

INDIANA TRAFFIC SAFETY FACTS

May 2008

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 accidents. 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 2007 vehicle crash data from the Automated Reporting Information Exchange System (ARIES), formally the Vehicle Crash Reporting System (VCRS), maintained by the Indiana State Police. 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 police officers. As of January 1, 2008, approximately 95 percent of all collisions are entered electronically through the 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.



DRIVERS 2007

In 2007, 5.7 percent of all Indiana licensed drivers were involved in collisions. Of the 5,468,420 licensed drivers, young drivers (aged 16-20) comprised 5.7 percent, drivers aged 21 to 24 comprised 6.3 percent, and older drivers (aged 65 and older) 19.8 percent. Motor vehicle collisions are the leading cause of death for young people ages 0 to 34.¹ The number of older licensed drivers (age 65 and older) continues to increase, producing different issues for highway safety. This fact sheet analyzes driver involvement in collisions and the issues associated with the age of the driver, including experience, susceptibility of injury, and driver behavior. Collision data are derived from the Indiana State Police Automated Reporting Information Exchange System as of March 16, 2008.

Table 1: Drivers in injury collisions by collision severity and gender, 2003-2007

Severity of Collision	Female	Male	Unknown Gender*	Grand Total	Collision severity as % of Total
2003	32,942	38,832	1,072	72,846	
Fatal	359	871	5	1,235	1.7%
Incapacitating	2,143	3,213	70	5,426	7.4%
Non-Incapacitating	30,440	34,748	997	66,185	90.9%
2004	34,366	42,443	550	77,359	
Fatal	344	994	0	1,338	1.7%
Incapacitating	2,034	3,371	37	5,442	7.0%
Non-Incapacitating	31,988	38,078	513	70,579	91.2%
2005	32,751	40,383	403	73,537	
Fatal	335	964	6	1,305	1.8%
Incapacitating	1,928	3,105	23	5,056	6.9%
Non-Incapacitating	30,488	36,314	374	67,176	91.3%
2006	30,735	36,948	318	68,001	
Fatal	350	888	2	1,240	1.8%
Incapacitating	1,865	3,157	26	5,048	7.4%
Non-Incapacitating	28,520	32,903	290	61,713	90.8%
2007	29,206	35,442	86	64,734	
Fatal	291	943	0	1,234	1.9%
Incapacitating	1,752	3,029	6	4,787	7.4%
Non-Incapacitating	27,163	31,470	80	58,713	90.7%

Source: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2008

Notes: *includes 'Unknown' gender category, blank and multiple codes. Non-incapacitating includes 'non-incapacitating' and 'possible' injuries.

¹Center for Disease Control, National Center for Health Statistics, National Vital Statistics System (2005).

Involvement in Crashes

Of the 311,334 drivers involved in collisions in Indiana in 2007, 64,734 were involved in injury collisions (1.2 percent of all licensed drivers). Table 1 shows the number of drivers involved in injury collisions from 2003 to 2007. The overall number of drivers involved in injury collisions decreased 11 percent from 2003 to 2007. However, while the number of drivers involved in fatal collisions declined, the drivers involved in fatal collisions as a percent of the total drivers involved in injury collisions increased slightly from 1.7 to 1.9 percent. The number of male drivers involved in fatal collisions increased six percent from 2006 to 2007, after an eight percent decrease from 2005 to 2006. Female drivers involved in fatal collisions decreased from 2006 to 2007. Overall from 2003 to 2007, there was an average annual decrease in collisions of nearly 3 percent (not shown).

The age of the driver plays an important role in crashes. As shown in Table 2, sixteen year olds have the highest rate of crashes involving injuries (8.4 percent of all 16-year old licensed drivers), with a continuing decrease in the rate as drivers age. Drivers aged 25 and older have rates that are lower than the overall rate (1.2 percent); involvement of drivers 55 and older drops to less than one percent.

The majority of collisions occur on urban roads; however, fatal collisions tend to occur more on rural roads. Table 3 shows that for every age group, the number of drivers involved in fatal collisions

on rural roads exceeded those on urban roads. Young drivers ages 16 and 17 were also more involved in incapacitating injury collisions on rural roads than on urban roads. Sixteen year old drivers were involved in rural road collisions 38 percent of the time, while drivers, aged 65 and older, were involved in rural collisions 25 percent of the time. The speed limit is generally higher on rural roads than urban roads so people are traveling faster when a crash occurs. The faster the vehicle is travelling when it hits something (another vehicle, tree, etc.), generally the more severe the injury.

When involved in a fatal collision, older drivers are killed twice as often as young drivers. In 2007, 67 percent of the 65 and older drivers who were involved in fatal collisions were killed, compared to 31 percent of 16 year olds and 30 percent of 17 year olds. Research shows that older drivers are more susceptible to injury in a crash. Their skeletal structures are more easily damaged, and the consequences of the assault on the body during a crash are likely to be more serious compared to young drivers.²

Table 3 also shows a possible correlation between driver age and the incidence of single (versus multiple) vehicle collisions. Young drivers were involved in single vehicle crashes almost twice as often as older drivers (25 percent and 13 percent, respectively), and there was a gradual decline of the percentage of single vehicle crashes from the youngest drivers to the older drivers.

Table 2: Indiana drivers involved in injury collisions by age, 2007

Age of Driver	Severity of Collision			Total Drivers	Licensed Drivers	% of Licensed Drivers
	Fatal	Incapacitating	Non-Incapacitating			
15	0	14	124	138	NA	NA
16	16	95	1,756	1,867	22,137	8.4%
17	33	165	2,311	2,509	56,856	4.4%
18 to 20	102	455	6,399	6,956	234,175	3.0%
21 to 24	105	522	6,449	7,076	344,853	2.1%
25 to 54	679	2,637	30,671	33,987	2,956,874	1.1%
55 to 64	146	480	5,775	6,401	772,487	0.8%
65 and over	148	388	4,975	5,511	1,081,038	0.5%
TOTAL	1,229	4,756	58,460	64,445	5,468,420	1.2%

Sources: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2008
Indiana Bureau of Motor Vehicles, as of January 23, 2008

Notes: Includes only drivers with a valid age and units (excludes bicycles and pedestrians).
Includes unit type=blank, unknown or multiple codes
Non-incapacitating includes 'non-incapacitating' and 'possible' injuries.
NA = not applicable

²Li, G., Braver, E.R., & Chen, L. (2003). Fragility versus Excessive Crash Involvement as Determinants of High Death Rates per Vehicle-Mile of Travel among Older Drivers. *Accident Analysis & Prevention*, 35, 2007.

Table 3: Drivers in Indiana collisions by age and collision type, 2007

Drivers in:	Age of Driver								TOTAL
	15	16	17	18 to 20	21 to 24	25 to 54	55 to 65	65 and over	
All collisions*	508	8,633	11,687	32,179	33,453	166,236	32,376	26,262	311,334
Fatal collisions	0	16	33	102	105	679	146	148	1,229
drivers killed	0	5	10	53	49	327	77	99	620
drivers surviving	0	11	23	49	56	352	69	49	609
% drivers killed	na	31.3%	30.3%	52.0%	46.7%	48.2%	52.7%	66.9%	50.4%
Rural**	139	3,321	4,106	10,311	10,064	52,220	10,080	6,620	96,861
fatal	0	13	23	76	61	477	101	106	857
incapacitating	3	64	92	227	215	1,169	225	150	2,145
non-incapacitating	37	742	912	2,156	1,984	8,984	1,680	1,321	17,816
property damage only	99	2,502	3,079	7,852	7,804	41,590	8,074	5,043	76,043
Urban**	369	5,307	7,572	21,837	23,346	113,821	22,271	19,619	214,142
fatal	0	3	10	26	44	202	45	42	372
incapacitating	11	31	73	228	306	1,467	255	238	2,609
non-incapacitating	87	1,012	1,397	4,236	4,460	21,654	4,089	3,650	40,585
property damage only	271	4,261	6,092	17,347	18,536	90,498	17,882	15,689	170,576
% rural collisions	27.4%	38.5%	35.2%	32.1%	30.1%	31.5%	31.2%	25.2%	31.1%
Single Vehicle**	139	2,179	2,558	7,250	7,366	33,092	5,764	3,349	61,697
fatal	0	4	18	43	51	231	47	27	421
incapacitating	4	40	74	174	177	766	126	91	1,452
non-incapacitating	44	553	646	1,701	1,509	5,497	877	679	11,506
property damage only	91	1,582	1,820	5,332	5,629	26,598	4,714	2,552	48,318
Multiple Vehicle**	369	6,454	9,129	24,929	26,087	133,144	26,612	22,913	249,637
fatal	0	12	15	59	54	448	99	121	808
incapacitating	10	55	91	281	345	1,871	354	297	3,304
non-incapacitating	80	1,203	1,665	4,698	4,940	25,174	4,898	4,296	46,954
property damage only	279	5,184	7,358	19,891	20,748	105,651	21,261	18,199	198,571
% single vehicle collisions	27.4%	25.2%	21.9%	22.5%	22.0%	19.9%	17.8%	12.8%	19.8%

Source: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2008

Notes: *includes property damage only crashes

Includes only drivers with a valid age and unit (excludes bicycles and pedestrians).

**known values only

Includes unit type=blank, unknown or multiple codes

Non-incapacitating includes 'non-incapacitating' and 'possible' injuries.

Property damage only collisions are defined as a collision with no fatalities or injuries.

Driver Behavior and Risk Factors

Motor vehicle crashes and their associated injuries and fatalities are often associated with potentially risky or unsafe driving behaviors. Driver distraction is a prominent topic on traffic safety agendas. With the increase in use of cellular phones, wireless Internet capabilities, vehicle navigation systems and other technologies, drivers have more ways to be distracted.

The *Indiana Officers Standard Crash Report* requires investigating officers to indicate the 'primary factor' of a collision, which includes 48 possible factors classified as contributing circumstances attached to the driver, the vehicle, or the environment. Table 4 shows the top ten primary factors for all collisions and counts of drivers where the investigating officer indicated that particular driver exhibited behavior of the listed primary factor. In non-fatal injury collisions 'Failure to Yield Right of Way' was the most frequent primary factor (blue highlight) for every age

group and 'Following too Closely' was the second primary factor (gray highlight) in every age group except one. The data also show that these two factors play an increasing role in non-fatal injury collisions the older the driver.

While 'Failure to Yield Right of Way' was a primary factor in fatal crashes some of the time, other factors were found to be contributing to fatal crashes. Driving 'Left of Center' was one of the top two primary factors for the three highest age groups as well as for the 18 to 20 year olds. 'Running off the road right' and 'Unsafe speed' were top factors for the younger drivers. Half of the 16 year old drivers in fatal collisions had a collision primary factor of 'Failure to Yield Right of Way.' 'Following Too Closely', second most frequent in the non-fatal injury collisions, was not one of the top two factors for any age group in fatal collisions.

Data regarding the primary factors of collisions support research findings on the effects and perceptions of driver behavior in rela-

³Simons-Morton, B., Lerner, N., & Singer, J. (2005). The observed effects of teenage passengers on the risky driving behavior of teenage drivers. *Accident Analysis and Prevention*, 37, 973-982.; Children's Hospital of Philadelphia. (2007). Driving: Through the eyes of teens. Philadelphia, PA. retrieved April 16, 2008 from http://stokes.chop.edu/programs/injury/files/PCPS_Reports/1289teen.pdf; Stutts, J., Feaganes, J., Reinfurt, D., Rodgman, E., Hamlett, C., Gish, K., Staplin, L. (2005). Driver's exposure to distractions in their natural driving environment. *Accident Analysis and Prevention* 37, 1093-1101.

Table 4: Number of drivers associated with the top ten primary factors of collisions where the investigating officer indicated that particular driver exhibited the behavior of the listed primary factor, 2007

		Drivers in fatal collisions							Drivers in non-fatal injury collisions							
Top ten primary factors for all drivers*	Total all drivers*	16	17	18 to 20	21 to 24	25 to 54	55 to 64	65 & over	15	16	17	18 to 20	21 to 24	25 to 54	55 to 64	65 & over
Failure to Yield Right of Way	16,400	8	5	12	9	99	18	40	39	476	654	1,648	1,744	8,150	1,630	1,796
Following Too Closely	10,653	1	0	0	2	10	5	5	14	257	382	1,051	1,136	5,791	1,177	792
Other (explained in narrative)-driver	5,619	1	2	8	10	57	19	18	16	150	200	507	518	2,945	599	531
Disregard Signal/Reg Sign	5,565	1	2	8	2	54	10	15	9	81	140	506	568	2,938	567	645
Ran Off Road Right	3,179	2	3	15	19	97	26	12	14	166	180	473	373	1,417	200	162
Driver Distracted (explained in narrative)	2,907	0	0	1	1	8	4	2	5	93	138	335	277	1,505	294	228
Unsafe Speed	2,428	2	8	13	16	57	6	3	10	129	139	335	285	1,146	172	91
Speed Too Fast for Weather Condition	2,264	0	2	4	5	18	6	2	2	96	105	309	266	1,185	175	83
Left of Center	1,798	1	4	16	11	108	22	27	4	41	52	185	170	880	150	117
Alcoholic Beverages	1,727	0	1	5	8	33	2	1	1	12	25	139	287	1,071	99	40
TOTAL	52,540	16	27	82	83	541	118	125	114	1,501	2,015	5,488	5,624	27,028	5,063	4,485
Number Drivers in Total Fatal/Non-Fatal Injury Collisions*	63,740	16	33	101	104	675	145	148	138	1,832	2,450	6,790	6,891	32,917	6,183	5,317
% of Total Drivers for Listed Primary Factors	82.4%	100.0%	81.8%	81.2%	79.8%	80.1%	81.4%	84.5%	82.6%	81.9%	82.2%	80.8%	81.6%	82.1%	81.9%	84.4%
% of Total Drivers for top two primary factors	42.4%	75.0%	39.4%	30.7%	33.7%	30.7%	33.1%	45.3%	39.9%	40.0%	42.3%	39.7%	41.8%	42.4%	45.4%	48.7%

Source: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 200

Notes: *where a primary factor was listed and the driver was associated with the vehicle that the investigating officer indicated the driver exhibited the behavior of the listed primary factor

Includes only drivers with valid age and unit (excludes bicycles and pedestrians)

Excludes drivers of vehicles where driver was not designated 'at fault'

Blue denotes primary factor with the highest number for that age group

Gray denotes primary factor with the second highest number for that age group

tion to driver age.³ Almost 80 percent of all collisions for all age groups in 2007 in Indiana can be associated with some aspect of driver behavior. As shown in Figure 1, errant and risky driving⁴ is prominent both in day and night collisions for all age groups. However, the older the driver the less likely the collision will occur at night. Sixty-three percent of drivers 65 and older had errant/risky driving as the primary factor in their daytime crashes and just over nine percent for their night time crashes.

Younger drivers tend not to drive impaired⁵ during the day; the percentage of daytime impaired driving collisions increases with

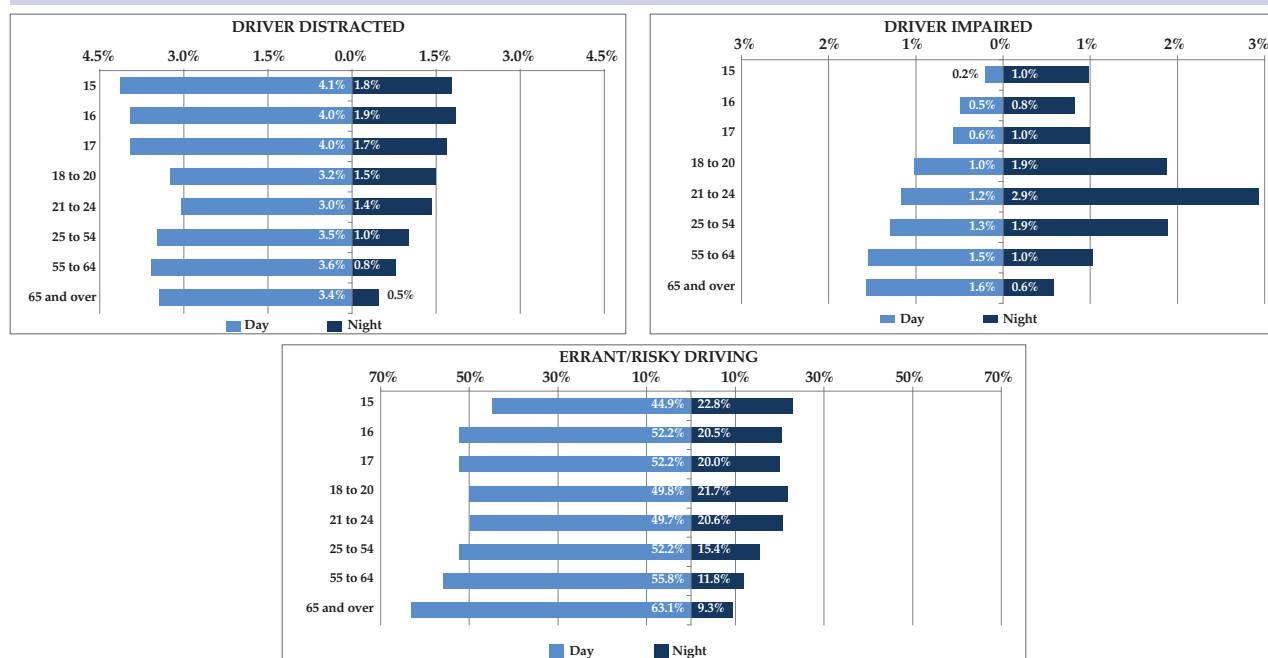
age. In 2007, less than one percent of young drivers were involved in crashes during the day where the primary factor was driver impairment (see Figure 1). Driving impaired at night shows different trends. The largest percentage (approximately 3 percent) of drivers involved in crashes at night where the driver was impaired involved drivers aged 21 to 24. The percent decreases the older and younger the driver. Driving distracted⁶ during the day was fairly evenly distributed through all age groups. However, younger drivers exhibited the highest proportion of driving distracted as primary factors for nighttime crashes.

⁴Errant/risky driving is defined as having at least one of the following contributing circumstances marked on the crash report – Disregard Signal or Sign, Failure to Yield Right of Way, Following Too Closely, Improper Lane Usage, Improper Passing, Improper Turning, Jackknifing, Left of Center, Overcorrecting/Oversteering, Ran Off Road Left, Ran Off Road Right, Speed too Fast for Weather Conditions, Unsafe Backing, Unsafe Speed, Wrong Way on One Way.

⁵Driving Impaired is defined as having at least one of the following contributing circumstances marked on the crash report – Alcoholic Beverages, Driver Asleep or Fatigued, Driver Illness, Illegal Drugs, Prescription Drugs.

⁶Driver Distracted is defined as having at least one of the following contributing circumstances marked on the crash report – Cell Phone Usage, Driver Distracted (explained in narrative), Other Telematics in Use, Passenger Distraction.

Figure 1: Percent of total drivers for day and nighttime collisions by primary driver factor and age group, 2007



Source: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2008

Note: Includes only those with valid age, unit, and time of day
Excludes primary factors not associated with the driver

Research indicates that passengers and the distractions they may cause, and in particular peers of young drivers, can have an influence on driving behavior.⁷ In Indiana in 2007, the percentage of younger drivers involved in collisions with at least one passenger in the vehicle is higher than that of older drivers (Table 5). Six-

teen and 17 year old drivers more frequently had at least one passenger in the vehicle when they were involved in crashes than 55 to 64 year old drivers. This difference holds true for single and multiple vehicle collisions as well as for drivers in fatal collisions. Female drivers aged 16 to 54 were more likely to have at

Table 5: Drivers in Indiana collisions by passenger presence and age, 2007

Drivers in:	15	16	17	18 to 20	21 to 24	25 to 54	55 to 64	65 and over
All collisions*	504	8,618	11,657	32,104	33,372	165,879	32,302	26,156
with passengers	366	3,117	4,348	10,726	9,731	46,795	7,463	7,108
% with passengers	72.6%	36.2%	37.3%	33.4%	29.2%	28.2%	23.1%	27.2%
Male	296	4,519	6,178	17,929	18,418	95,214	18,914	15,114
with passengers	189	1,569	2,242	6,003	5,118	23,379	4,402	4,740
% with passengers	63.9%	34.7%	36.3%	33.5%	27.8%	24.6%	23.3%	31.4%
Female	207	4,088	5,464	14,141	14,928	70,501	13,350	10,961
with passengers	176	1,546	2,096	4,712	4,607	23,376	3,053	2,351
% with passengers	85.0%	37.8%	38.4%	33.3%	30.9%	33.2%	22.9%	21.4%
Fatal collisions	0	16	33	102	104	679	145	148
with passengers	0	9	21	42	32	190	39	44
% with passengers	na	56.3%	63.6%	41.2%	30.8%	28.0%	26.9%	29.7%
Single vehicle	136	2,175	2,551	7,233	7,331	32,987	5,750	3,316
with passengers	94	766	868	2,237	2,029	8,412	1,369	946
% with passengers	69.1%	35.2%	34.0%	30.9%	27.7%	25.5%	23.8%	28.5%
Multiple vehicle	368	6,443	9,106	24,871	26,041	132,892	26,552	22,840
with passengers	272	2,351	3,480	8,489	7,702	38,383	6,094	6,162
% with passengers	73.9%	36.5%	38.2%	34.1%	29.6%	28.9%	23.0%	27.0%

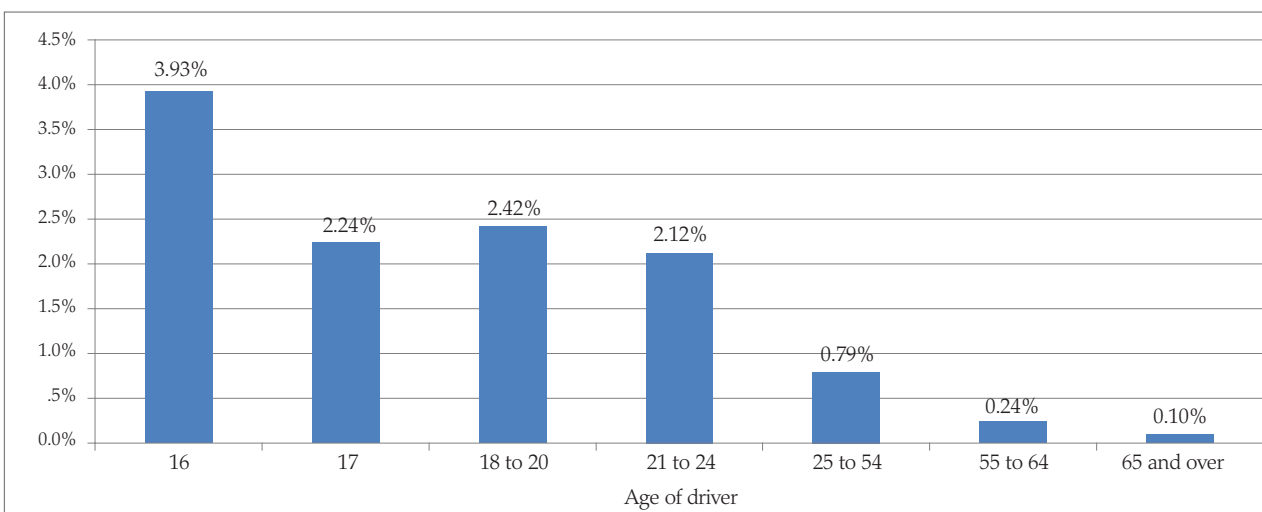
Source: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2008

Notes: Includes only drivers where passenger and gender information known and valid age

*All collisions includes drivers with unknown/invalid gender

⁷Engstrom, I., Gregersen, N.P., Granstrom, K., Nyberg, A. (2008). Young drivers—Reduced crash risk with passengers in the vehicle. *Accident Analysis and Prevention* 40, 341-348.

Figure 2: Percent of licensed drivers involved in collisions in Indiana receiving citations by age group, 2007



Source: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2008
Indiana Bureau of Motor Vehicles, as of January 23, 2008

least one passenger with them than male drivers of the same ages. Further, 31 percent of male drivers aged 65 and over, compared to 21 percent of female drivers of the same age, were more apt to have at least one passenger when involved in a collision.

Nearly 42,000 citations were issued to drivers involved in collisions in Indiana in 2007. As a percentage of licensed drivers within an age group, 16 year old drivers received citations approximately 40 times more often than drivers aged 65 and

older (Figure 2). Drivers aged 18 to 64 received a citation for 'operating a vehicle without proof of financial responsibility' more often than any other type of citation (Table 6). Younger drivers (15 to 17) most often received citations for driving without a license. Drivers aged 65 and older received citations most often for 'failure to yield right of way'. As shown in Figure 2, citation percentages for licensed drivers decrease dramatically after age 24. This coincides with research stating the importance of experience in driving.⁸

Table 6: Most common citations issued to Indiana drivers involved in all collisions by age, 2007

Indiana Code	Description	Number citations issued to drivers aged:							
		15	16	17	18 to 20	21 to 24	25 to 54	55 to 64	65 and over
9-25-8-2	Operating vehicle without proof of financial responsibility	1	56	105	655	830	2,314	162	65
9-24-19-1	Operating vehicle while suspended or revoked	0	7	40	387	673	1,717	71	22
9-30-5-2	Operating vehicle while intoxicated	2	14	32	257	529	1,858	146	39
9-26-1-2	Accident responsibility violation	14	46	63	295	382	1,151	48	37
9-24-18-1	Driving without a license	76	92	122	398	396	845	20	5
9-21-8-31	Failure to yield right of way	1	84	89	206	168	619	122	148
9-21-5-1	Speed limit violation	3	87	91	252	178	666	59	32
9-21-3-7	Traffic control signal violation	2	9	27	91	107	346	55	80
	Total all citations for age group**	214	869	1,271	5,668	7,305	23,473	1,856	1,080

Source: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2008

Notes: Blue highlight indicates the highest number of citations for the age group

**Includes citations not listed

More than one citation may have been issued to a driver

Includes only drivers with valid age and unit

⁸Levy, D. (1990). Youth and Traffic Safety: The effects of driving age, experience, and education. *Accident Analysis and Prevention* 22.4, 327-334.; Eby, D. (1995). An analysis of crash likelihood: Age versus driving experience. University of Michigan Transportation Research Institute technical report. Accessed October 3, 2007 via <http://www.umtri.umich.edu/news.php>.

Table 7: Restraint use among drivers involved in injury collisions in Indiana, 2007

Drivers in:	Age of Driver								TOTAL
	15	16	17	18 to 20	21 to 24	25 to 54	55 to 65	65 and over	
All injury collisions									
Total Drivers	138	1,867	2,509	6,956	7,076	33,987	6,401	5,511	64,445
% Restrained	63.0%	88.4%	86.7%	84.9%	84.3%	84.8%	88.5%	89.9%	85.7%
Driver killed	0	5	10	53	49	327	77	99	620
% Restrained	na	20.0%	70.0%	32.1%	26.5%	29.1%	42.9%	54.5%	35.5%
Time of Day*									
Day (6am to 5:59pm)	84	1,249	1,660	4,482	4,572	24,461	5,081	4,712	46,301
% Restrained	53.6%	88.6%	88.3%	86.3%	87.6%	87.0%	88.2%	89.7%	87.4%
Night (6pm to 5:59am)	54	615	846	2,470	2,501	9,506	1,317	795	18,104
% Restrained	59.3%	85.5%	82.9%	80.4%	75.4%	75.0%	82.8%	85.3%	77.5%
Passenger presence**									
With Passengers	80	814	1,057	2,613	2,397	10,910	1,664	1,596	21,131
% Restrained	73.8%	87.6%	86.4%	86.5%	85.9%	87.8%	88.7%	92.7%	87.7%
Without passengers	58	1,051	1,447	4,334	4,672	23,036	4,728	3,908	43,234
% Restrained	31.0%	87.6%	86.6%	82.9%	82.0%	81.7%	86.5%	87.6%	83.2%
Driver Alcohol Use***									
Had been drinking	2	22	50	332	683	2,373	181	55	3,698
% Restrained	50.0%	68.2%	54.0%	55.1%	54.2%	48.8%	54.7%	61.8%	51.0%
Had not been drinking	136	1,845	2,459	6,624	6,393	31,614	6,220	5,456	60,747
% Restrained	63.2%	88.7%	87.4%	86.4%	87.5%	87.5%	89.5%	90.2%	87.8%

Source: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2008

Notes: Counts are where restraint use known, valid age, valid unit

*Includes valid times only

**Where known

***Defined as when any one of the following conditions are met: (1) 'alcoholic beverages' was listed as a driver contributing circumstance; (2) driver had a positive blood alcohol content (BAC) test result, (3) as a measure of apparent physical condition, the officer determined that the driver had been drinking, or (4) an Operating While Intoxicated (OWI) citation was issued to the driver.

Restraint Use

There were 64,445 drivers aged 15 and over involved in injury collisions in 2007.⁹ Of those, 86 percent were using safety equipment. Comparatively, of the 620 drivers who were killed, only 35 percent were restrained (Table 7). For the drivers who were killed, the proportion of drivers restrained varied among age groups. While only 20 percent of 16 year old drivers killed were restrained, 70 percent of 17 year olds killed were restrained. Older drivers killed were more likely to have been wearing safety belts. Although there does not appear to be much difference in safety belt usage between age groups for day time drivers of injury collisions, night time drivers involved in injury collisions were less likely to be wearing safety belts than day time drivers, among all age groups.

Indiana drivers were more likely to wear safety belts if they had at least one passenger in the vehicle, with little variation among

age groups of drivers. Alcohol adversely affects the driver's decision to wear a safety belt. If the driver had been drinking,¹⁰ the use of the safety belt was 20 to 30 percentage points lower than if the driver had not been drinking.

Alcohol Use

There were 176,982 male and 133,893 female drivers involved in all collisions in Indiana in 2007 (Table 8). Of those, 4.3 percent of the males and 1.6 percent of the females had been drinking. Male drivers were four times as likely to have been drinking when involved in a collision as females. This holds true for injury only collisions as well. For both male and female drivers in all collisions, the 21 to 24 year old age group had the highest percentage of drivers drinking, which is also true for male drivers for injury collisions (14.6 percent), fatal collisions (46.5 percent), and collisions where the driver was killed (50

⁹This number differs from that of Table 1 due to use of valid ages – Table 7 excludes invalid ages.

¹⁰Defined as when any one of the following conditions are met: (1) 'alcoholic beverages' was listed as a driver contributing circumstance; (2) driver had a positive blood alcohol content (BAC) test result, (3) as a measure of apparent physical condition, the officer determined that the driver had been drinking, or (4) an Operating While Intoxicated (OWI) citation was issued to the driver.

Table 8: Drivers and alcohol use by age, gender and collision types, 2007

Drivers in:	Age of Driver								TOTAL
	15	16	17	18 to 20	21 to 24	25 to 54	55 to 65	65 and over	
All collisions	507	8,622	11,669	32,141	33,424	166,056	32,337	26,119	310,875
Male	299	4,525	6,193	17,973	18,469	95,427	18,954	15,142	176,982
% males drinking*	1.7%	0.9%	1.6%	3.8%	8.1%	5.0%	2.2%	1.1%	4.3%
% of males drinking with BAC >= .08 g/dL	40.0%	34.1%	34.3%	39.4%	40.8%	40.2%	46.2%	38.2%	40.4%
Female	208	4,097	5,476	14,168	14,955	70,629	13,383	10,977	133,893
% females drinking	0.5%	0.3%	0.6%	1.2%	2.4%	2.0%	0.6%	0.2%	1.6%
% of females drinking with BAC >= .08 g/dL	0.0%	50.0%	48.6%	48.5%	50.5%	41.4%	38.2%	38.5%	43.6%
All injury collisions	138	1,867	2,509	6,951	7,072	33,960	6,394	5,497	64,388
Male	77	932	1,303	3,789	3,803	18,782	3,492	3,108	35,286
% males drinking	1.3%	1.6%	2.8%	6.9%	14.6%	9.9%	4.6%	1.4%	8.3%
% of males drinking with BAC >= .08 g/dL	0.0%	33.3%	22.2%	30.5%	35.4%	34.6%	40.3%	42.2%	34.6%
Female	61	935	1,206	3,162	3,269	15,178	2,902	2,389	29,102
% females drinking	1.6%	0.7%	1.2%	2.2%	3.9%	3.4%	0.8%	0.4%	2.6%
% of females drinking with BAC >= .08 g/dL	0.0%	28.6%	42.9%	42.0%	44.2%	38.1%	27.3%	40.0%	39.1%
All fatal collisions	0	16	33	102	105	679	146	148	1,229
Male	0	11	22	80	71	530	115	110	939
% males drinking	na	0.0%	22.7%	20.0%	46.5%	24.3%	11.3%	4.5%	21.4%
% of males drinking with BAC >= .08 g/dL	na	na	20.0%	75.0%	78.8%	78.3%	61.5%	60.0%	75.1%
Female	0	5	11	22	34	149	31	38	290
% females drinking	na	0.0%	9.1%	27.3%	20.6%	8.7%	0.0%	2.6%	9.7%
% of females drinking with BAC >= .08 g/dL	na	na	0.0%	66.7%	57.1%	61.5%	na	100.0%	60.7%
Drivers killed	0	5	10	53	49	327	77	99	620
Male	0	5	7	42	36	267	63	75	495
% males drinking	na	0.0%	28.6%	33.3%	50.0%	37.5%	19.0%	4.0%	30.1%
% of males drinking with BAC >= .08 g/dL	na	na	0.0%	78.6%	88.9%	85.0%	58.3%	100.0%	81.9%
Female	0	0	3	11	13	60	14	24	125
% females drinking	na	na	0.0%	36.4%	46.2%	13.3%	0.0%	4.2%	15.2%
% of females drinking with BAC >= .08 g/dL	na	na	na	75.0%	50.0%	75.0%	na	100.0%	68.4%

Source: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2008

Notes: Counts are where gender is known.

*Defined as when any one of the following conditions are met: (1) 'alcoholic beverages' was listed as a driver contributing circumstance; (2) driver had a positive blood alcohol content (BAC) test result, (3) as a measure of apparent physical condition, the officer determined that the driver had been drinking, or (4) an Operating While Intoxicated (OWI) citation was issued to the driver.

NA = not applicable

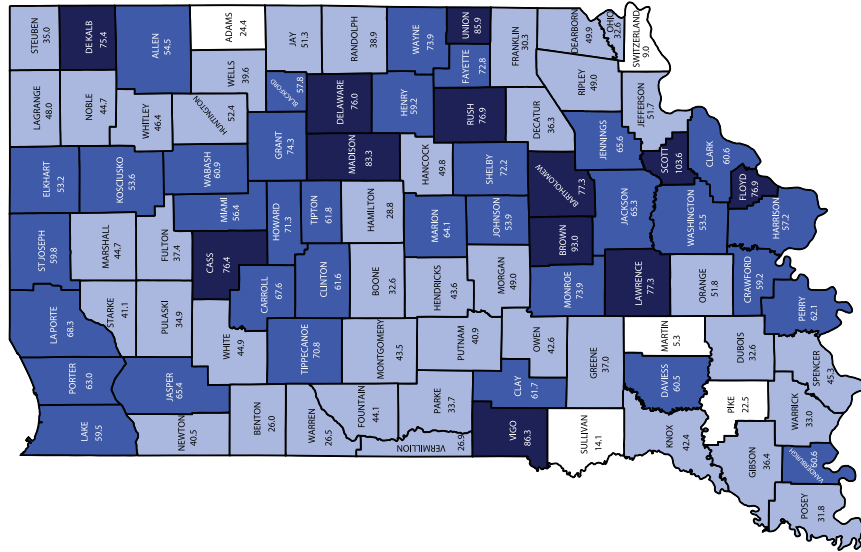
percent). For the most part, the proportion of drivers drinking increased with the severity of the collision. There were no 15 and 16 year old drivers drinking in fatal collisions or collisions where the driver was killed.

In collisions where the driver was killed, all of the 65 and older drivers, male and female, who had been drinking were intoxicated (had a blood alcohol content equal to or greater than 0.08 grams per deciliter, g/dL). Over half the drivers aged 18 and older who had been drinking in fatal collisions and collisions where the driver was killed were intoxicated. Drivers under the age of 18 were less likely to be drinking and intoxicated.

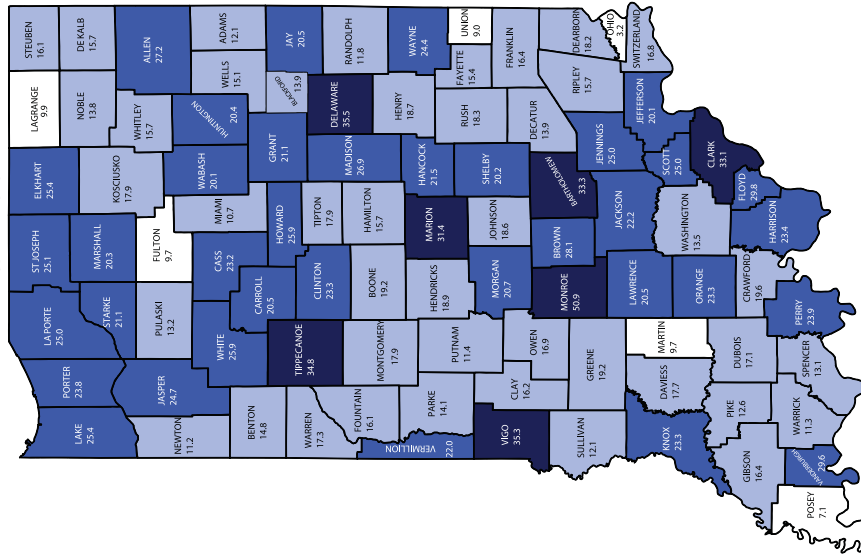
Indiana County Comparisons

Maps 1 to 3 depict the rate per 1,000 licensed drivers of three age groups of drivers involved in fatal and injury collisions – the two youngest groups, ages 16 and 17 and ages 18 to 24; and the oldest group, age 55 and over. In 2007, there was a county average of nearly 53 drivers aged 16 and 17 involved in fatal or injury collisions (per 1,000 licensed drivers), compared to an average of 20 for aged 18 to 24 and five for drivers aged 55 and over. Scott County had the highest rate (103.6) and Martin County the lowest (5.3) for the 16 and 17 year olds; Monroe County (50.9) was the highest for the 18 to 24 year olds with

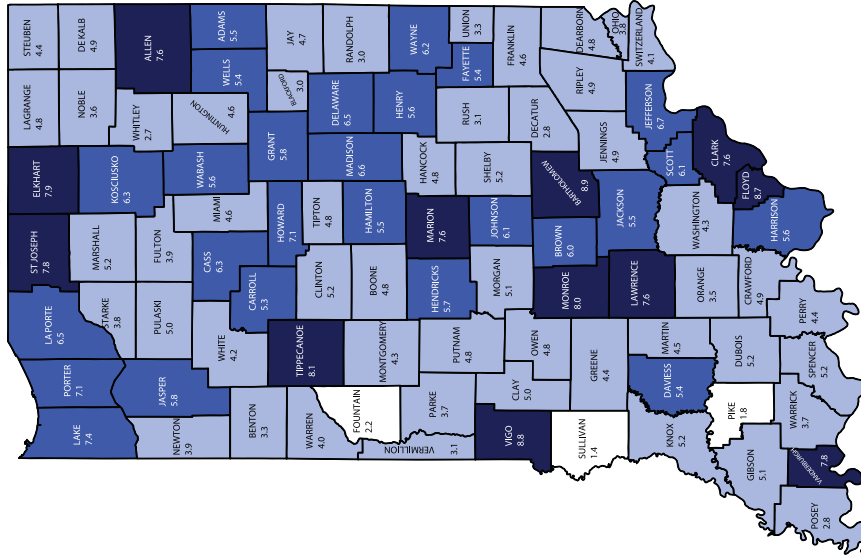
Mean = 52.7



Mean = 19.8



Mean = 5.2



Rate per 1,000 licensed drivers



Rate per 1,000 licensed drivers



Rate per 1,000 licensed drivers



Source: Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 16, 2008 (Collision data); Indiana Bureau of Motor Vehicles, as of January 10, 2008 (licensed drivers data)

Notes: It is assumed that drivers involved in motor vehicle collisions live in the county in which they were injured. Includes only records with a valid age, county and unit.

Stages of Graduated Drivers Licensing:

Stage 1-Learner's Permit

- Minimum age for learner's permit at no younger than age 16,
- Licensed adult who is at least 21 years old in vehicle at all times,
- Teenage-passenger restrictions,
- Parental certification of 30 to 50 practice hours,
- Learner's permit held for at least 6 months before gaining a license that allows unsupervised driving;

Stage 2 – Intermediate or Provisional

- Minimum entry age of at least 16 years and 6 months,
- Nighttime driving restriction beginning no later than 10 pm
- Passenger restriction allowing no more than one teenage passenger for the first 12 months then limit to two passengers until age 18

Stage 3 – Full Licensure

- Minimum age of 18 for lifting passenger and nighttime restrictions.

Source: National Highway Traffic Safety Administration (NHTSA), *Traffic Safety Facts, Graduated Driver Licensing System*, January 2008. DOT HS 810 888W.

Posey County (7.1) the lowest; and Bartholomew County was highest (8.9) and Sullivan County (1.4) lowest for the 55 and over age groups.

Two counties reflect the highest rates of involvement for all three age groups, Vigo and Bartholomew. An additional seven counties have the highest involvement rates in two of the three age groups - Clark, Delaware, Floyd, Lawrence, Marion, Monroe and Tippecanoe. Union County has one of the highest involvement rates for 16 and 17 year olds and one of the lowest for the 18 to 24 year olds.

Experience, Graduated Driving Laws, Aging

In Indiana, the rate of involvement of licensed drivers in traffic collisions decreases with age (see Table 2). In 2007, 16 year olds were 16 times more likely to be in a traffic collision than those drivers aged 65 and older. Along with the inexperience of young drivers, they also have a tendency to participate in more risky behaviors – such as not wearing safety belts, and speeding. Older drivers are at a high risk for serious traffic collisions, mainly due to age-related changes in sensory, perceptual, motor and cognitive skills and due to physical fragility and impaired health, which makes them less able to resist crash forces and recover from injuries.¹²

Young Drivers

To address young driver issues, the National Highway Traffic Safety Administration (NHTSA) encourages states to implement a graduated driver licensing (GDL) system. Traffic safety researchers developed a licensing system that would prolong the learning process for young novice drivers. This allows the young drivers more time to learn the complex skills required to operate a vehicle. The program consists of three stages and young drivers are required to demonstrate responsible driving behavior at each stage before advancing to the next (see text box). As of January 2008, 46 states and the District of Columbia have three-stage systems. However, no state has a GDL law with all of the recommended components within each stage.

Currently Indiana has a minimum entry age for learner's permit of 15 years with Driver Education, and 16 years without Driver Education. There is a two-month holding period and no minimum amount of supervised driving. The minimum age for the probationary license is 16 years and 1 month with Driver Education, and 16 years 6 months without Driver Education and there are some restrictions on night time driving. After a probationary license is issued, there can be no passengers for the first three months unless there is a 21 year old or older licensed driver in the front passenger seat, and no more total passengers than the number of seat belts. Licensure is totally unrestricted at age 18.

¹²Rafaely, V., Meyer, J., Zilberman-Sandler, I., Viener, S. (2006). Perception of traffic risks for older and younger adults. *Accident Analysis and Prevention* 38, 1231-1236.

Research shows the benefits of adopting GDL laws. Ongoing research in Michigan and North Carolina has shown a 26 and 25 percent reduction, respectively, in crashes involving 16 year olds. A recent national evaluation of GDL programs by Johns Hopkins University concluded that the most comprehensive programs are associated with reductions of about 20 percent in 16 year old driver's fatal crash involvement rates.¹³

Older Drivers

Older drivers are likely to have increased traffic risk. Older adults apparently perceive this increased risk in that they appear to change their driving habits.¹⁴ Older drivers drive less, particularly during adverse weather conditions, at night, and during heavy traffic or on heavily travelled roads. This self-regulation can be associated with problems with vision, deteriorating health, or the concern over the possibility of traffic crash involvement.¹⁵ These findings indicate that older drivers are aware of their limitations and risks, and that they adapt by changing their driving behavior.

Licensing procedures vary within the United States. Renewal procedures, however, are not as varied. Applicants' driving records are checked to ensure there are no suspensions or revocations, and, if none, upon payment of fees, new licenses are issued. Most states require renewal applicants to appear in person and to pass a vision test. The significant differences are in the length of time between renewals, ranging from two to eight years, and the existence of provisions in some states designed to guarantee that older adults continue to meet license requirements.

Renewal procedures for older adults include shorter renewal intervals for drivers older than a specified age, generally 65 or 70; a requirement they renew in person; and testing that is not

routinely required of younger drivers (e.g., vision, driving test). In some instances, if a person's fitness is in doubt, they may be required to undergo physical or mental examinations (generally by a medical review board). Restrictions may be applied such as prohibition of nighttime driving, requiring additional mirrors on the vehicle, or restriction of driving to specified places or a certain radius from the drivers' home.¹⁶

Indiana's current law requires a four-year renewal cycle under normal conditions. For drivers 75 and older the renewal cycle is three years. There are no other special provisions for older drivers.

The Federal Highway Administration (FHWA) has recommended practices to make roads safer for older drivers – such as using larger letters and reflectivity on signs, placing advance street name signs before intersections, or improving intersection layouts. States are incorporating these practices into their design standards.

CONCLUSION

One of the greatest issues relating to traffic crash involvement is driver behavior. Roads can be made safer with engineering, laws can be enforced, and traffic safety programs can educate, but it is very difficult to predict and/or change people's driving behavior. Driver behavior was the main factor for nearly 80 percent of the collisions in Indiana in 2007. The inexperience of the new driver along with the deteriorating health of the older driver can increase the risk and severity of traffic collisions. Graduated driver licensing programs can reduce collisions for new drivers. More frequent renewal and testing for older drivers may help reduce the risk of crashes as well.

¹³NHTSA, (2008).

¹⁴Rafaely, et.al. (2006).

¹⁵Ragland, D.R., Satariano, W.A., MacLeod, K.E., (2004). Reasons given by older people for limitation or avoidance of driving. *Gerontologist* 44.2, 237-244.

¹⁶Insurance Institute for Highway Safety. (April 2008). *Licensing renewal provisions for older drivers*. Accessed via web on April 17, 2008 at http://www.hldi.org/laws/state_laws/older_drivers.html.



This publication was prepared on behalf of the Indiana Criminal Justice Institute 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 Indiana Criminal Justice Institute and the National Highway Traffic Safety Administration.

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The Indiana Criminal Justice Institute (ICJI)

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, the Center for Health Policy, 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).

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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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