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OCCUPANT PROTECTION 2015

IN 2015:

- 325,610 passenger vehicle occupants were reported to be involved in Indiana traffic collisions; 91 percent were wearing seatbelts.
- 296 of the 574 Indiana passenger vehicle occupants who were killed in crashes Were not wearing seatbelts.
- Pickup truck occupants who were not wearing seatbelts in Indiana crashes were 14 times more likely to be killed than occupants who were properly restrained.
- Male drivers between the ages of 15 and 34 represented the highest percentages of passenger vehicle drivers in crashes who were not wearing a seatbelt.
- Twenty-two percent of passenger vehicle fatalities in Indiana crashes occurred in rural areas, only 53 percent of whom were wearing seatbelts.

INDIANA JUSTICE INDIANA UNIVERSITY PUBLIC POLICY INSTITUTE In 2015, 45,693 passenger vehicle occupants were injured or killed in Indiana traffic collisions; 88 percent were wearing proper safety restraints (calculated from Table 1). Among the 574 passenger vehicle occupants killed in Indiana collisions, 48 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 17, 2016. Nearly 89 percent of passenger vehicle occupants injured (excludes individuals in collisions with no injury reported) in 2015 Indiana traffic collisions were wearing the proper safety restraint.

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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.

Data discrepancies may exist between the 2015 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, 2011-2015

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

The National Highway Traffic Safety Administration (NHTSA) reports that, nationally in 2015, the overall observed seatbelt use rate was 88.5 percent, an increase of two percentage points from 2014 (DOT HS 812 243) (Figure 2). NHTSA identifies safety belt use as the most effective strategy a person can employ to prevent death and minimize injury resulting from traffic collisions (see text box for summary of Indiana Occupant Protection Laws). Research shows that rates of restraint use are consistently higher in states with primary enforcement laws (DOT HS 812 243). Primary enforcement laws allow a law enforcement officer to stop a vehicle and issue a citation for the sole purpose of observing an unrestrained driver or passenger. Secondary enforcement means that a citation for being unrestrained can only be issued after the officer stops the vehicle or cites the offender for another unrelated infraction. As of May 2015, Indiana was one of 35 states that have primary enforcement laws in effect.

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.ⁱ 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." 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 or exceeds height and weight requirements specified by the car seat manufacturer. These guidelines also include the use of booster safety seats until age 8 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.

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

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GENERAL TRENDS

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). 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.



Sources: Indiana - Indiana Roadside Observational Survey of Safety Belt and Motorcycle Helmet Use, Center for Road Safety, Purdue University, 2016 U.S. - DOT HS 812 243, February 2016

Notes:

 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.

3) 2015 most recent year available for U.S. data.

among the 574 passenger vehicle occupants killed, 48 percent were wearing seatbelts. Approximately 84 percent of the 15,884 individuals suffering incapacitating injuries were properly restrained.

Table 1. Seatbelt use and injury status among passenger vehicle occupants involved in Indiana collisions, 2011-2015

Description in the second second	0011	0010	0010	0014	0015	Annual rate of change	
rassenger venicle occupant injuries	2011	2012	2015	2014	2015	2014-15	2011-15
All occupants	280,926	283,470	287,781	304,612	325,610	6.9%	3.8%
Properly restrained	254,552	256,889	260,821	278,340	296,708	6.6%	3.9%
Restraint use rate	90.6%	90.6%	90.6%	91.4%	91.1%	-0.3%	0.1%
Fatalities	515	518	550	500	574	14.8%	2.7%
Properly restrained	255	250	281	235	278	18.3%	2.2%
Restraint use rate	49.5%	48.3%	51.1%	47.0%	48.4%	3.0%	-0.6%
Incapacitating injuries	2,433	2,763	2,470	4,343	15,884	265.7%	59.8 %
Properly restrained	1,803	2,009	1,824	3,458	13,398	287.4%	65.1%
Restraint use rate	74.1%	72.7%	73.8%	79.6%	84.3%	5.9%	3.3%
Non-incapacitating injuries	36,632	37,645	36,609	35,731	25,830	-27.7%	-8.4%
Properly restrained	32,679	33,483	32,595	32,205	23,611	-26.7%	-7.8%
Restraint use rate	89.2%	88.9%	89.0%	90.1%	91.4%	1.4%	0.6%
Other injuries	1,721	1,739	2,003	1,946	3,405	75.0%	18.6%
Properly restrained	1,519	1,554	1,799	1,753	3,021	72.3%	18.8%
Restraint use rate	88.3%	89.4%	89.8%	90.1%	88.7%	-1.5%	0.1%
Not injured	239,625	240,805	246,149	262,092	279,917	6.8%	4.0%
Properly restrained	218,296	219,593	224,322	240,689	256,400	6.5%	4.1%
Restraint use rate	91.1%	91.2%	91.1%	91.8%	91.6%	-0.3%	0.1%

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

Note: Totals include individuals with 'NULL' and unknown restraint use.



RESTRAINT USE BY VEHICLE TYPE AND SEATING POSITION

Table 2 shows the relative risk of fatal injury when passenger vehicle occupants in crashes were unrestrained. In 2015, approximately 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 unrestrained individual 10 times more likely to be killed in 2015 crashes in a passenger car than those who were restrained. Unrestrained occupants of pickup trucks were 14 times more likely to be killed than occupants using proper safety restraints.

Unrestrained occupants of SUVs were 13 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).

Figure 3 shows injury counts and restraint usage rates for 2015 by injury type, vehicle seating position, and relative risk of a fatality. The greatest number of fatalities occurred in the driver seating position (421), among which 49 percent were properly restrained. About 61 percent of the 100 individuals killed in the front right passenger seat were properly restrained, and 30 percent of the 43 individuals killed in the rear seating positions were restrained (calculated from Figure 3). Unrestrained occupants in the driver seating position were 11 times more likely to be killed in collisions compared to restrained occupants in the same seating position. Figure 3. Individuals in Indiana passenger vehicle collisions by injury status, seating position, and seatbelt use, 2015



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

Notes:

- 1) Relative risk of <u>fatal</u> injury is calculated as % not restrained / % restrained. All relative risk ratios are significant (p<0.01).
- Injury counts include only individuals in crashes where valid seating position was identified.
- 3) Percentages depicted are the percentage of individuals reported to be properly restrained by injury type in each seating position. Both *not restrained* and *unknown* restraint use codes are included in the totals for restraint use rate calculations.

Table 2. Passenger vehicle occupants involved in Indiana collisions, by vehicle type, seatbelt use, and injury status, 2015

Southalt use and injum status	Passenger cars		Pickup	trucks	SU	Vs	Vans	
Seatbelt use and injury status	Count	% Total	Count	% Total	Count	% Total	Count	% Total
Restrained (R)	203,761	100.0%	34,983	100.0%	42,434	100.0%	15,530	100.0%
Fatal	195	0.1%	28	0.1%	37	0.1%	18	0.1%
Incapacitating	9,443	4.6%	1,281	3.7%	1,870	4.4%	804	5.2%
Non-incapacitating	16,668	8.2%	2,060	5.9%	3,606	8.5%	1,277	8.2%
Other	2,006	1.0%	392	1.1%	454	1.1%	169	1.1%
No injury	175,449	86.1%	31,222	89.2%	36,467	85.9%	13,262	85.4%
Not restrained (NR)	19,216	100.0%	4,454	100.0%	3,797	100.0%	1,435	100.0%
Fatal	189	1.0%	50	1.1%	43	1.1%	14	1.0%
Incapacitating	1,595	8.3%	428	9.6%	324	8.5%	139	9.7%
Non-incapacitating	1,467	7.6%	337	7.6%	268	7.1%	147	10.2%
Other	249	1.3%	69	1.5%	49	1.3%	17	1.2%
No injury	15,716	81.8%	3570	80.2%	3113	82.0%	1118	77.9%
Relative risk of fatal injury	10.3		14.0		13	.0	8.4	

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

Notes: 1) Relative risk of <u>fatal</u> injury is calculated as NR % fatal/R % fatal. All relative risk ratios are significant (p<0.01).

2) Unrestrained counts include NULL values and *no restraint* in the restraint use code field.

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SPEEDING, IMPAIRED DRIVING, AND RESTRAINT USE

Rates of unrestrained injuries in Indiana collisions were consistently higher between 2011 and 2015 in vehicles with a driver who was speeding and in vehicles with an alcohol-impaired driver (Figure 4). In 2015, the rate of injury per 1,000 individuals involved in crashes was 15.4, compared to 45.5 per 1,000 in vehicles with a driver who was speeding and 80.6 per 1,000 in vehicles where the driver was legally impaired.

When looking at restraint use by age and gender between 2011 and 2015, 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 unrestrained in collisions from 2011 through 2015. Similarly, among female drivers, those between the ages of 15 and 34 years old consistently represented the highest proportion of unrestrained drivers during this same time period.

Figure 4. Unrestrained injury rates per 1,000 passenger vehicle occupants in Indiana collisions, by drivers speeding and driver impairment, 2011-2015



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

Notes:

1) Injuries include injury status codes reported as fatal, incapacitating, non-incapacitating, and possible.

2) Impaired and speeding driver categories are not mutually exclusive.

Table 3. Proportion of passenger vehicle drivers in Indiana collisions who were unrestrained, by age group and gender, 2011-2015

			Low <	<		> >	High			
	20)11	2012		2013		2014		2015	
Age group	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
15-20	10.5%	8.3%	10.2%	7.9%	9.8%	7.6%	9.2%	7.4%	9.5%	7.4%
21-24	11.3%	8.0%	11.4%	7.9%	11.2%	7.7%	10.0%	7.2%	10.4%	7.5%
25-34	10.5%	8.1%	11.0%	8.0%	10.8%	8.0%	10.1%	7.4%	10.3%	7.8%
35-44	10.0%	7.6%	9.9%	7.8%	9.8%	7.8%	9.0%	7.1%	9.1%	7.3%
45-54	9.2%	7.4%	9.1%	7.8%	9.5%	7.5%	8.5%	6.9%	8.6%	7.4%
55-64	8.7%	7.6%	9.0%	7.0%	8.6%	7.6%	8.1%	7.1%	8.6%	6.9%
65-74	8.7%	7.5%	7.7%	7.2%	9.0%	7.5%	7.8%	6.8%	8.8%	7.0%
75 +	8.5%	7.6%	9.6%	7.1%	9.2%	8.1%	8.1%	7.6%	8.6%	7.8%
All ages	9.9 %	7.8%	10.0%	7.7%	9.9 %	7.7%	9.1%	7.2%	9.4%	7.4%

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

Notes:

Data limited to drivers of passenger vehicles with valid gender and age reported.
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**

Restraint use and injury rates tend to vary inversely (i.e., when one is high, the other is low). In 2015, the highest percentage of hourly fatal and incapacitating injuries occurred during overnight hours (between 12am and 5am) (Figure 5). The lowest hourly rates of restraint usage occurred during this same time period. The highest percentage of hourly fatal and incapacitating injuries in 2015 occurred during the hours

between 2am (9.1 percent) and 3am (9.8 percent), while the lowest hourly rate of restraint use occurred during these same hours, 81 percent and 82 percent, respectively.

On average, daily counts of unrestrained passenger vehicle occupants in daytime collisions are higher than counts in nighttime collisions. In 2015, the average daily count of unrestrained passenger vehicle occupants in daytime collisions was 427, compared to 343 in nighttime collisions (Figure 6). Both daytime and nighttime counts of unrestrained passenger vehicle occupants exceeded daily averages on Friday and Saturday.



Figure 5. Indiana fatal and incapacitating injuries and seatbelt use in passenger vehicles, by time of day, 2015

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

Fatal and incapacitating injury rate represents *fatal* or *incapacitating* injuries as a proportion of all individuals involved in collisions.
Seatbelt use rate 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, 2015



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

Notes:

Notes:

Day is defined as 6am - 5:59pm. Night is defined as 6pm - 5:59am.
Excludes uninjured passenger vehicle occupants.

GEOGRAPHY OF INDIANA RESTRAINT USE

Figure 7 show seatbelt use among passenger vehicle occupants in 2015 collisions by locale. Nearly 70 percent of passenger vehicle occupants suffering non-fatal injuries occurred in urban area collisions, of whom 90 percent were wearing a seatbelt. Thirty-three percent of passenger vehi-

cle occupants killed in collisions occurred in urban areas, of whom only 42 percent were wearing a seatbelt. Rates of restraint use, generally, tend to be lower in non-urban areas with the exception of fatal collisions. Individuals killed in urban area collisions had a lower rate of restraint use (42 percent) than individuals killed in non-urban areas. Fifty-three percent of individuals killed in both suburban and rural area collisions were wearing a seatbelt.



Figure 7. Seatbelt use among passenger vehicle occupants in collisions, by Census locale and injury severity, 2015

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

Passenger vehicles include vehicles reported as a *passenger car, pickup truck, van,* or *sport utility vehicle.* Excludes cases where locale could not be determined.

Notes:



Map 1 illustrates 2015 Indiana county percent of unrestrained passenger vehicle occupants in collisions. The median county rate of unrestrained occupants in Indiana passenger vehicle collisions was 11.7 percent, while the mean rate was 14.3 percent. Many counties with higher rates (at or above the median) of unrestrained passenger vehicle occupants in crash-

es were located in the southern half of the state. Counties clustered in areas of southwestern Indiana were among the highest rates of unrestrained vehicle occupants in 2015 crashes. Relatively low rates of unrestrained occupants (below the median) in 2015 crashes were clustered in areas of central and northern Indiana.



Map 1. Percent of unrestrained passenger vehicle occupants in Indiana collisions by county, 2015

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

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 2011 to 2015, it is calculated as (Value in 2015 / Value in 2011)^{1/4} 1.
- *Census 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).
- Not injured status includes individuals involved in collisions reported as *null* values in the injury status code field. Reporting officers are instructed to enter only *drivers* in ARIES, if no injury occurs; however, passengers and non-motorists are sometimes mistakenly reported when no injury occurs. For this reason, *not injured* counts should be interpreted with caution.
- Non-incapacitating injuries include those injuries reported as non-incapacitating or possible.
- Other injury status includes not reported, unknown, and refused (treatment) status codes.
- 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 2015–Overall Results*, DOT HS 812 243, February 2016.
- National Center for Statistics and Analysis (2015, April). *Summary of Vehicle Occupant Protection and Motorcycle Laws*, Twelfth Edition, DOT HS 812 129, Washington, DC: National Highway Traffic Safety Administration.

DATA SOURCES

- Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 17, 2016.
- National Center for Statistics and Analysis, National Highway Traffic Safety Administration, *Seat Belt Use in 2015–Overall Results*, DOT HS 812 243, February 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 tenth 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.