



IN 2016:

- 337,932 passenger vehicle occupants were reported to be involved in Indiana traffic collisions; 91 percent were wearing seatbelts.
- 322 of the 581 (55 percent) Indiana passenger vehicle occupants who were killed in crashes were **not** wearing seatbelts.
- Pickup truck occupants in Indiana crashes who were **not** wearing seatbelts were 26 times more likely to be killed than occupants who were properly restrained, and unrestrained SUV occupants were 15 times more likely to be killed.
- Male drivers, particularly those between the ages of 21 and 34, represented the highest percentages of passenger vehicle drivers in crashes who were **not** wearing a seatbelt.
- Rural areas had a higher portion of unrestrained occupants in collisions (15 percent) than other locales, and 21 percent of all unrestrained passenger vehicle fatalities in Indiana crashes occurred in rural areas.

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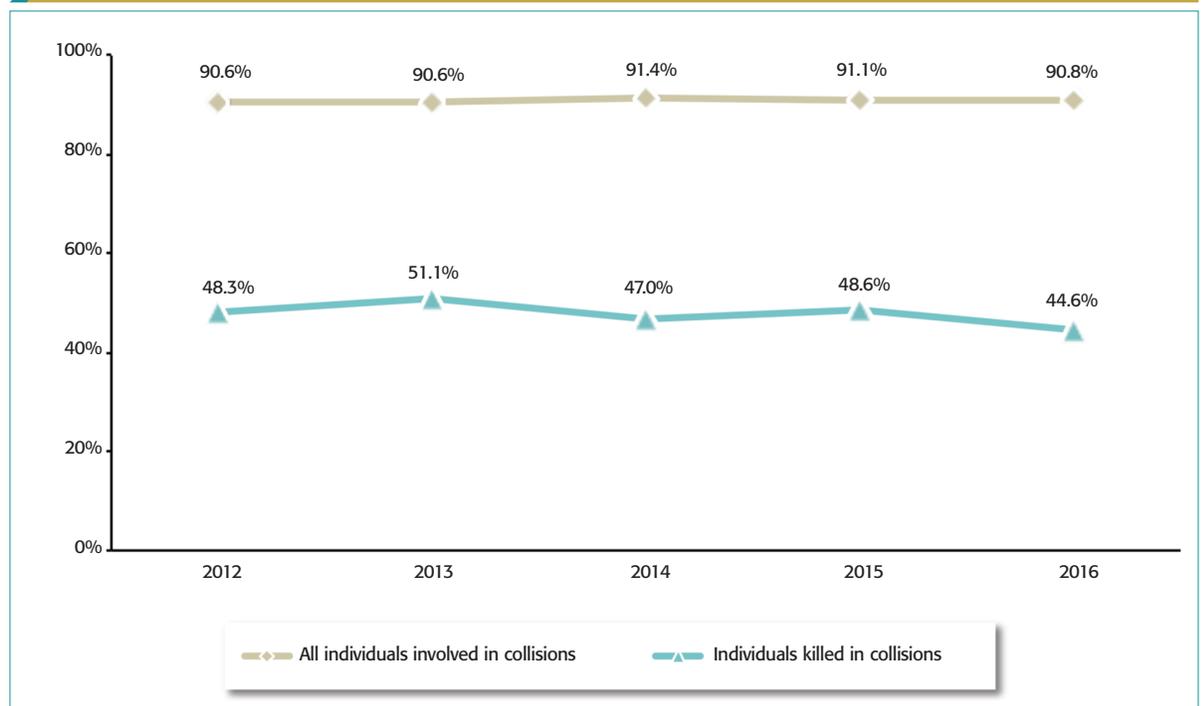
OCCUPANT PROTECTION 2016

In 2016, 46,885 passenger vehicle occupants were injured or killed in Indiana traffic collisions; 88 percent were wearing proper safety restraints (calculated from Table 1). Rates of seatbelt usage are consistently far lower among individuals killed in crashes than overall seatbelt usage rates. Among the 581 passenger vehicle occupants killed in 2016 collisions, 44 percent were properly restrained (Figure 1). This fact sheet summarizes occupant protection data trends at state and county levels in Indiana crashes. Restraint 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 from several sources (see last page for a full list of references, data sources, and definitions). Indiana data come primarily from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2017.

Note: 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. For the purposes of this fact sheet, the term seatbelt will include all five categories. A summary of Indiana Occupant Protection Laws is included on page 3.

Data discrepancies may exist between the 2016 Indiana traffic safety reports and previous traffic safety publications due to updates to the Indiana State Police ARIES data that have occurred since the original publication dates.

Figure 1. Seatbelt use among passenger vehicle occupants involved in Indiana collisions, by injury status, 2012-2016



Source: Indiana State Police Automated Reporting Information Exchange System, as of March 16, 2017

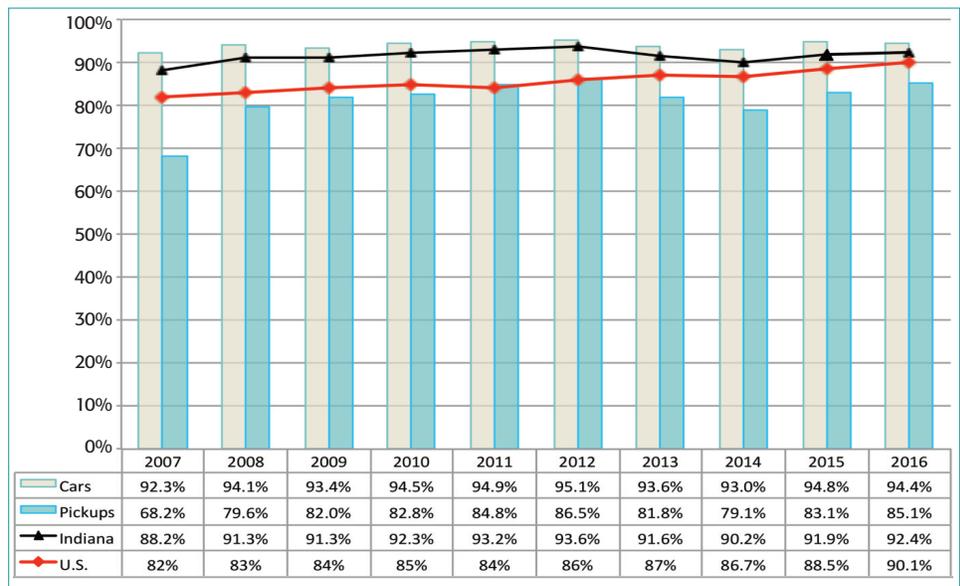
Note: Seatbelt use rates include individuals with 'NULL' and unknown restraint use in the totals.

The National Highway Traffic Safety Administration (NHTSA) reports that, nationally in 2016, the overall observed seatbelt use rate was 90.1 percent, an increase of nearly two percentage points from 2015 (DOT HS 812 351) (Figure 2). Indiana observational studies of seatbelt usage, conducted annually by the Indiana Criminal Justice Institute (ICJI) and the Purdue University Center for Road Safety, show that Indiana's overall seatbelt usage rates have exceeded national rates since 2007. The overall Indiana observed seatbelt use rate in passenger vehicles in 2016 was 92.4 percent, up slightly from 2015. Figure 2 shows that Indiana restraint usage rates for all passenger vehicle occupants increased 4 percentage points since 2007. Observed seatbelt use among Indiana pickup truck occupants in 2016 (85.1 percent) was the highest observed rate since 2013.

NHTSA identifies seat belt use as an essential to 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 that 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 May 2016, Indiana was one of 35 states that have primary enforcement laws in effect.

Table 1 shows the overall rate of restraint usage among passenger vehicle occupants involved in Indiana crashes was 90.8 percent in 2016. Rates of restraint usage among passenger vehicle occupants injured in Indiana traffic collisions decreased as the severity of injuries increased. In 2016, among the 581 passenger vehicle occupants killed, 45 percent were properly restrained. Approximately 85 percent of the 17,884 individuals suffering incapacitating injuries were wearing seatbelts.

Figure 2. Observed Indiana and U.S. seat belt use rates in passenger vehicles, 2007-2016



Sources: Indiana - *Indiana Roadside Observational Survey of Safety Belt and Motorcycle Helmet Use*, Center for Road Safety, Purdue University, 2016
U.S. - DOT HS 812 351, November 2016

Notes:

- 1) Indiana data (2007-2010) represent the average annual rates of observed restraint use among all Indiana passenger vehicle occupants in a study previously conducted by ICJI twice per year. Beginning in 2011, this study was conducted only once each year; therefore, averages no longer apply from this point forward.
- 2) Car and pickup truck restraint usage rates are specific to Indiana only.

Table 1. Seatbelt use and injury status among passenger vehicle occupants involved in Indiana collisions, 2012-2016

Injury status	2012	2013	2014	2015	2016	Annual rate of change	
						2015-16	2012-16
All occupants	283,470	287,781	304,632	325,835	337,932	3.7%	4.5%
Properly restrained	256,889	260,821	278,357	296,880	307,004	3.4%	4.6%
Restraint use rate	90.6%	90.6%	91.4%	91.1%	90.8%	-0.3%	0.1%
Fatalities	518	550	500	568	581	2.3%	2.9%
Properly restrained	250	281	235	276	259	-6.2%	0.9%
Restraint use rate	48.3%	51.1%	47.0%	48.6%	44.6%	-8.3%	-2.0%
Incapacitating injuries	2,763	2,470	4,342	15,900	17,884	12.5%	59.5%
Properly restrained	2,009	1,824	3,458	13,410	15,161	13.1%	65.7%
Restraint use rate	72.7%	73.8%	79.6%	84.3%	84.8%	0.5%	3.9%
Non-incapacitating injuries	39,384	38,612	37,679	29,258	28,420	-2.9%	-7.8%
Properly restrained	35,037	34,394	33,960	26,652	25,882	-2.9%	-7.3%
Restraint use rate	89.0%	89.1%	90.1%	91.1%	91.1%	0.0%	0.6%
Not injured	240,805	246,149	262,111	280,109	291,047	3.9%	4.9%
Properly restrained	219,593	224,322	240,704	256,542	265,702	3.6%	4.9%
Restraint use rate	91.2%	91.1%	91.8%	91.6%	91.3%	-0.3%	0.0%

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 16, 2017

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.

RESTRAINT USE BY VEHICLE TYPE

Table 2 shows the relative risk of fatal injury when passenger vehicle occupants in crashes were not wearing seatbelts. In 2016, only one-tenth of a percent of restrained individuals in each of the four passenger vehicle types involved in collisions were killed. Among unrestrained individuals injured in passenger cars, 1 percent were killed, making an individual 11 times more likely to be killed in 2016 crashes in a passenger car when unrestrained compared to when they were wearing a seatbelt. Unrestrained occupants of pickup trucks were 26 times more likely to be killed than occupants wearing seatbelts. Unrestrained occupants of SUVs were 15 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 ($p < 0.01$).

Table 2. Passenger vehicle occupants involved in Indiana collisions, by vehicle type, seatbelt use, and injury status, 2016

Seatbelt use and injury status	Passenger cars		Pickup trucks		SUVs		Vans	
	Count	% Total	Count	% Total	Count	% Total	Count	% Total
Restrained (R)	214,571	100.0%	34,440	100.0%	43,311	100.0%	14,682	100.0%
Fatal	198	0.1%	21	0.1%	29	0.1%	11	0.1%
Incapacitating	10,931	5.1%	1,370	4.0%	2,130	4.9%	730	5.0%
Non-incapacitating	18,357	8.6%	2,283	6.6%	3,911	9.0%	1,331	9.1%
No injury	185,085	86.3%	30,766	89.3%	37,241	86.0%	12,610	85.9%
Not restrained (NR)	20,820	100.0%	4,651	100.0%	4,066	100.0%	1,391	100.0%
Fatal	201	1.0%	73	1.6%	41	1.0%	7	0.5%
Incapacitating	1,705	8.2%	482	10.4%	408	10.0%	128	9.2%
Non-incapacitating	1,732	8.3%	317	6.8%	360	8.9%	129	9.3%
No injury	17,182	82.5%	3,779	81.3%	3,257	80.1%	1,127	81.0%
Relative risk of fatal injury	10.5		25.7		15.1		6.7	

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 16, 2017

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.¹ 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.² 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 two 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.

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

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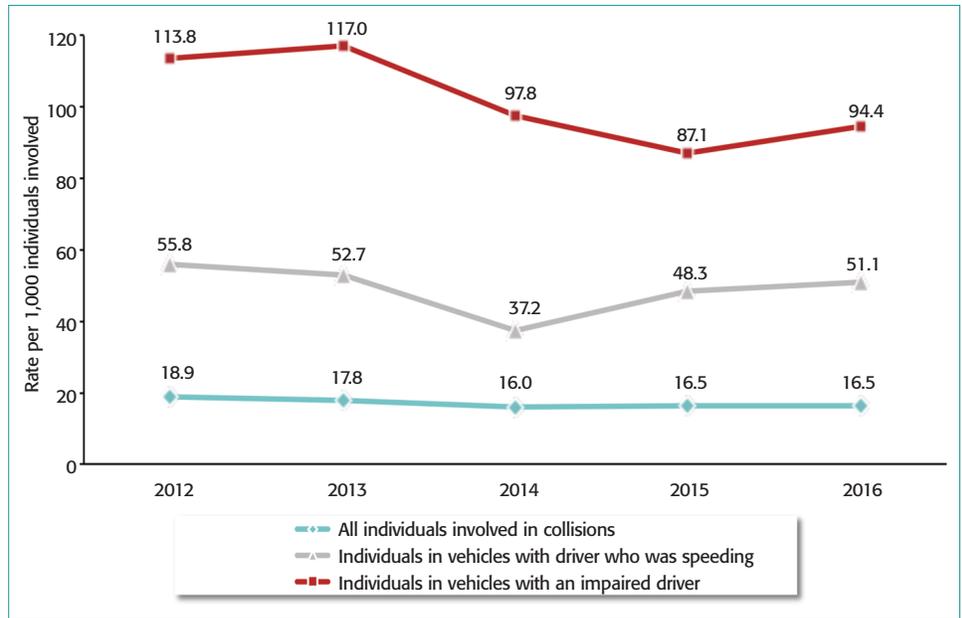
SPEEDING, IMPAIRED DRIVING, AND RESTRAINT USE

Rates of unrestrained injuries in Indiana collisions were consistently higher between 2012 and 2016 in vehicles with a driver who was speeding and in vehicles with an alcohol-impaired driver (Figure 3). In 2016, the rate of injury per 1,000 individuals involved in crashes was 16.5, compared to 51.1 per 1,000 in vehicles with a driver who was speeding and 94.4 per 1,000 in vehicles where the driver was legally impaired.

SEATBELT USE BY AGE

When looking at restraint use by age and gender between 2012 and 2016, male drivers in collisions were consistently more likely to be unrestrained than females in the same age groups (Table 3). Male drivers in the 21 to 24 and 25 to 34 age groups represented the highest proportion of passenger vehicle drivers who were not wearing seatbelts in collisions from 2012 through 2016. Among female drivers in 2016 crashes, those in the 15 to 20 and 75+ age groups represented the highest proportion of unrestrained drivers.

Figure 3. Unrestrained injury rates per 1,000 passenger vehicle occupants in Indiana collisions, by drivers speeding and driver impairment, 2012-2016



Source: Indiana State Police Automated Reporting Information Exchange System, as of March 16, 2017

Note: Injuries include injury status codes reported as fatal, incapacitating, non-incapacitating, possible, refused (treatment), and unknown.

Table 3. Proportion of passenger vehicle drivers in Indiana collisions who were unrestrained, by age group and gender, 2012-2016

Age group	2012		2013		2014		2015		2016	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
15-20	10.2%	7.9%	9.8%	7.6%	9.2%	7.4%	9.5%	7.4%	9.4%	8.3%
21-24	11.4%	7.9%	11.2%	7.7%	10.0%	7.2%	10.4%	7.5%	10.5%	7.7%
25-34	11.0%	8.0%	10.8%	8.0%	10.1%	7.4%	10.3%	7.8%	10.6%	7.9%
35-44	9.9%	7.8%	9.8%	7.8%	9.0%	7.1%	9.1%	7.3%	9.7%	7.9%
45-54	9.1%	7.8%	9.5%	7.5%	8.5%	6.9%	8.6%	7.4%	8.9%	7.9%
55-64	9.0%	7.0%	8.6%	7.6%	8.1%	7.1%	8.6%	6.9%	8.7%	7.6%
65-74	7.7%	7.2%	9.0%	7.5%	7.8%	6.8%	8.8%	7.0%	8.1%	7.2%
75 +	9.6%	7.1%	9.2%	8.1%	8.1%	7.6%	8.6%	7.8%	9.0%	8.2%
All ages	10.0%	7.7%	9.9%	7.7%	9.1%	7.2%	9.4%	7.4%	9.6%	7.9%

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 16, 2017

Notes:

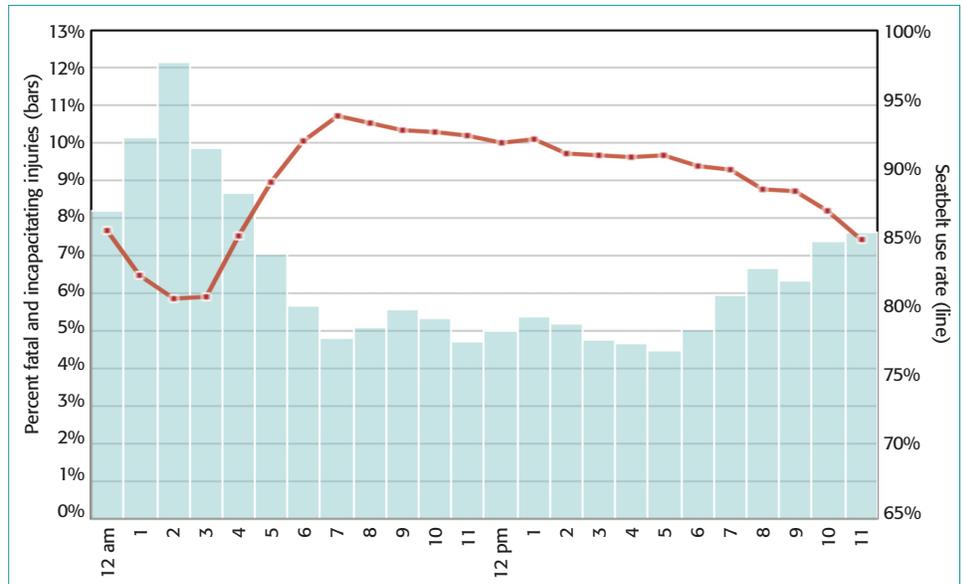
- 1) Data limited to drivers of passenger vehicles with valid gender and age reported.
- 2) Percent unrestrained includes individuals reported with "No restraint" and NULL values in the restraint use code field.

TIME OF DAY, DAY OF WEEK, AND RESTRAINT USE

In 2016, the highest percentage of hourly fatal and incapacitating injuries occurred during overnight hours (between 12am and 5am) (Figure 4). The lowest hourly rates of restraint usage occurred during this same time period. The highest percentage of hourly fatal and incapacitating injuries in 2016 occurred between 2am and 3am (12.2 percent), while the lowest hourly rate of restraint use occurred during this same period (81 percent).

On average, daily counts of unrestrained passenger vehicle occupants in daytime collisions are higher than counts in nighttime collisions. In 2016, the average daily count of unrestrained passenger vehicle occupants in daytime collisions was 416, compared to 332 in nighttime collisions (Figure 5). Nighttime counts of unrestrained passenger vehicle occupants exceeded daily averages on Friday, Saturday, and Sunday.

Figure 4. Indiana fatal and incapacitating injuries and seatbelt use in passenger vehicles, by time of day, 2016

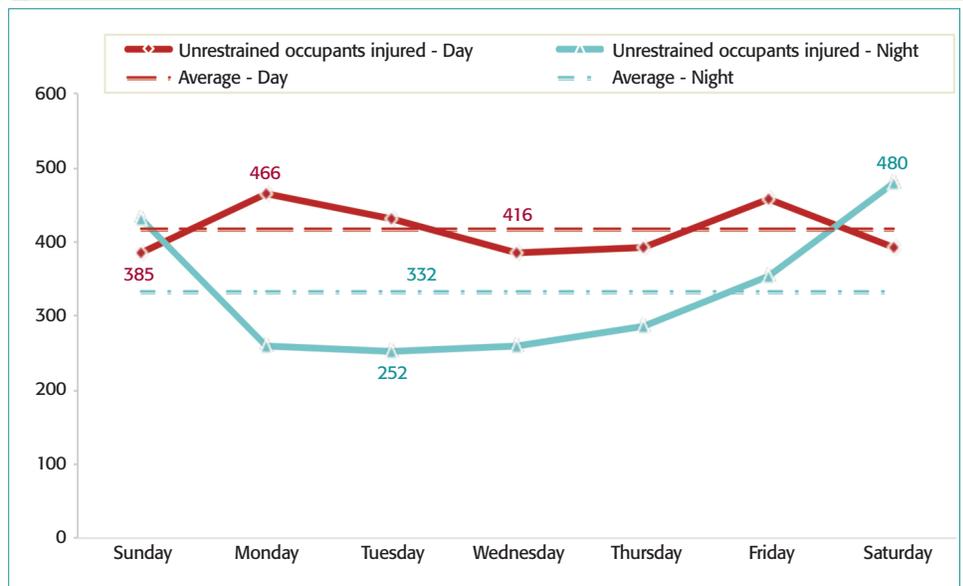


Source: Indiana State Police Automated Reporting Information Exchange System, as of March 16, 2017

Notes:

- 1) *Fatal and incapacitating injury rate* represents *fatal or incapacitating* injuries as a proportion of all individuals involved in collisions.
- 2) *Seatbelt use rate* includes individuals reported with unknown and invalid safety equipment type.

Figure 5. Unrestrained passenger vehicle occupants injured in Indiana collisions, by day of week and day/night, 2016



Source: Indiana State Police Automated Reporting Information Exchange System, as of March 17, 2016

Notes:

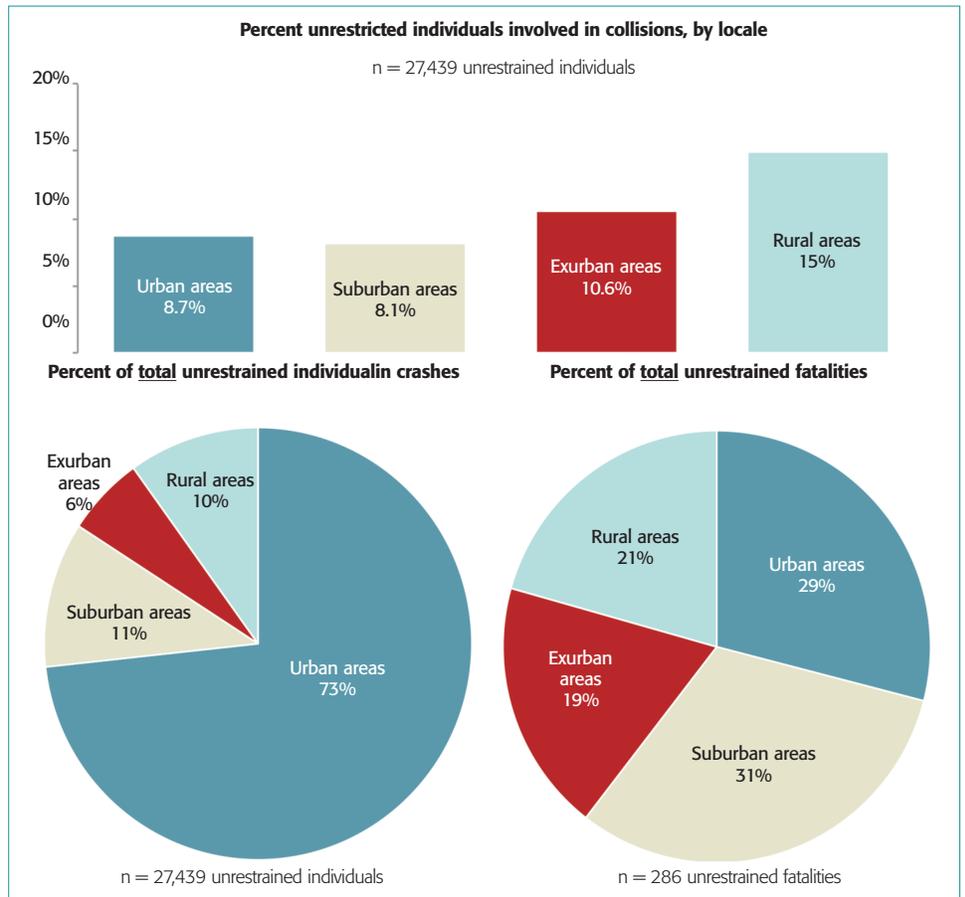
- 1) Day is defined as 6am - 5:59pm. Night is defined as 6pm - 5:59am.
- 2) Includes passenger vehicle occupants with *fatal, incapacitating, non-incapacitating, and possible* injuries.

GEOGRAPHY OF INDIANA RESTRAINT USE

Figure 6 show seatbelt use among passenger vehicle occupants in 2016 collisions by locale. Generally, the proportion of individuals involved in crashes who are not wearing seatbelts increases size with distance from urban areas. While less than 9 percent of individuals in collisions in urban areas were unrestrained, 15 percent of those in collisions in rural areas were not wearing seatbelts. Urban areas represented more than 70 percent of total unrestrained passenger vehicle occupants in 2016 collisions, while suburban and rural areas represented 11 percent and 10 percent of total unrestrained individuals, respectively. Among unrestrained individuals killed in collisions, suburban and rural areas were disproportionately represented at 31 percent and 21 percent, respectively.

Map 1 illustrates 2016 Indiana county percent of unrestrained passenger vehicle occupants in collisions. Both the median and the mean county percent of injured passenger vehicle occupants in collisions who were unrestrained were 18.0 percent. Many counties with higher rates (at or above the median) of unrestrained injured passenger vehicle occupants in crashes were located outside of central Indiana, particular in the western and southern portions of the state. Relatively low rates of unrestrained injured occupants (below the median) in 2016 crashes were clustered in areas of central and northern Indiana. Crawford (47.5 percent) and Owen (42 percent) counties had the highest percent of injured passenger vehicle occupants in crashes who were not wearing seatbelts, while Vanderburgh (4.3 percent), Hamilton (5.4 percent), and Tippecanoe (5.4 percent) counties had the lowest percent of injured occupants who were unrestrained.

Figure 6. Restraint use in Indiana collisions, by Census locale, 2016



Source: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2017

Note: Excludes records where locale could not be determined.

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 2012 to 2016, it is calculated as $(\text{Value in 2016} / \text{Value in 2012})^{1/4} - 1$.
- **Census Locale - Urban** is defined as Census 2013 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).
- **Non-incapacitating** injuries include those injuries reported as *non-incapacitating*, *possible*, *not reported*, *unknown*, and *refused* (treatment) injury status codes.
- **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.
- **Passenger vehicles** are defined as *passenger 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, 2016

National Center for Statistics and Analysis, National Highway Traffic Safety Administration, *Seat Belt Use in 2016—Overall Results*, DOT HS 812 351, November 2016.

DATA SOURCES

Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2017.

National Center for Statistics and Analysis, National Highway Traffic Safety Administration, *Seat Belt Use in 2016—Overall Results*, DOT HS 812 351, November 2016.

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 website (www.policyinstitute.iu.edu), the ICJI website (www.in.gov/cji/), or you may contact the PPI at 317-261-3000.

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 eleventh 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.

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 Governor's Council on Impaired & Dangerous Driving

The Governor's Council on Impaired & Dangerous Driving, a division of the Indiana Criminal Justice Institute, serves as the public opinion catalyst and the implementing body for statewide action to reduce death and injury on Indiana roadways. The Council provides grant funding, training, coordination, and ongoing support to state and local traffic safety advocates.

Indiana University Public Policy Institute

The IU Public Policy Institute delivers unbiased research and data-driven, objective, expert analysis to help public, private and nonprofit sectors make important decisions that directly impact quality of life in Indiana. Using the knowledge and expertise of our staff and faculty, we provide research and analysis that is free of political and ideological bias. A multidisciplinary institute within the Indiana University School of Public and Environmental Affairs (SPEA), our efforts also support the Indiana Advisory Commission on Intergovernmental Relations (IACIR).

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



INDIANA UNIVERSITY PUBLIC POLICY INSTITUTE

