

INDIANA 2010 TRAFFIC SAFETY FACTS CHILDREN, 2010

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In 2010, over 4,300 children (ages 0 to 15) were injured or killed in Indiana motor vehicle collisions. Approximately five percent of all children involved in 2010 Indiana collisions experienced serious or life-threatening injuries; 33 of these injuries were fatal, and 235 were reported as incapacitating. The National Highway Traffic Safety Administration (NHTSA) finds that motor vehicle collisions are the leading cause of death for children from 3 to 14 years old (DOT HS 811 387). In 2009, 1,314 children (ages 14 and younger) were killed in traffic collisions, representing four percent of the 33,808 traffic fatalities in the United States and a three percent decrease in child traffic fatalities from 2008.

Research has shown that child restraint use (including lap/shoulder safety belts and child safety seats) is the most effective tool for preventing serious and fatal injuries to children who are vehicle occupants in traffic collisions. NHTSA reports that child safety seats, when used properly, reduce the risk of fatal injury by 71 percent for infants and 54 percent for toddlers (DOT HS 811 387). Research findings suggest that older children (ages 8 to 15) are at greater risk of suffering serious injuries and fatalities than the other child age groups. This higher vulnerability is likely due in part to lower rates of restraint usage among child passengers in this age

group. NHTSA emphasizes continued efforts in developing strong child passenger safety legislation and public awareness campaigns to educate citizens on laws and best practices, the correct use of child restraints, the potential dangers to children associated with failure to use proper restraints, as well as dangers to child passengers when drivers are under the influence of alcohol.

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 (IC 9-19-11). In addition to legislative efforts, child passenger safety experts have developed recommended safety standards and best practices. NHTSA advocates that child occupants graduate through “four steps” of restraint usage from birth to adulthood (Figure 1).

This fact sheet summarizes data trends, safety legislation, and best practices on child passenger safety and traffic collisions involving children between 2006 and 2010. Data from several sources are used (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 1, 2011.

Figure 1. Car Seat Recommendations for Children



Birth — 12 months

Your child under age 1 should always ride in a rear-facing car seat. There are different types of rear-facing car seats: Infant-only seats can only be used rear-facing. Convertible and 3-in-1 car seats typically have higher height and weight limits for the rear-facing position, allowing you to keep your child rear-facing for a longer period of time.



1 – 3 years

Keep your child rear-facing as long as possible. It's the best way to keep him or her safe. Your child should remain in a rear-facing car seat until he or she reaches the top height or weight limit allowed by your car seat's manufacturer. Once your child outgrows the rear-facing car seat, your child is ready to travel in a forward-facing car seat with a harness.



4 – 7 years

Keep your child in a forward-facing car seat with a harness until he or she reaches the top height or weight limit allowed by your car seat's manufacturer. Once your child outgrows the forward-facing car seat with a harness, it's time to travel in a booster seat, but still in the back seat.



8 – 12 years

Keep your child in a booster seat until he or she is big enough to fit in a seat belt properly. For a seat belt to fit properly the lap belt must lie snugly across the upper thighs, not the stomach. The shoulder belt should lie snug across the shoulder and chest and not cross the neck or face. Remember: your child should still ride in the back seat because it's safer there.

Source: NHTSA, March 2011.

GENERAL TRENDS

Table 1 shows that, from 2009 to 2010, the number of children killed in Indiana traffic collisions decreased by 5.7 percent, and the number of children suffering incapacitating injuries remained the same. Data show that the largest portion of serious injuries occurred in the 8- to 15-year-old age group. Sixty-one percent of all child traffic fatalities and 63 percent of incapacitating injuries occurred in the 8- to 15-year-old age group in 2010. These numbers are disproportionately high given that the 8- to 15-year-old age group represents only 50 percent of the Indiana child population (Table 2). The *less than 1 year old* age group, representing 6.3 percent of the Indiana child population, also accounted for a disproportionately high share (9.1 percent) of 2010 fatal injuries in traffic collisions.

Table 3 shows the number of children injured or killed in traffic incidents by injury status and person type (including vehicle occupants, pedestrians, and pedalcyclists) in Indiana. The nine child pedestrian fatalities accounted for 27 percent of all Indiana child traffic fatalities in 2010. There was one child pedalcyclist fatality in Indiana traffic collisions in 2010.

Table 1. Children injured or killed in Indiana traffic collisions by injury status and age group, 2006-2010

	2006		2007		2008		2009		2010		% Change ('09-'10)
	Count	%	Count	%	Count	%	Count	%	Count	%	
Fatalities											
Less than 1 year old	3	6.3	2	4.1	4	8.5	3	8.6	3	9.1	0.0%
1 to 3 years old	10	20.8	4	8.2	5	10.6	2	5.7	4	12.1	100.0%
4 to 7 years old	12	25.0	6	12.2	10	21.3	5	14.3	6	18.2	20.0%
8 to 15 years old	23	47.9	37	75.5	28	59.6	25	71.4	20	60.6	-20.0%
<i>Total</i>	48	100.0	49	100.0	47	100.0	35	100.0	33	100.0	-5.7%
Incapacitating injuries											
Less than 1 year old	15	5.2	13	4.3	11	4.4	14	6.0	12	5.1	-14.3%
1 to 3 years old	23	8.0	36	11.8	27	10.8	28	11.9	28	11.9	0.0%
4 to 7 years old	52	18.1	64	21.0	44	17.7	41	17.4	47	20.0	14.6%
8 to 15 years old	197	68.6	192	63.0	167	67.1	152	64.7	148	63.0	-2.6%
<i>Total</i>	287	100.0	305	100.0	249	100.0	235	100.0	235	100.0	0.0%
Non-incapacitating injuries											
Less than 1 year old	246	5.1	274	5.8	201	4.9	239	6.0	200	5.0	-16.3%
1 to 3 years old	526	10.9	560	11.9	433	10.6	496	12.4	493	12.2	-0.6%
4 to 7 years old	1,029	21.4	1,006	21.4	878	21.6	765	19.2	798	19.8	4.3%
8 to 15 years old	3,017	62.6	2,851	60.8	2,560	62.9	2,485	62.4	2,537	63.0	2.1%
<i>Total</i>	4,818	100.0	4,691	100.0	4,072	100.0	3,985	100.0	4,028	100.0	1.1%
Other injuries											
Less than 1 year old	39	14.8	31	27.7	36	33.3	19	26.0	24	36.4	26.3%
1 to 3 years old	46	17.5	6	5.4	16	14.8	12	16.4	11	16.7	-8.3%
4 to 7 years old	34	12.9	24	21.4	10	9.3	10	13.7	9	13.6	-10.0%
8 to 15 years old	144	54.8	51	45.5	46	42.6	32	43.8	22	33.3	-31.3%
<i>Total</i>	263	100.0	112	100.0	108	100.0	73	100.0	66	100.0	-9.6%
Not injured											
Less than 1 year old	427	35.4	618	40.5	659	42.2	658	42.8	592	46.8	-10.0%
1 to 3 years old	39	3.2	25	1.6	35	2.2	19	1.2	26	2.1	36.8%
4 to 7 years old	154	12.8	195	12.8	128	8.2	35	2.3	28	2.2	-20.0%
8 to 15 years old	586	48.6	689	45.1	738	47.3	824	53.6	620	49.0	-24.8%
<i>Total</i>	1,206	100.0	1,527	100.0	1,560	100.0	1,536	100.0	1,266	100.0	-17.6%

Source: Indiana State Police

Note: Includes individuals identified as *drivers, injured occupants, pedestrians, and pedalcyclists*.

Table 2. Indiana child population estimates, 2009

	Estimated IN Population	Share of IN Child Population
Less than 1 year old	88,683	6.3
1 to 3 years old	269,505	19.1
4 to 7 years old	350,086	24.9
8 to 15 years old	699,456	49.7
<i>Total</i>	1,407,730	

Source: U.S. Census Bureau

Note: The most recent population estimates available by age and county are for the year 2009.

Table 3. Children seriously injured or killed in Indiana traffic collisions by injury status and person type, 2006-2010

	2006		2007		2008		2009		2010		% Change ('09-'10)
	Count	%	Count	%	Count	%	Count	%	Count	%	
Fatalities											
Driver	1	2.1	5	10.2	5	10.6	3	8.6	3	9.1	0.0%
Injured occupant	34	70.8	35	71.4	29	61.7	22	62.9	20	60.6	-9.1%
Pedalcyclist	3	6.3	3	6.1	4	8.5	0	0.0	1	3.0	100.0%
Pedestrian	10	20.8	6	12.2	9	19.1	10	28.6	9	27.3	-10.0%
<i>Total</i>	48	100.0	49	100.0	47	100.0	35	100.0	33	100.0	-5.7%
Incapacitating injuries											
Driver	20	7.0	25	8.2	17	6.8	24	10.2	16	6.8	-33.3%
Injured occupant	180	62.7	195	63.9	163	65.5	148	63.0	153	65.1	3.4%
Pedalcyclist	36	12.5	27	8.9	22	8.8	19	8.1	20	8.5	5.3%
Pedestrian	51	17.8	58	19.0	47	18.9	44	18.7	46	19.6	4.5%
<i>Total</i>	287	100.0	305	100.0	249	100.0	235	100.0	235	100.0	0.0%

Source: Indiana State Police

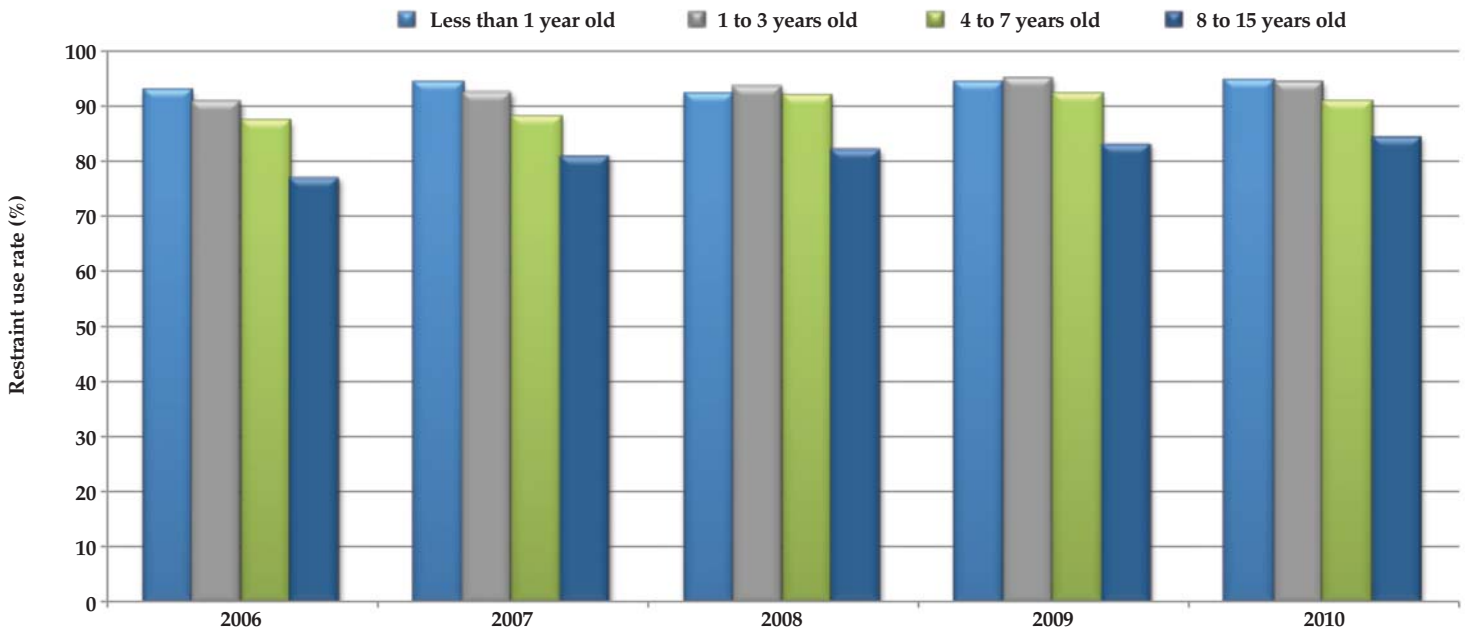
CHILD RESTRAINT USAGE

Restraint use rates among children in collisions generally decline as children get older (Figure 2). While the rate of restraint use among 8- to 15-year-olds increased 7.4 percentage points between 2006 and 2010, this age group was the only child age group with a rate of restraint use below 90 percent in 2010 (84.3 percent).

The relative risk of serious injury increases when child vehicle occupants are unrestrained. Among all children involved in traffic collisions who

were properly restrained, only 4 percent were seriously injured, while 10.3 percent of unrestrained child occupants were seriously injured, indicating that a child is 2.56 times more likely to be seriously injured when unrestrained (Table 4). The risk is greater among younger unrestrained child occupants. Unrestrained child occupants in the *less than 1 year old* age group are 3.11 times more likely to be seriously injured, while children in the *1- to 3-year-old* age group are 4.82 times more likely to be seriously injured in a collision.

Figure 2. Restraint use among children involved in Indiana traffic collisions, by age group, 2006-2010



Source: Indiana State Police

Note: Restraint use percentages were calculated based on individuals identified as *driver* or *injured occupant* where restraint use was known.

Table 4. Risk of serious injury to child vehicle occupants involved in Indiana collisions, by restraint use, 2010

Age group	Restrained?	Serious injuries	Non-serious injuries	Total	% Serious injury	Risk
Less than 1 year old	No	4	25	29	13.8%	3.11
	Yes	9	194	203	4.4%	
1 to 3 years old	No	6	28	34	17.6%	4.82
	Yes	17	447	464	3.7%	
4 to 7 years old	No	5	84	89	5.6%	1.33
	Yes	28	634	662	4.2%	
8 to 15 years old	No	51	435	486	10.5%	2.60
	Yes	72	1,714	1,786	4.0%	
Total	No	66	572	638	10.3%	2.56
	Yes	126	2,989	3,115	4.0%	

Source: Indiana State Police

Notes:

1) Limited to children, ages 0 to 15 years old, identified as *drivers* or *injured occupants*, where restraint use was known.

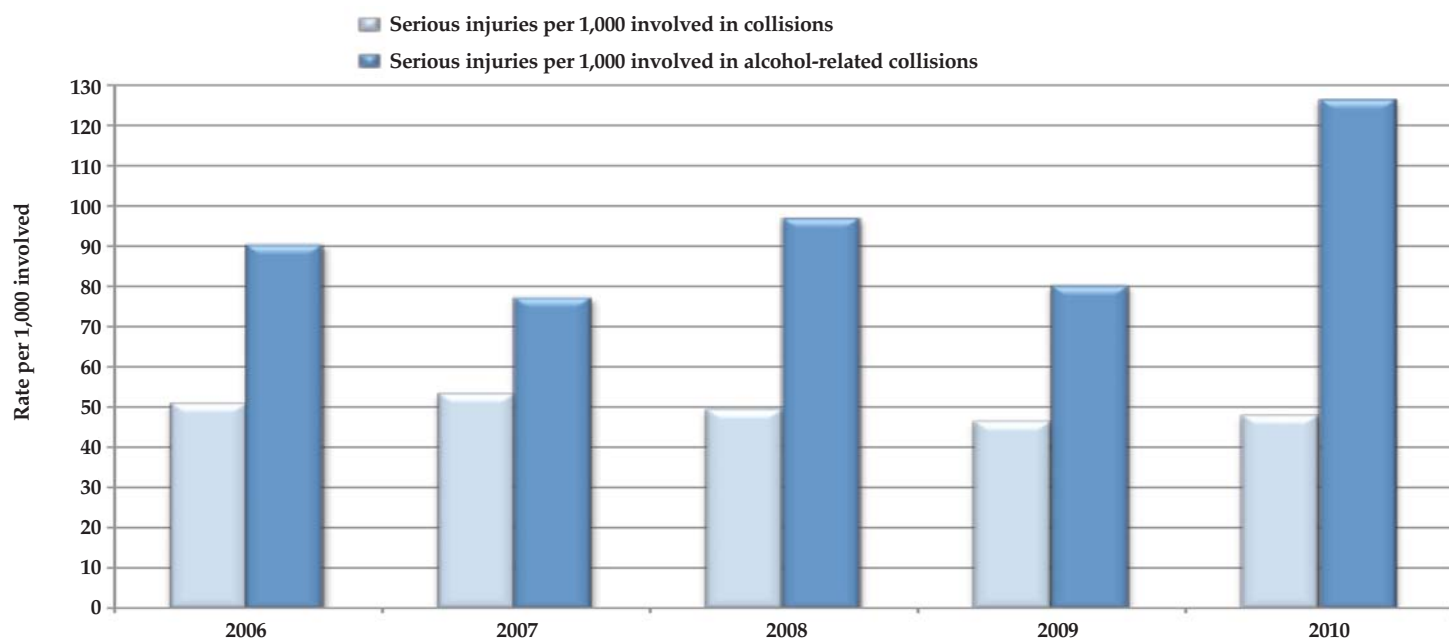
2) Serious injuries include those reported as *fatal* and *incapacitating*.

CHILDREN IN ALCOHOL-RELATED COLLISIONS

In 2010, 184 children were injured or killed (5 fatal, 23 incapacitating) in Indiana alcohol-related motor vehicle collisions. Rates of serious injury

among children involved in collisions are higher in collisions that involve alcohol (Figure 3). The rate of serious injury per 1,000 children involved in alcohol-related collisions was at a five-year high in 2010. Data show that children are 2.65 times more likely to be seriously injured in collisions when alcohol is involved (Table 5).

Figure 3. Children seriously injured in Indiana alcohol-related collisions, 2006-2010



Source: Indiana State Police

Notes:
 1) Serious injuries are defined as children suffering *fatal* or *incapacitating* injuries.
 2) A collision is identified as alcohol-related if any vehicle driver or non-motorist (pedestrian, bicycles) involved in the collision has a measurable blood-alcohol content (BAC) result or appears to have been drinking, if alcoholic beverages are listed as contributing or primary factors in the collision, or if an Operating While Intoxicated (OWI) citation is issued to a driver.

Table 5. Risk of serious injury to children involved in Indiana alcohol-related collisions, 2010

Age group	Alcohol-related?	Serious injuries	Non-serious injuries	Total	% Serious injury	Risk
Less than 1 year old	Yes	2	10	12	16.7%	2.91
	No	13	214	227	5.7%	
1 to 3 years old	Yes	3	17	20	15.0%	2.67
	No	29	487	516	5.6%	
4 to 7 years old	Yes	6	39	45	13.3%	2.31
	No	47	768	815	5.8%	
8 to 15 years old	Yes	17	90	107	15.9%	2.76
	No	151	2,469	2,620	5.8%	
Total	Yes	28	156	184	15.2%	2.65
	No	240	3,938	4,178	5.7%	

Source: Indiana State Police

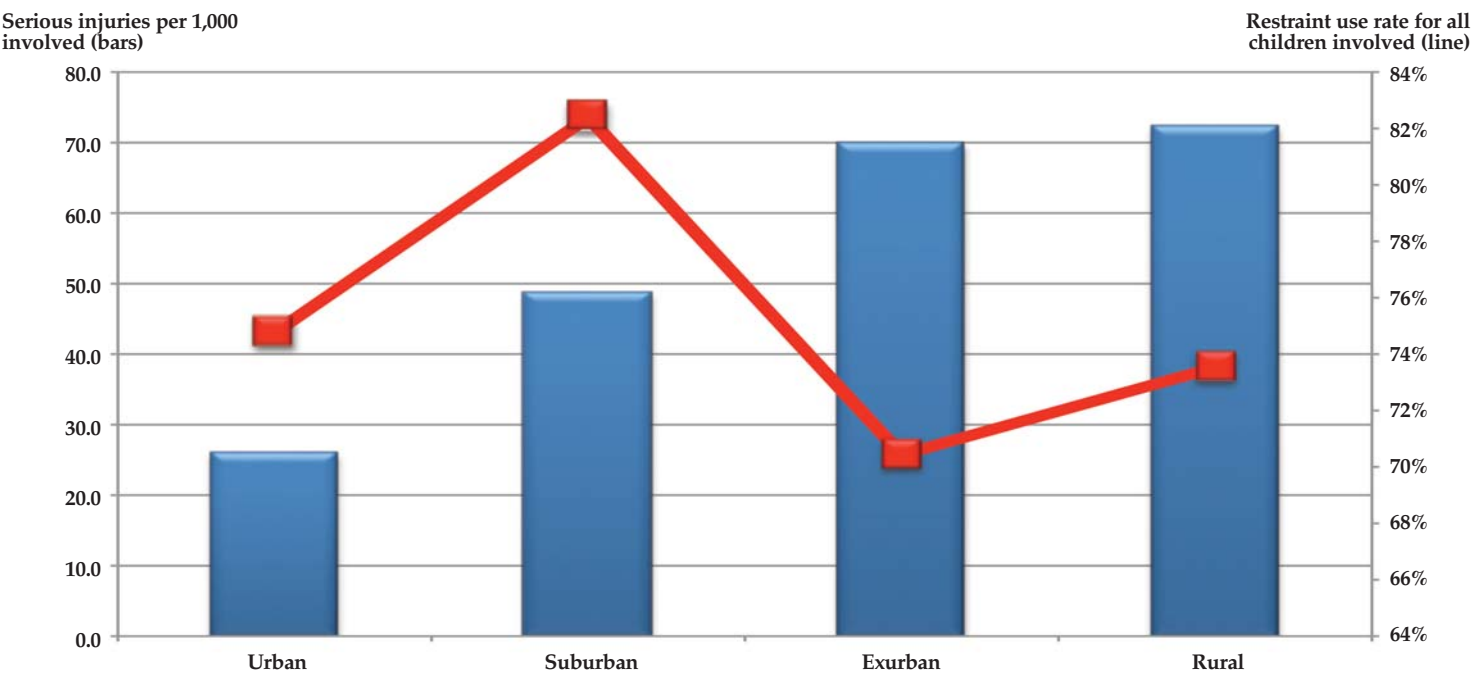
Notes:
 1) Includes children, ages 0 to 15 years old, identified as *drivers*, *injured occupants*, *pedestrians*, or *pedalcyclists*.
 2) Serious injuries include children suffering *fatal* or *incapacitating* injuries.

GEOGRAPHY OF INDIANA CHILD RESTRAINT USE AND TRAFFIC INJURIES

The serious injury rate per 1,000 children involved was lower in Indiana urban (25.8 per 1,000) and suburban (48.5) locales than in surrounding exurban (69.7) and rural (72.2) areas (Figure 4). Overall rates of child restraint use were highest in suburban (82.4 percent) locales and lowest in exurban (70.4 percent) areas.

The distribution of child traffic injuries by county further illustrates the increased incidence of injuries in children ages 8 to 15 years old. Injury rates were also higher in the *less than 1 year old* age group. Maps 1 to 4 illustrate the distribution of child traffic accident injuries and fatalities by county and age group for 2010. The mean traffic injury rate per 1,000 county residents in the *less than 1 year old* age group was 2.3 (Map 1), and the mean traffic injury rate in the 8- to 15-year-old age group was 3.3, a rate higher than that of all other child age groups (Map 4).

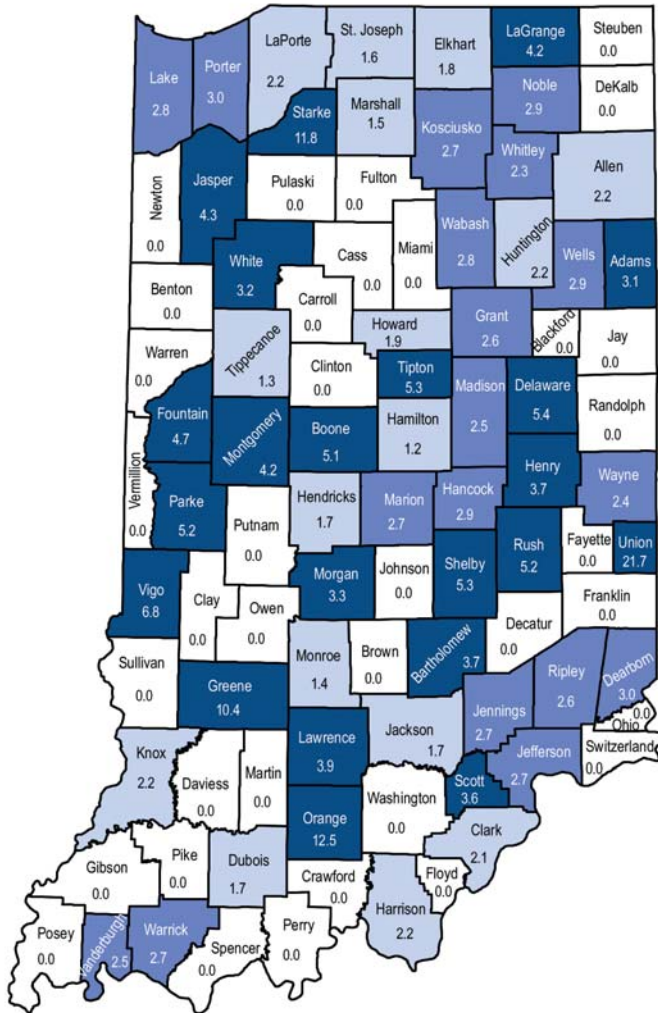
Figure 4. Children seriously injured in Indiana traffic collisions, by restraint use and locale, 2010



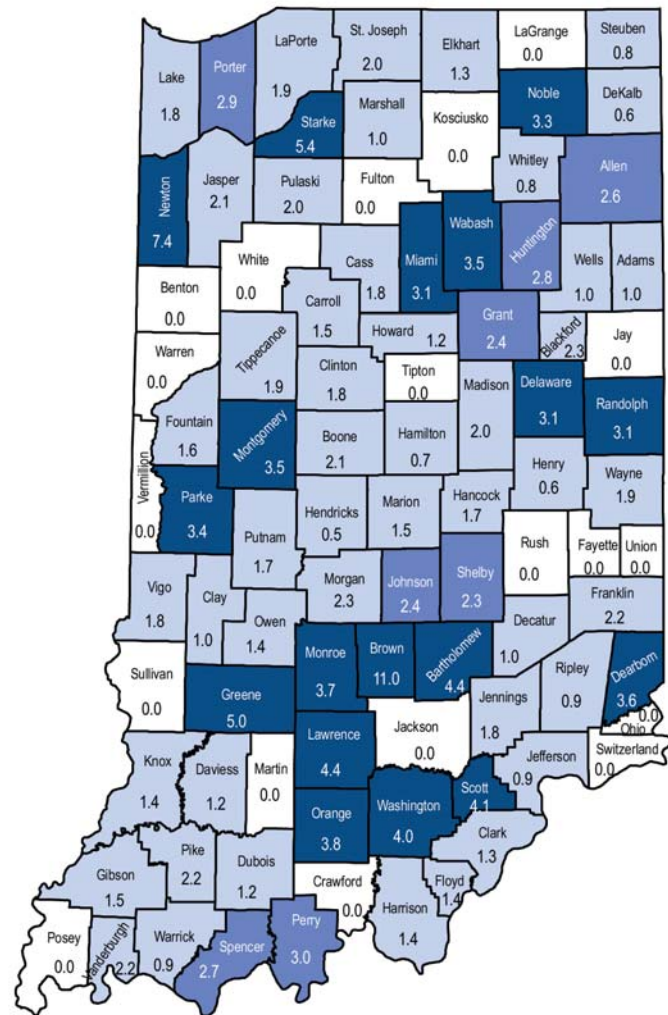
Source: Indiana State Police

Child injury/fatality rates in Indiana traffic collisions by county (2010)

Map 1: Less than 1 year old
Mean county injury/fatality rate = 2.3



Map 2: Ages 1 to 3 years old
Mean county injury/fatality rate = 1.8

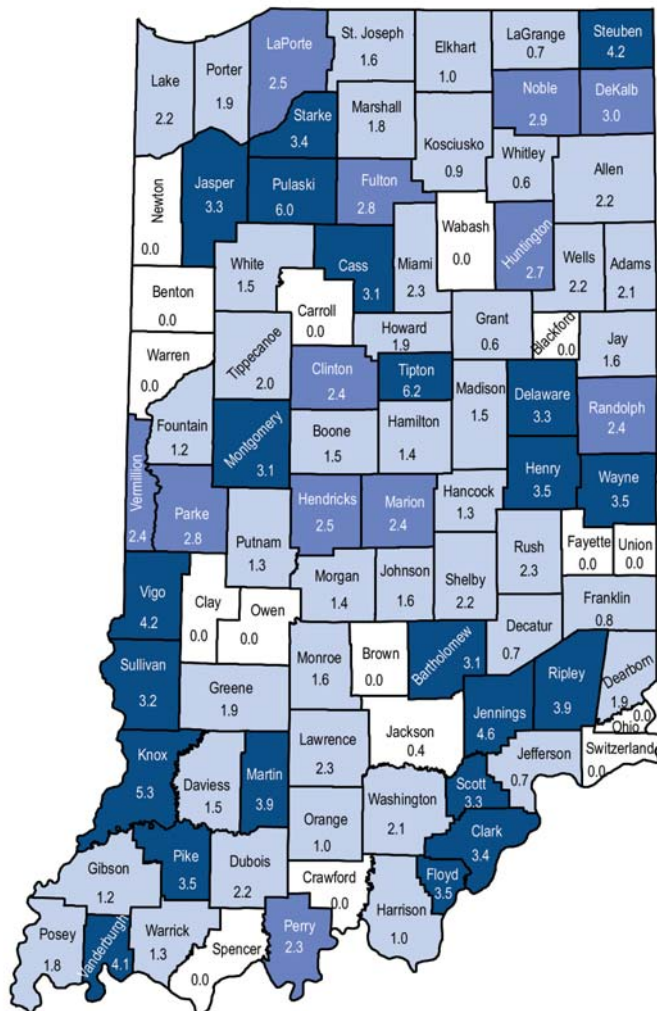


Sources:
Injuries - Indiana State Police, Population - U.S. Census Bureau

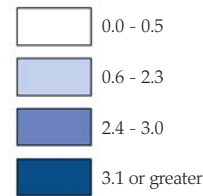
Notes:
1) Due to the lack of available address-level data on traffic collision victims, it is assumed that children injured in collisions live in the county in which they were injured.
2) Injuries depicted include only those reported as *fatal, incapacitating, non-incapacitating, and possible*.

Child injury/fatality rates in Indiana traffic collisions by county (2010)

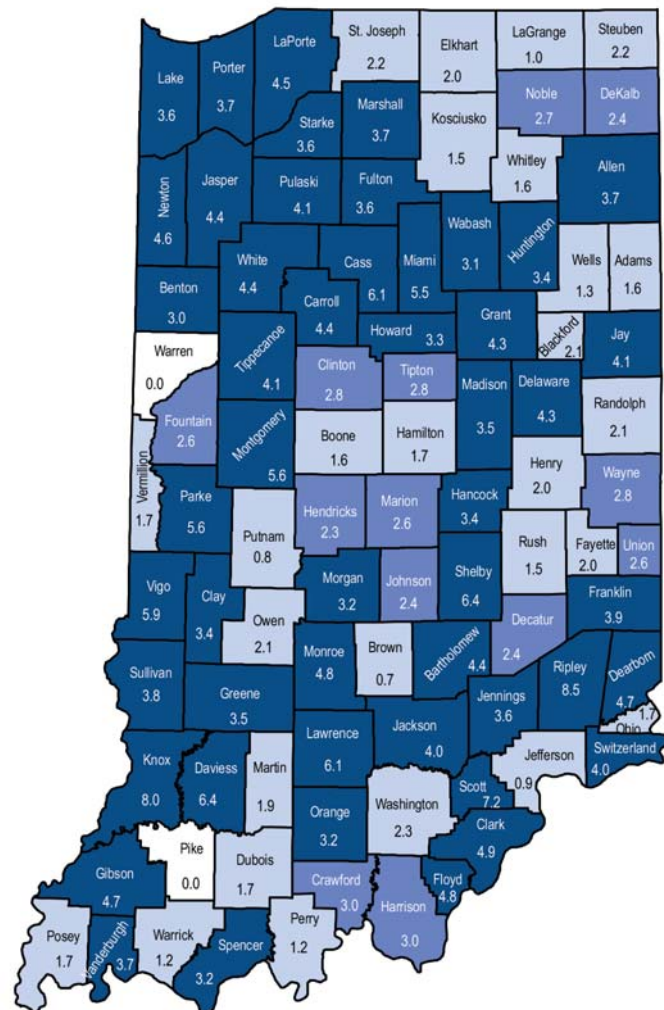
Map 3: Ages 4 to 7 years old
Mean county injury/fatality rate = 2.0



Injury/fatality rate per 1,000 population



Map 4: Ages 8 to 15 years old
Mean county injury/fatality rate = 3.3



Sources:
Injuries - Indiana State Police, Population - U.S. Census Bureau

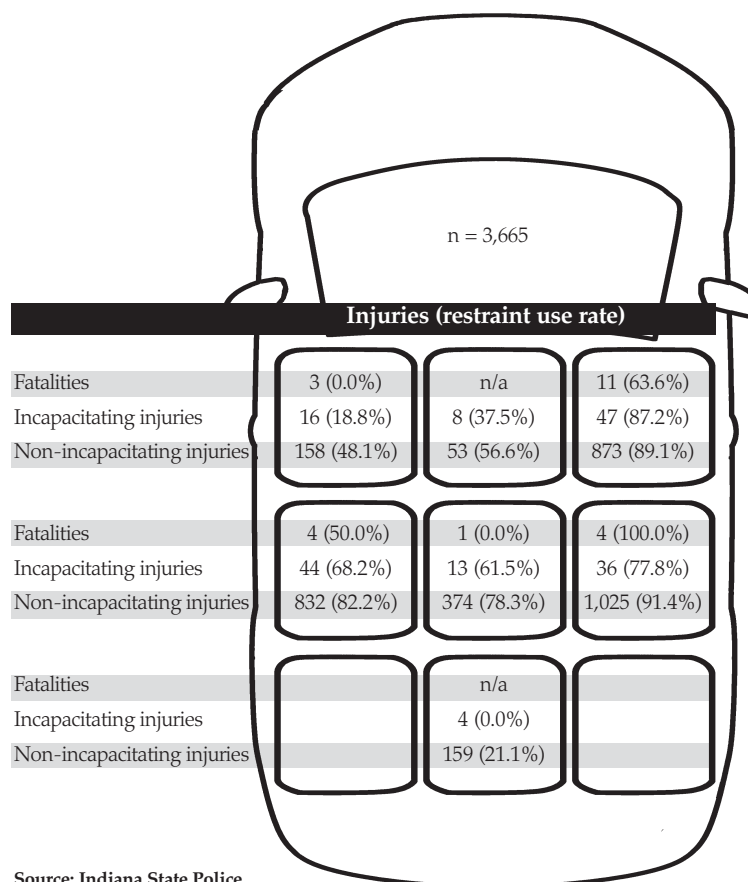
Notes:
1) Due to the lack of available address-level data on traffic collision victims, it is assumed that children injured in collisions live in the county in which they were injured.
2) Injuries depicted include only those reported as *fatal, incapacitating, non-incapacitating, and possible*.

CHILD RESTRAINT USE AND SEATING POSITION

Figure 5 shows the number and restraint usage rates for 2010 child injuries by injury type and vehicle seating position. The greatest number of child fatalities occurred in the *front-right* passenger seating position (11), among which 64 percent were properly restrained.

This risk of serious injury is greater for unrestrained child occupants across all seating positions, with the exception of the *far back/sleeper* position (Table 6). Child occupants seated in the *driver's* position who are unrestrained are 4.77 times more likely to suffer serious injuries than those wearing the proper restraints. Unrestrained child occupants seated in the *rear-right* position are 3.02 times more likely to suffer serious injuries than child occupants who are properly restrained.

Figure 5. Children in Indiana collisions by injury status, seating position, and restraint use, 2010



Source: Indiana State Police

Notes:

1) Limited to child injuries reported as *fatal*, *incapacitating*, *non-incapacitating*, and *possible* injuries where valid seating position was identified.

2) Percentages depicted are the percentage of individuals properly restrained by injury type in each seating position.

Table 6. Risk of serious injury to children involved in Indiana collisions, by seating position and restraint use, 2010

Seating position	Restrained?	Serious injuries	Non-serious injuries	Total	% Serious injury	Risk
Front left (driver)	No	13	66	79	16.5%	4.77
	Yes	3	84	87	3.4%	
Front center	No	4	21	25	16.0%	1.76
	Yes	3	30	33	9.1%	
Front right	No	6	56	62	9.7%	1.67
	Yes	48	779	827	5.8%	
Rear left	No	13	102	115	11.3%	2.55
	Yes	32	689	721	4.4%	
Rear center	No	5	70	75	6.7%	2.62
	Yes	8	306	314	2.5%	
Rear right	No	6	55	61	9.8%	3.02
	Yes	32	952	984	3.3%	
Far back/sleeper	No	3	15	18	16.7%	--
	Yes	-	142	142	0.0%	
Total	No	50	385	435	11.5%	2.84
	Yes	126	2,982	3,108	4.1%	

Source: Indiana State Police

Notes:

1) Limited to children where restraint use was known with valid seating position identified.

2) Serious injuries include those reported as *fatal* and *incapacitating*.

DEFINITIONS

Locale—*Urban* is defined as Census 2000 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* or *possible*.

Not injured status includes individuals involved in collisions reported as NULL values in the injury status code field.

Other injury status includes *not reported*, *unknown*, *refused* (treatment), and invalid injury status codes.

REFERENCES

National Center for Statistics and Analysis, National Highway Traffic Safety Administration, *Traffic Safety Facts: Children (2009 data)*, DOT HS 811 387.

Car Seat Recommendations for Children,

<http://www.nhtsa.gov/DOT/NHTSA/Traffic%20Injury%20Control/Articles/Associated%20Files/4StepsFlyer.pdf>, March 2011.

DATA SOURCES

Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 1, 2011

US Census Bureau, Annual Estimates of the Resident Population by Single-Year of Age and Sex for the United States: April 1, 2000 to July 1, 2009.

<http://www.census.gov/popest/states/asrh/>

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

This publication is one of a series of fact sheets that, along with the annual Indiana Crash Fact Book, form the analytical foundation of traffic safety program planning and design in the state of Indiana. Funding for these publications is provided by the ICJI and the National Highway Traffic Safety Administration.

An electronic copy of this document can be accessed via the CCJR website (www.ccjr.iupui.edu), the ICJI website (www.in.gov/cji/), or you may contact the Center for Criminal Justice Research at 317-261-3000.



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Traffic Safety Project

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.

Designing and implementing effective traffic safety policies requires data-driven analysis of traffic collisions. To help in the policy-making process, the Indiana University Center for Criminal Justice Research is collaborating with the Indiana Criminal Justice Institute to analyze 2010 vehicle crash data from the Automated Reporting Information Exchange System (ARIES), maintained by the Indiana State Police. This marks the fifth year of this partnership. Research findings will be summarized in a series of fact sheets on various aspects of traffic collisions, including alcohol-related crashes, light and large trucks, dangerous driving, children, motorcycles, occupant protection, and drivers. An additional publication will provide information on county and municipality data and the final publication will be the annual Indiana Crash Fact Book. 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. As of December 31, 2010, approximately 99 percent of all collisions are entered electronically through ARIES. Trends in collisions incidence as reported in these publications could 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. 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 Indiana University (IU) Public Policy Institute is a collaborative, multidisciplinary research institute within the Indiana University School of Public and Environmental Affairs (SPEA), Indianapolis. The Institute serves as an umbrella organization for research centers affiliated with SPEA, including the Center for Urban Policy and the Environment and the Center for Criminal Justice Research. The Institute also supports the Office of International Community Development and the Indiana Advisory Commission on Intergovernmental Relations (IACIR).

The Center for Criminal Justice Research

The Center for Criminal Justice Research, one of two applied research centers currently affiliated with the Indiana University Public Policy Institute, works with public safety agencies and social services organizations to provide impartial applied research on criminal justice and public safety issues. CCJR provides analysis, evaluation, and assistance to criminal justice agencies; and community information and education on public safety questions. CCJR research topics include traffic safety, crime prevention, criminal justice systems, drugs and alcohol, policing, violence and victimization, and youth.

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.

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