals involved in collisions reported as *null* values in the injury status code field. While reporting officers are instructed to enter all drivers in ARIES, passengers are only to be entered in the crash report if an injury occurs; therefore, not injured counts should be interpreted with caution.
- **Non-incapacitating** injuries include those injuries reported as *non-incapacitating*, *possible*, *not reported*, *unknown*, and *refused* (treatment) injury status codes.
- **Passenger vehicles** are defined as *passengers cars*, *pickup trucks*, *sport utility vehicles*, and *vans*.
- **Restraint use** - Vehicle occupants injured in Indiana collisions are counted as having been restrained when the investigating officer selects any one of the following passenger vehicle safety equipment categories on the Indiana Crash Report: (1) *lap belt only*; (2) *harness*; (3) *airbag deployed and harness*; (4) *child restraint*; or (5) *lap and harness*.

## REFERENCES

*Indiana Roadside Observational Survey of Safety Belt and Motorcycle Helmet Use*, Center for Road Safety, Purdue University, 2018

National Center for Statistics and Analysis, National Highway Traffic Safety Administration, *Seat Belt Use in 2018—Overall Results*, DOT HS 812 662, January 2019.

## DATA SOURCES

Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 18, 2019.

National Center for Statistics and Analysis, National Highway Traffic Safety Administration, *Seat Belt Use in 2018—Overall Results*, DOT HS 812 662, January 2019.



This publication was prepared on behalf of the Indiana Criminal Justice Institute (ICJI) by the Indiana University Public Policy Institute (PPI). Please direct any questions concerning data in this document to ICJI at 317-232-1233.

This publication is one of a series of publications that form the analytical foundation of traffic safety program planning and design in the state of Indiana. Funding for these publications is provided by ICJI and the National Highway Traffic Safety Administration.

An electronic copy of this document can be accessed via the PPI traffic safety research project site (<http://trafficsafety.iupui.edu>), the ICJI website ([www.in.gov/cji/](http://www.in.gov/cji/)), or you may contact the PPI at 317-278-1305.



INDIANA UNIVERSITY  
**PUBLIC POLICY INSTITUTE**



## **Traffic Safety Project**

Designing and implementing effective traffic safety policies requires data-driven analysis of traffic collisions. To help in the policy-making process, the Indiana University Public Policy Institute collaborates each year with the Indiana Criminal Justice Institute to analyze vehicle crash data from the Automated Reporting Information Exchange System (ARIES), maintained by the Indiana State Police. This marks the thirteenth year of this partnership. Research findings are summarized in a series of publications on various aspects of traffic collisions, including alcohol-related crashes, commercial vehicles, dangerous driving, child passenger safety, motorcycles, occupant protection, and drivers. An additional publication provides detailed information on county and municipality data. These publications serve as the analytical foundation of traffic safety program planning and design in Indiana.

Indiana collision data are obtained from Indiana Crash Reports, as completed by law enforcement officers. Crash reports for all Indiana collisions are entered electronically through ARIES. Collisions trends as reported in these publications incorporate the effects of changes to data elements on the Crash Report, agency-specific enforcement policy changes, re-engineered roadways, driver safety education programs, and other unspecified effects. A collision produces three levels of data: collision, unit (vehicles), and individual. For this reason, readers should pay particular attention to the wording of statements about the data to avoid misinterpretations. If you have questions regarding trends or unexpected results, please contact the Indiana Criminal Justice Institute, Traffic Safety Division for more information.

## **Indiana University Public Policy Institute**

The Indiana University Public Policy Institute produces unbiased, high-quality research, analyses and policy guidance to promote positive change and improve the quality of life in communities across Indiana and the nation. Our clients use our research to enhance their programs and services, to develop strategies and policies, to evaluate the impact of their decisions—and ultimately to help the people they serve. Established in 1992, PPI is part of the IU O'Neill School of Public and Environmental Affairs at IUPUI.

## **The Indiana Criminal Justice Institute**

Guided by a Board of Trustees representing all components of Indiana's criminal and juvenile justice systems, the Indiana Criminal Justice Institute serves as the state's planning agency for criminal justice, juvenile justice, traffic safety, and victim services. ICJI develops long-range strategies for the effective administration of Indiana's criminal and juvenile justice systems and administers federal and state funds to carry out these strategies.

## **The National Highway Traffic Safety Administration (NHTSA)**

NHTSA provides leadership to the motor vehicle and highway safety community through the development of innovative approaches to reducing motor vehicle crashes and injuries. The mission of NHTSA is to save lives, prevent injuries and reduce economic costs due to road traffic crashes, through education, research, safety standards and enforcement activity.

**Author: Dona Sapp, Senior Policy Analyst**