INDIANA 2011 TRAFFIC SAFETY FACTS

MOTORCYCLES, 2011

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From 2010 to 2011, Indiana had increases in the number of collisions involving motorcycles and mopeds and the number of individuals involved. This 2011 factsheet summarizes general aspects of motorcycle and moped collisions, selected demographic characteristics of persons involved, license types and status, helmet use, the incidence of alcohol impairment, and the geographical locations of collisions generally and fatal collisions specifically.

PERSONS INVOLVED IN MOTORCYCLE AND MOPED COLLISIONS[1]

The population of persons involved in motorcycle collisions comprises the operators (drivers) and passengers of motorcycles, mopeds, and other vehicles, and non-motorists (other vehicles and non-motorists are combined in this factsheet). Considering all persons involved in such collisions in 2011, there was a 3.3 percent increase from 2010. More specifically, in 2011 there were 118 fatalities from collisions involving motorcycles and mopeds: 92 motorcycle operators, 21 moped operators, 4 motorcycle passengers, and 1 moped passenger. In addition, there were 2,912 persons reported with non-fatal injuries (Table 1).

Among those involved in motorcycle and moped collisions, perhaps the most striking statistics are generated by moped operators. Involvement of persons in moped collisions grew substantially over the 2007 to 2011 period (11 percent annually). Moped operator fatalities increased over the period, and after a low of 7 in 2010, fatalities tripled to 21 in 2011.

There are differences in fatality and injury rates among the groups involved in motorcycle and moped collisions (Table 2). Fatality rates for motorcycle operators (averaging 3.6 percent from 2007 to 2011) have remained stable, while there has been more variation in passenger fatality rates (from 1.4 percent to nearly 4 percent during the 2007 to 2011 period). Moped operator and passenger fatality rates are less than those of motorcycles.

Table 1. Persons involved in motorcycle or moped collisions by person type and injury, 2007-2011

Injury status and person type	2007	2008	2009	2010	2011	Annual rate of change 2007-11	Annual rate of change 2010-11
Motorcycle	**3,171**	**3,312**	**2,758**	**2,858**	**2,850**	**-2.6%**	**-0.3%**
Driver	**2,888**	**3,003**	**2,513**	**2,553**	**2,574**	**-2.8%**	**0.8%**
Fatal	106	102	88	93	92	-3.5%	-1.1%
Injured	2,032	2,097	1,683	1,736	1,718	-4.1%	-1.0%
Not injured	750	804	742	724	764	0.5%	5.5%
Injured passenger	**283**	**309**	**245**	**305**	**276**	**-0.6%**	**-9.5%**
Fatal	9	12	4	10	4	-18.4%	-60.0%
Injured	274	297	241	295	272	-0.2%	-7.8%
Moped	**632**	**792**	**728**	**864**	**959**	**11.0%**	**11.0%**
Driver	**580**	**723**	**667**	**785**	**882**	**11.0%**	**12.4%**
Fatal	7	16	19	7	21	31.6%	200.0%
Injured	458	547	512	611	661	9.6%	8.2%
Not injured	115	160	136	167	200	14.8%	19.8%
Injured passenger	**52**	**69**	**61**	**79**	**77**	**10.3%**	**-2.5%**
Fatal	0	0	0	0	1	--	--
Injured	52	69	61	79	76	10.0%	-3.8%
Other vehicles/units	**1,766**	**1,912**	**1,648**	**1,802**	**1,899**	**1.8%**	**5.4%**
Fatal	3	3	2	4	0	-100.0%	-100.0%
Injured	264	248	204	204	185	-8.5%	-9.3%
Not injured	1,499	1,661	1,442	1,594	1,714	3.4%	7.5%
All persons involved	**5,569**	**6,016**	**5,134**	**5,524**	**5,708**	**0.6%**	**3.3%**

Source: Indiana State Police

Table 2. Fatality and injury rates for individuals involved in motorcycle or moped collisions, 2007-2011

Injury status and person type	Percent by injury status 2007	2008	2009	2010	2011	Average, 2007-11
Motorcycle						
Driver						
Fatal	3.7%	3.4%	3.5%	3.6%	3.6%	3.6%
Injured	70.4%	69.8%	67.0%	68.0%	66.7%	68.4%
Not injured	26.0%	26.8%	29.5%	28.4%	29.7%	28.1%
Injured passenger						
Fatal	3.2%	3.9%	1.6%	3.3%	1.4%	2.7%
Injured	96.8%	96.1%	98.4%	96.7%	98.6%	97.3%
Moped						
Driver						
Fatal	1.2%	2.2%	2.8%	0.9%	2.4%	1.9%
Injured	79.0%	75.7%	76.8%	77.8%	74.9%	76.8%
Not injured	19.8%	22.1%	20.4%	21.3%	22.7%	21.3%
Injured passenger						
Fatal	0.0%	0.0%	0.0%	0.0%	1.3%	0.3%
Injured	100.0%	100.0%	100.0%	100.0%	98.7%	99.7%
Other vehicles/units						
Fatal	0.2%	0.2%	0.1%	0.2%	0.0%	0.1%
Injured	14.9%	13.0%	12.4%	11.3%	9.7%	12.3%
Not injured	84.9%	86.9%	87.5%	88.5%	90.3%	87.6%

Source: Indiana State Police

MOTORCYCLE COLLISIONS

The number of collisions involving motorcycles (including mopeds) has remained relatively constant from 2007 to 2011 (Table 3). There are typically slightly more multi-vehicle than single-vehicle crashes. From 2007 to 2010, the fatal collision rate was somewhat higher for multi-vehicle collisions, but the gap was reversed in 2011: single-vehicle collisions were slightly more lethal. Multi-vehicle collision injury rates are lower than single-vehicle rates, whether injury rates are counted in terms of collisions or individuals (not shown in Table).

Measured in terms of collisions per 10,000 registered motorcycles, Indiana has generally paralleled US collision rates from 2000 to 2011 (Figure 1). The state motorcycle fatality rate has dropped each year since 2005, but differences between the Indiana and US rates have narrowed considerably. For example, in 2010, the Indiana fatality rate was roughly the same as the US rate for the first time since 2005 (when Indiana slightly exceeded the US rate). However, the Indiana fatality rate per 10,000 registered motorcycles had a slight uptick in 2011 (from 5.38 in 2010 to 5.77 in 2011).[2]

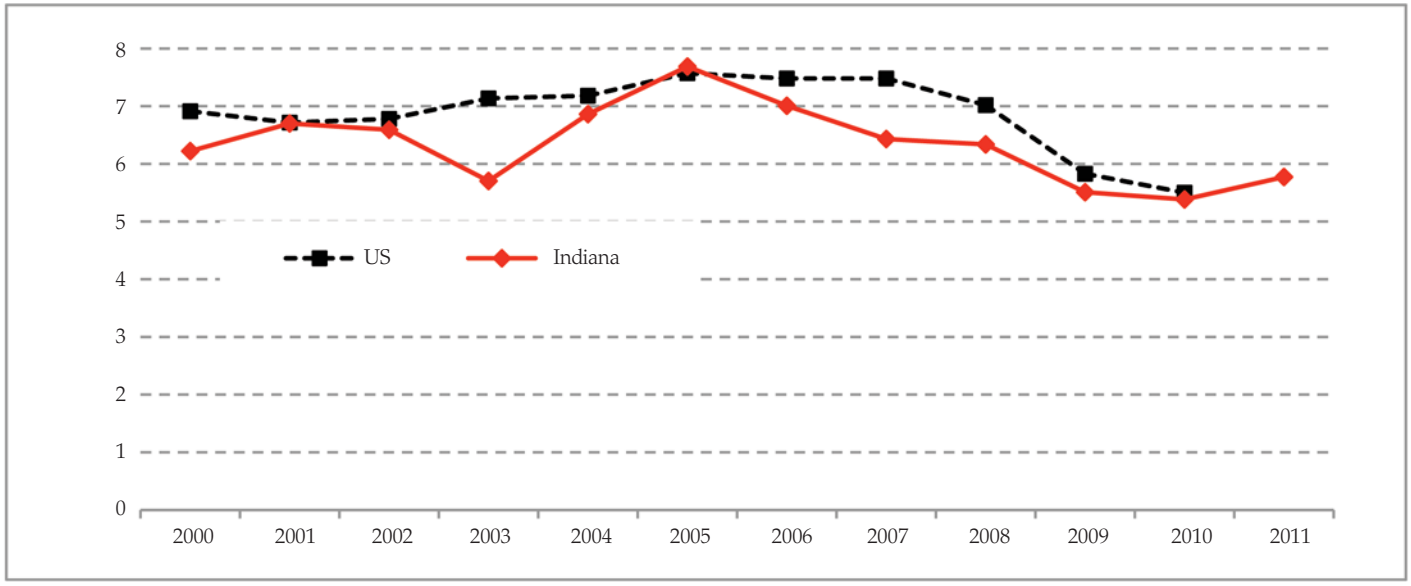
Table 3. Collisions involving motorcycles by collision severity and vehicles involved, 2007-2011

Collision type and severity	2007	2008	2009	2010	2011	Annual rate of change 2007-11	Annual rate of change 2010-11
All collisions	**3,556**	**3,822**	**3,276**	**3,429**	**3,551**	**-0.04%**	**3.6%**
Fatal	117	125	111	110	117	0.0%	6.4%
Injury	2,494	2,646	2,224	2,410	2,421	-0.7%	0.5%
Property damage	945	1,051	941	909	1,013	1.8%	11.4%
Single vehicle	**1,644**	**1,794**	**1,493**	**1,557**	**1,566**	**-1.2%**	**0.6%**
Fatal	51	53	48	49	54	1.4%	10.2%
Injury	1,326	1,423	1,162	1,236	1,231	-1.8%	-0.4%
Property damage	267	318	283	272	281	1.3%	3.3%
Multi-vehicle	**1,912**	**2,028**	**1,783**	**1,872**	**1,985**	**0.9%**	**6.0%**
Fatal	66	72	63	61	63	-1.2%	3.3%
Injury	1,168	1,223	1,062	1,174	1,190	0.5%	1.4%
Property damage	678	733	658	637	732	1.9%	14.9%
Fatal collision as % total							
Single vehicle	3.1%	3.0%	3.2%	3.1%	3.4%	2.7%	9.6%
Multi-vehicle	3.5%	3.6%	3.5%	3.3%	3.2%	-2.1%	-2.6%
Injury collision as % total							
Single vehicle	80.7%	79.3%	77.8%	79.4%	78.6%	-0.6%	-1.0%
Multi-vehicle	61.1%	60.3%	59.6%	62.7%	59.9%	-0.5%	-4.4%

Source: Indiana State Police

Notes:
***Motorcycles* includes *mopeds*.**
***Multi-vehicle* collision includes other vehicles and non-motorists.**

Figure 1. Motorcycles involved in fatal collisions per 10,000 motorcycle registrations, 2000-2011



Sources: Fatality Analysis Reporting System (2000-2010); Indiana State Police (2011); Indiana Bureau of Motor Vehicles

Note: FARS data not yet available for 2011.

GENDER AND AGE[3]

While the number of male motorcycle operators in collisions declined slightly on average from 2007 to 2011, it increased 3.4 percent in 2011, and the number of male operators killed increased 13.5 percent (Table 4). Overall, the number of male motorcycle riders killed in crashes increased 10.1 percent in 2011. The number of collision-involved female operators has grown during this period, and increased 5.8 percent from 2010 to 2011. The number of male passengers involved in collisions has generally increased, while the number of female passengers was steady or declining slightly.

From 2007 to 2011, female operators had lower fatality proportions—but higher injury proportions—than male operators (Table 5). Female passengers generally had higher fatality rates than male passengers—the exception was three male passenger fatalities in 2010, the only year between 2007 and 2011 for which any male motorcycle passenger was killed. Female and male passengers generally had similar injury rates during this time period.

Table 4. Injury status of motorcycle and moped riders by gender and person type, 2007-2011

Person type and injury status	2007	2008	2009	2010	2011	Annual rate of change 2007-11	Annual rate of change 2010-11
All riders							
Male	**3,247**	**3,463**	**2,967**	**3,122**	**3,221**	**-0.2%**	**3.2%**
Fatal	109	113	100	99	109	0.0%	10.1%
Injured	2,320	2,453	2,041	2,177	2,196	-1.4%	0.9%
Not injured	818	897	826	846	916	2.9%	8.3%
Female	**549**	**637**	**515**	**599**	**587**	**1.7%**	**-2.0%**
Fatal	13	16	11	11	9	-8.8%	-18.2%
Injured	476	541	444	535	522	2.3%	-2.4%
Not injured	60	80	60	53	56	-1.7%	5.7%
Operators only							
Male	**3,192**	**3,385**	**2,910**	**3,044**	**3,146**	**-0.4%**	**3.4%**
Fatal	109	113	100	96	109	0.0%	13.5%
Injured	2,277	2,387	1,991	2,110	2,124	-1.7%	0.7%
Not injured	806	885	819	838	913	3.2%	8.9%
Female	**271**	**337**	**266**	**293**	**310**	**3.4%**	**5.8%**
Fatal	4	4	7	4	4	0.0%	0.0%
Injured	212	256	204	237	255	4.7%	7.6%
Not injured	55	77	55	52	51	-1.9%	-1.9%
Injured passengers							
Male	**55**	**78**	**57**	**78**	**75**	**8.1%**	**-3.8%**
Fatal	0	0	0	3	0	--	-100.0%
Injured	55	78	57	75	75	8.1%	0.0%
Female	**278**	**300**	**249**	**306**	**277**	**-0.1%**	**-9.5%**
Fatal	9	12	4	7	5	-13.7%	-28.6%
Injured	269	288	245	299	272	0.3%	-9.0%

Source: Indiana State Police

Note: Excludes cases where *gender* or *injury status* were unknown.

Table 5. Fatal and non-fatal injury proportions by person type and gender, 2007-2011

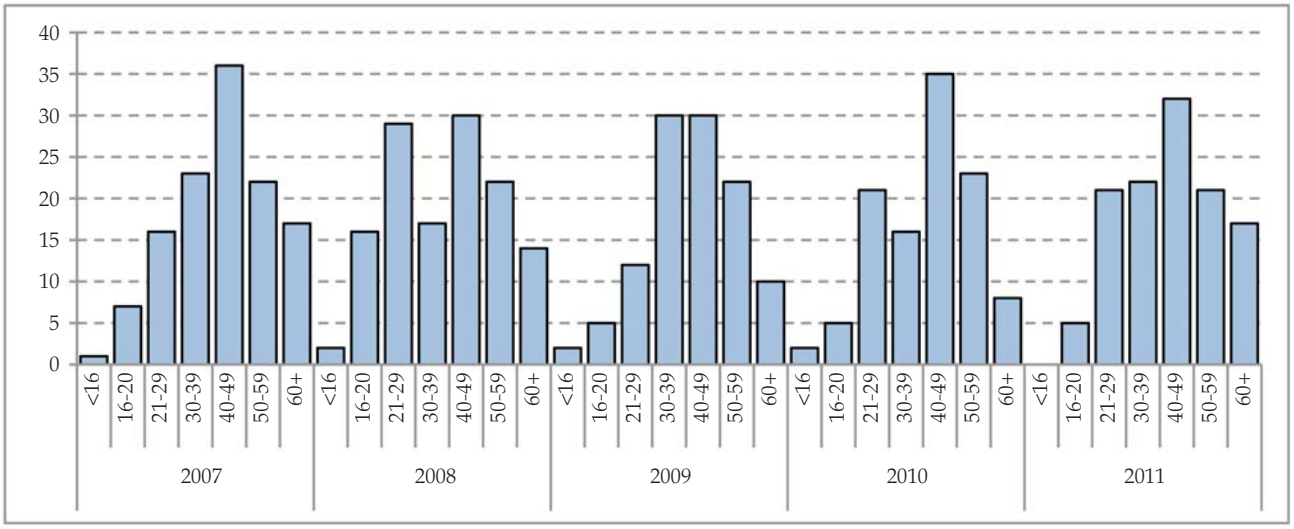
Person type and injury status	2007	2008	2009	2010	2011
Fatality rates					
Male operators	3.4%	3.3%	3.4%	3.2%	3.4%
Female operators	2.4%	2.5%	2.1%	1.8%	1.5%
Male passengers	0.0%	0.0%	0.0%	3.8%	0.0%
Female passengers	3.2%	4.0%	1.6%	2.3%	1.8%
Injury rates					
Male operators	71.3%	70.5%	68.4%	69.3%	67.5%
Female operators	78.2%	76.0%	76.7%	80.9%	82.3%
Male passengers	100.0%	100.0%	100.0%	96.2%	100.0%
Female passengers	96.8%	96.0%	98.4%	97.7%	98.2%

Source: Indiana State Police

Note: Columns (by person type) will not add to 100% because *not injured* is excluded.

Considering the age of Indiana motorcyclists killed from 2007 to 2011, the most common age category has typically been *40 to 49 years*, and the general pattern annually was an increasing number of fatalities up to the *40-49 years* category, and a decline in counts for older age categories (Figure 2). However, during this five-year period, the pattern of fatality rates per 100 persons involved varied among age categories. In 2007, 2008, and 2011, fatality rates generally increased for older motorcyclists, with the highest fatality rates in the 60 years and above age group (Figure 3). But in 2009 and 2010, the fatality rate per 100 persons involved were lower for the ages older than the *40-49 years* age category, similar to the decline in counts.

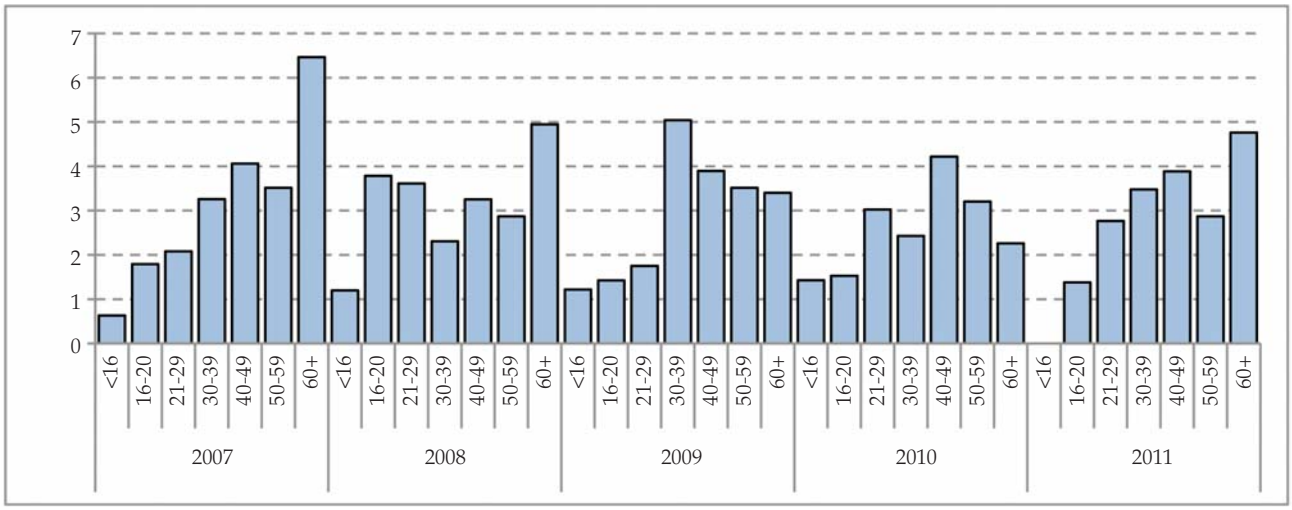
Figure 2. Count of motorcyclists killed by age, 2007-2011



Source: Indiana State Police

Note: *Motorcyclists* includes *moped* riders

Figure 3. Fatality rate per 100 motorcyclists involved by age, 2007-2011



Source: Indiana State Police

Note: *Motorcyclists* includes *moped* riders

LICENSING AND DRIVER HISTORY

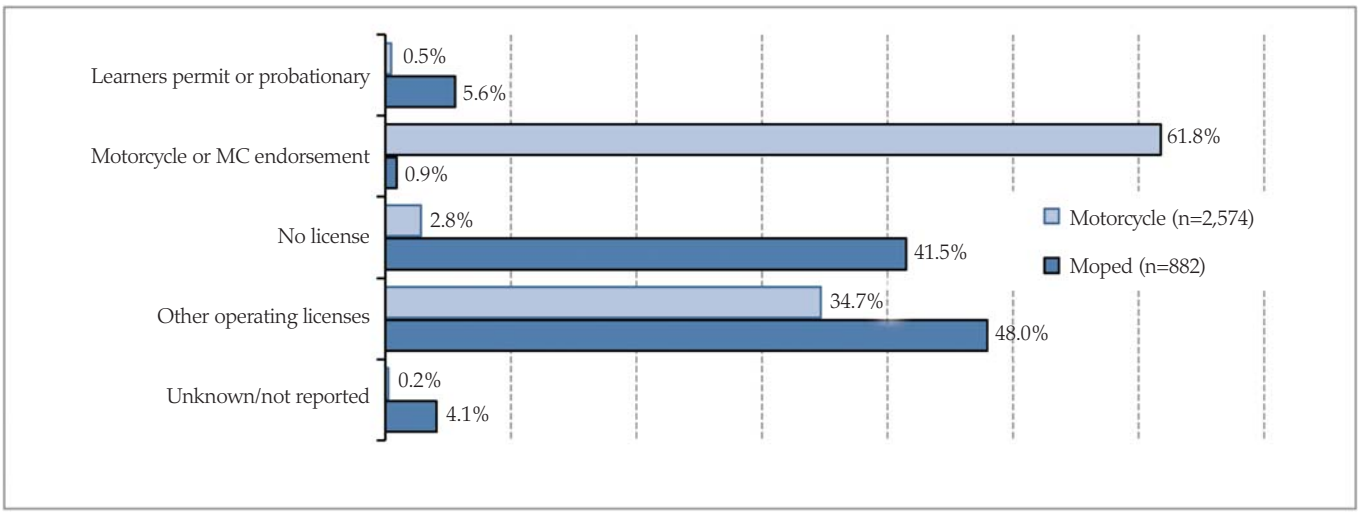
The types of drivers licenses issued (or not) to motorcycle operators differed somewhat from those of moped operators. From 2007 to 2011, the number of collision-involved motorcycle operators with proper motorcycle endorsements declined slightly, although the percentage of all involved motorcycle operators with a proper endorsement increased from 56 percent (2007) to 64 percent (2010)—only to drop back to 62 percent in 2011 (Table 6). This was not the case with Indiana moped operators—less than 2 percent of moped operators typically had a *motorcycle* license. The more serious problem with the licensing of moped operators is their lack of any licensing: the number of unlicensed moped operators involved in collisions increased nearly 11 percent annually from 2007 to 2011. In 2011, 42 percent of collision-involved moped operators reported no license at all (Figure 4). The Indiana legal code (9-21-11-12) requires moped operators to have either a state identification card or valid operators license.

Table 6. License type of motorcycle and moped operators involved in collisions, 2007-2011

						Annual rate of change	
	2007	2008	2009	2010	2011	2007-11	2010-11
All operators	**3,468**	**3,726**	**3,180**	**3,338**	**3,456**	**-0.1%**	**3.5%**
Motorcycle	**2,888**	**3,003**	**2,513**	**2,553**	**2,574**	**-2.8%**	**0.8%**
Motorcycle or MC endorsement	1,630	1,858	1,593	1,636	1,590	-0.6%	-2.8%
Other operating licenses	1,157	1,048	832	851	893	-6.3%	4.9%
No license	62	63	57	46	73	4.2%	58.7%
Learners permit/probationary	14	21	19	13	12	-3.8%	-7.7%
Unknown/not reported	25	13	12	7	6	-30.0%	-14.3%
Moped	**580**	**723**	**667**	**785**	**882**	**11.0%**	**12.4%**
Motorcycle or MC endorsement	8	8	14	13	8	0.0%	-38.5%
Other operating licenses	244	348	287	348	423	14.7%	21.6%
No license	243	283	284	331	366	10.8%	10.6%
Learners permit/probationary	36	37	42	49	49	8.0%	0.0%
Unknown/not reported	49	47	40	44	36	-7.4%	-18.2%
Percent motorcycle or MC endorsement							
Motorcycles	56.4%	61.9%	63.4%	64.1%	61.8%		
Mopeds	1.4%	1.1%	2.1%	1.7%	0.9%		

Source: Indiana State Police

Figure 4. License type of collision-involved motorcycle and moped operators, 2011



Source: Indiana State Police

At the time a collision occurs, the status of the license of an Indiana motorcycle or moped operator can vary. Based on Indiana BMV data classifications, an Indiana motorcycle or moped operator can have a valid operator's license, a suspended license due to various reasons, be *unlicensed*, be classified as a *habitual traffic violator,* or have some *other invalid status* such as a revoked or fraudulent license.

From 2009 to 2011, the number of Indiana moped operators involved in crashes increased more than 16 percent annually (Table 7). In addition, while there were substantial annual declines in collision-involved motorcycle operators reporting non-valid license statuses, the number of collision-involved moped operators with an invalid status grew rapidly. From 2009 to 2011, more than 75 percent of all Indiana motorcycle operators had valid licenses at the time of the crash, compared to only 33 percent of moped operators (Table 8). In this context, Indiana data suggest that mopeds might be a primary vehicle of choice for persons whose drivers license has been suspended or has some other type of invalid status. In 2011, nearly one-half of moped operators involved in collisions had a suspended license (38 percent) or were considered habitual traffic violators (11 percent).

Table 7. License status of motorcycle and moped operators at time of crash, 2009-2011

License status	2009	2010	2011	Annual change 2009-11	Annual change 2010-11
All operators	**2,738**	**2,845**	**2,934**	**3.9%**	**3.1%**
Motorcycle	**2,250**	**2,277**	**2,284**	**1.2%**	**0.3%**
Valid	1,763	1,868	1,752	6.0%	-6.2%
Suspended	436	369	481	-15.4%	30.4%
Unlicensed	20	15	22	-25.0%	46.7%
Habitual traffic violator	12	11	14	-26.3%	7.1%
Other invalid status	19	14	15	-8.3%	27.3%
Moped	488	568	650	16.4%	14.4%
Valid	152	187	211	8.6%	14.4%
Suspended	198	215	246	23.0%	12.8%
Unlicensed	74	71	108	-4.1%	52.1%
Habitual traffic violator	53	82	69	54.7%	-15.9%
Other invalid status	11	13	16	18.2%	23.1%

Sources: Indiana State Police; Indiana Bureau of Motor Vehicles

Notes:
Suspended* includes *suspended-infraction, suspended-misdemeanor,* and *suspended-prior conviction.
Other invalid status* includes *cancelled, conditional, revoked,* and *fraudulent.
Excludes collision-involved operators from out-of-state or collision-involved operators with no matching Indiana BMV record.
***Unlicensed* totals might not match earlier tables and figures due to different data origins of license status.**

Table 8. Percent of operators by license status and type of unit at time of crash, 2009-2011

License status	2009 Motorcycle	2009 Moped	2010 Motorcycle	2010 Moped	2011 Motorcycle	2011 Moped
All operators	**2,250**	**488**	**2,277**	**568**	**2,284**	**650**
Valid	78.4%	31.1%	82.0%	32.9%	76.7%	32.5%
Suspended	19.4%	40.6%	16.2%	37.9%	21.1%	37.8%
Unlicensed	0.9%	15.2%	0.7%	12.5%	1.0%	16.6%
Habitual traffic violator	0.5%	10.9%	0.5%	14.4%	0.6%	10.6%
Other invalid status	0.8%	2.3%	0.6%	2.3%	0.7%	2.5%
Percent non-valid	**21.6%**	**68.9%**	**18.0%**	**67.1%**	**23.3%**	**67.5%**

Sources: Indiana State Police; Indiana Bureau of Motor Vehicles

Notes:
Suspended* includes *suspended-infraction, suspended-misdemeanor,* and *suspended-prior conviction.
Other invalid status* includes *cancelled, conditional, revoked,* and *fraudulent.

License status at the time of the crash is also associated with different injury outcomes for Indiana motorcycle and moped operators during the 2009-2011 period. Habitual traffic offenders had the highest fatality rates for motorcycles (16.2 percent) and mopeds (2.5 percent) (Table 9). Habitual traffic offenders also had the highest frequencies of fatal crashes per 1,000 non-fatal crashes (47.8)—compared to a rate of 33.6 for those with valid license status (Figure 5).

Based on Indiana BMV previous driving offense histories, Indiana motorcycle and moped operators in 2011 had a slightly higher rate of previous traffic convictions than did passenger vehicle drivers (all drivers, not just those in collisions with motorcycles or mopeds). For example, more than one-half of motorcycle (including mopeds) operators had at least one previous conviction, compared to about 39 percent of passenger vehicle drivers involved in collisions (Table 10). In addition, a larger percentage of motorcycle operators had previous felony or misdemeanor traffic offenses (7.5 percent) than did passenger vehicle drivers (3.5 percent). On both these traffic offense metrics for motorcycle operators, males had substantially higher rates than females.

Table 9. Individual injury outcomes for motorcycle and moped operators by license status at time of the crash, 2009-2011

License status	Fatal	Injured	Not injured	Total
Motorcycle	**240**	**4,594**	**1,977**	**6,811**
Valid (n=5,383)	3.4%	67.1%	29.5%	100%
Suspended (n=1,286)	3.9%	67.9%	28.2%	100%
Unlicensed (n= 57)	1.8%	80.7%	17.5%	100%
Habitual traffic violator (n=37)	16.2%	73.0%	10.8%	100%
Other invalid status (n=48)	4.2%	72.9%	22.9%	100%
Moped	**37**	**1,316**	**353**	**1,706**
Valid (n=550)	2.3%	78.9%	18.8%	100%
Suspended (n=659)	2.2%	77.5%	20.4%	100%
Unlicensed (n= 253)	1.6%	71.9%	26.5%	100%
Habitual traffic violator (n=204)	2.5%	78.9%	18.6%	100%
Other invalid status (n=40)	2.5%	67.5%	30.0%	100%

Figure 5. Motorcycle and moped operators in fatal crashes per 1,000 non-fatal crashes by license status at time of the crash, 2009-2011

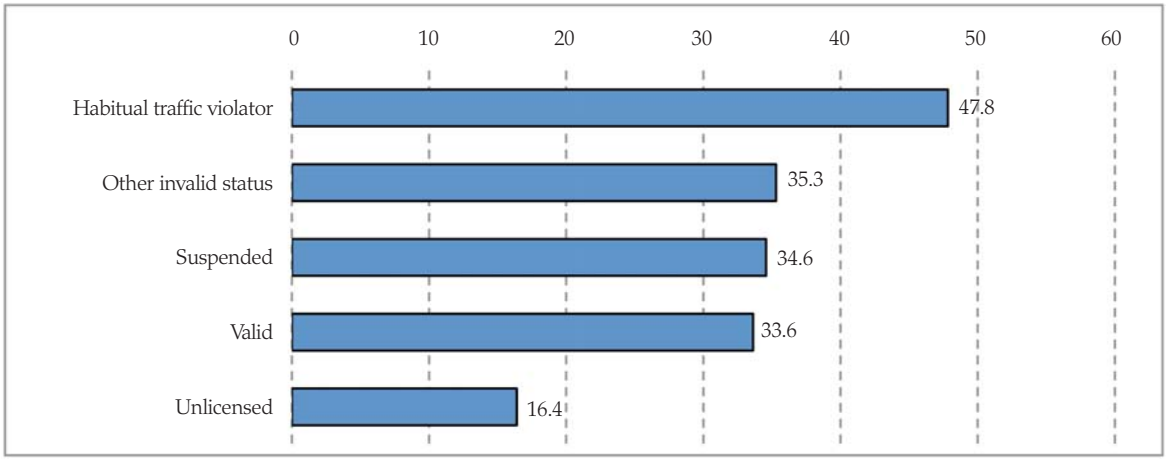


Table 10. Vehicle operators in Indiana crashes, by traffic offense history, vehicle type, and gender, 2011

	Motorcycle operators			Passenger vehicle drivers		
Offense count	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
Convictions for all offenses						
None	92	970	1,062	77,711	69,416	147,127
One	32	481	513	20,607	25,630	46,237
Two	9	266	275	8,282	13,003	21,285
Three	12	160	172	3,560	6,947	10,507
Four	0	87	87	1,883	3,964	5,847
Five or more	6	169	175	2,543	6,592	9,135
Total	151	2,133	2,284	114,586	125,552	240,138
% One or more	39.1%	54.5%	53.5%	32.2%	44.7%	38.7%
Convictions for felony or misdemeanor offenses						
None	147	1,966	2,113	112,084	119,593	231,677
One	3	136	139	2,117	5,007	7,124
Two	1	28	29	297	754	1,051
Three	0	1	1	66	149	215
Four	0	2	2	17	29	46
Five or more	0	0	0	5	20	25
Total	151	2,133	2,284	114,586	125,552	240,138
% One or more	2.6%	7.8%	7.5%	2.2%	4.7%	3.5%

Sources: Indiana State Police; Indiana Bureau of Motor Vehicles

Note: Totals for vehicle type excludes cases where gender was not reported or was reported as *unknown*.

HELMET USE

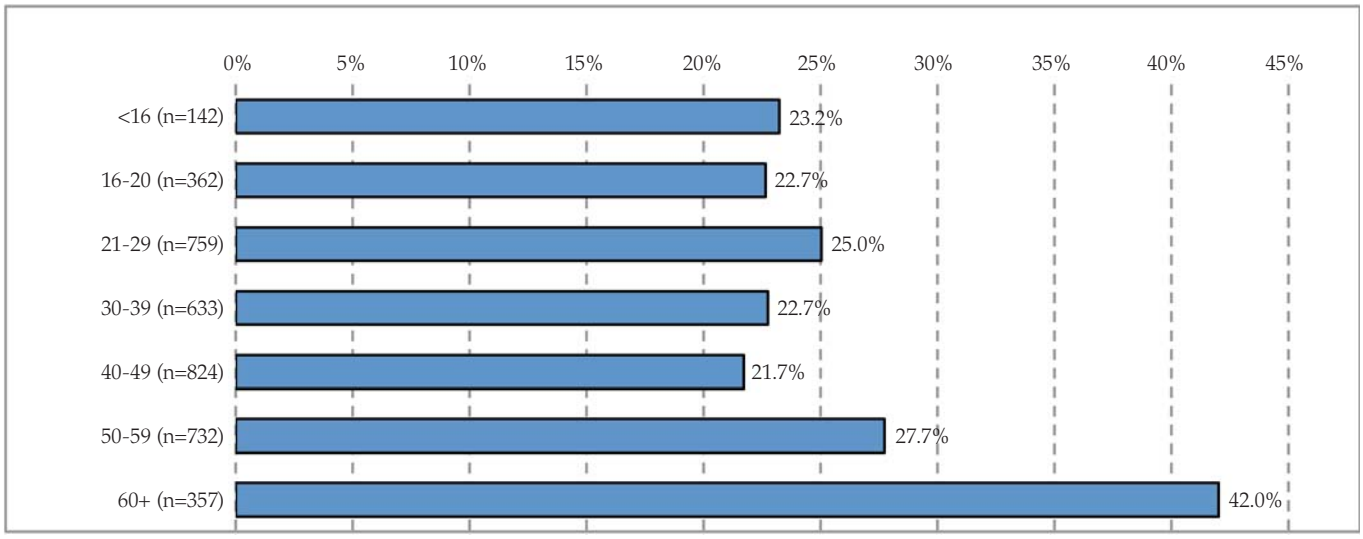
From 2007 to 2011, the rate of helmet use by individuals involved in motorcycle collisions was about one in three; among moped riders, helmet use was consistently low, with a rate of 1.5 percent in 2011 (Table 11). Helmet use in fatal collisions involving motorcycles was slightly less than 18 percent in 2011, and less than 5 percent among moped fatalities. The highest rate of helmet use in 2011 was among riders 60 years and older (42 percent) (Figure 6). Despite Indiana law, which requires motorcycle riders 17 years and under to wear helmets (see IC 9-19-7-1), young riders (under 21 years old) were reported as wearing helmets at rates less than 25 percent.

Table 11. Helmet use by operators and passengers in Indiana collisions by vehicle type, 2007-2011

Helmet use	2007	2008	2009	2010	2011	Annual rate of change 2007-11	Annual rate of change 2010-11
All injuries							
Motorcycles	**3,171**	**3,312**	**2,758**	**2,858**	**2,850**	**-2.6%**	**-0.3%**
Helmet reported	995	1168	975	980	967	-0.7%	-1.3%
% helmet	*31.4%*	*35.3%*	*35.4%*	*34.3%*	*33.9%*	*2.0%*	*-1.0%*
Mopeds	**632**	**792**	**728**	**864**	**959**	**11.0%**	**11.0%**
Helmet reported	21	14	12	6	14	-9.6%	133.3%
% helmet	*3.3%*	*1.8%*	*1.6%*	*0.7%*	*1.5%*	*-18.6%*	*110.2%*
Total	**3,803**	**4,104**	**3,486**	**3,722**	**3,809**	**0.0%**	**2.3%**
% helmet	*26.7%*	*28.8%*	*28.3%*	*26.5%*	*25.8%*	*-0.9%*	*-2.8%*
Fatal injuries							
Motorcycle	**115**	**114**	**92**	**103**	**96**	**-4.4%**	**-6.8%**
Helmet reported	30	31	21	18	17	-13.2%	-5.6%
% helmet	*26.1%*	*27.2%*	*22.8%*	*17.5%*	*17.7%*	*-9.2%*	*1.3%*
Moped	**7**	**16**	**19**	**7**	**22**	**33.1%**	**214.3%**
Helmet reported	0	0	0	0	1	--	--
% helmet	*0%*	*0%*	*0%*	*0%*	*4.5%*	--	--
Total	**122**	**130**	**111**	**110**	**117**	**-1.0%**	**6.4%**
% helmet	*24.6%*	*23.8%*	*18.9%*	*16.4%*	*15.4%*	*-11.1%*	*-6.0%*

Source: Indiana State Police

Figure 6. Percent helmet use reported in all collisions involving motorcycles and mopeds by rider age, 2011



Source: Indiana State Police

Note: Cases with unknown helmet use are classified as no helmet use.

Male and female motorcycle operators involved in collisions had similar reported rates of helmet use during the 2007 to 2011 period. Roughly 25 percent of both female and male motorcycle and moped riders in collisions were classified as using helmets (Table 12). Considering all motorcycle and moped riders involved in collisions from 2007 to 2011 in Indiana, both males and females were less likely to suffer fatal injuries when wearing helmets (Table 13). Unhelmeted males were about 1.6 times more likely to die and unhelmeted females were about 1.9 times more likely to be killed. In contrast, persons wearing helmets were more likely to report no injury than those without.

Table 12. Helmet use for motorcycle and moped riders in crashes, by gender, 2007-2011

						Annual rate of change	
All riders	**2007**	**2008**	**2009**	**2010**	**2011**	**2007-11**	**2010-11**
Male	**3,247**	**3,463**	**2,967**	**3,122**	**3,221**	**-0.2%**	**3.2%**
Helmet reported	874	1,000	854	834	830	-1.3%	-0.5%
% helmet	*26.9%*	*28.9%*	*28.8%*	*26.7%*	*25.8%*	*-1.1%*	*-3.5%*
Female	**549**	**637**	**515**	**599**	**587**	**1.7%**	**-2.0%**
Helmet reported	141	181	132	152	150	1.6%	-1.3%
% helmet	*25.7%*	*28.4%*	*25.6%*	*25.4%*	*25.6%*	*-0.1%*	*0.7%*
Operators only							
Male	**3,192**	**3,385**	**2,910**	**3,044**	**3,146**	**-0.4%**	**3.4%**
Helmet reported							
% helmet	*27.1%*	*29.2%*	*29.0%*	*26.9%*	*25.8%*	*-1.2%*	*-4.0%*
Female	**271**	**337**	**266**	**293**	**310**	**3.4%**	**5.8%**
Helmet reported	82	105	78	84	94	3.5%	11.9%
% helmet	*30.3%*	*31.2%*	*29.3%*	*28.7%*	*30.3%*	*0.1%*	*5.8%*

Source: Indiana State Police

Table 13. Individual injury status by helmet use reported and gender, all motorcycle and moped riders, 2007-2011

All riders	**Fatal**	**Injured**	**Not injured**	**Total**
Male (n=14,642)	**3.4%**	**70.7%**	**25.8%**	**100%**
No helmet (n=10,250)	3.9%	72.0%	24.1%	100%
Helmet reported (n=4,392	2.4%	67.7%	29.8%	100%
Female (n=2,638)	**2.2%**	**88.4%**	**9.4%**	**100%**
No helmet (n=1,882))	2.6%	89.3%	8.2%	100%
Helmet reported (n=756)	1.3%	86.4%	12.3%	100%
Relative risk (no helmet/helmet)				
Male	1.59	1.06	0.81	
Female	1.93	1.03	0.67	

Source: Indiana State Police

Note: Includes all cases where gender, helmet use, and injury status are known.

ALCOHOL INVOLVEMENT

The numbers of impaired operators (i.e., operators with a blood alcohol content [BAC] of 0.08 grams per deciliter [g/dL]) involved in motorcycle and moped collisions from 2007 to 2011 generally increased, as has the percentage of operators classified as impaired (Table 14). Considering all collisions, impaired operators comprised an average of about 3.6 percent for motorcycles and 5.8 percent of mopeds. In 2011, 35 percent of motorcycle operator fatalities were classified impaired, compared to 29 percent of moped operator fatalities. Operators (motorcycles and mopeds combined) classified with 0.08 g/dL BAC or greater grew an average of about 7 percent annually during the 2007 to 2011 period (Table 15). Indiana law generally calls for drivers involved in serious bodily injury collisions to be tested for alcohol (see IC 9-30-7). From 2007 to 2011, the percentage of fatalities tested ranged from about 46 percent in 2009 to 66 percent in 2011. Considering only those tested, the percentage of operators with 0.08 g/dL or greater drifted upward since 2007, to nearly 51 percent in 2011.

Table 14. Operators involved in collisions by alcohol impairment and injury status, 2007-2011

Operators by alcohol and injury status	2007	2008	2009	2010	2011	Annual rate of change 2007-11	Annual rate of change 2010-11
Unimpaired	**3,358**	**3,622**	**3,045**	**3,178**	**3,276**	**-0.6%**	**3.1%**
Motorcycle	**2,806**	**2,934**	**2,415**	**2,451**	**2,450**	**-3.3%**	**0.0%**
Fatal	79	81	69	71	60	-6.6%	-15.5%
Injured	1,988	2,059	1,627	1,665	1,641	-4.7%	-1.4%
Not injured	739	794	719	715	749	0.3%	4.8%
Moped	**552**	**688**	**630**	**727**	**826**	**10.6%**	**13.6%**
Fatal	5	10	18	5	15	31.6%	200.0%
Injured	440	525	480	562	620	9.0%	10.3%
Not injured	107	153	132	160	191	15.6%	19.4%
Impaired	**110**	**104**	**135**	**160**	**180**	**13.1%**	**12.5%**
Motorcycle	**82**	**69**	**98**	**102**	**124**	**10.9%**	**21.6%**
Fatal	27	21	19	22	32	4.3%	45.5%
Injured	44	38	56	71	77	15.0%	8.5%
Not injured	11	10	23	9	15	8.1%	66.7%
Moped	**28**	**35**	**37**	**58**	**56**	**18.9%**	**-3.4%**
Fatal	2	6	1	2	6	31.6%	200.0%
Injured	18	22	32	49	41	22.9%	-16.3%
Not injured	8	7	4	7	9	3.0%	28.6%
% impaired—all							
Motorcycle	2.8%	2.3%	3.9%	4.0%	4.8%		
Moped	4.8%	4.8%	5.5%	7.4%	6.3%		
% impaired—fatal							
Motorcycle	25.5%	20.6%	21.6%	23.7%	34.8%		
Moped	28.6%	37.5%	5.3%	28.6%	28.6%		

Source: Indiana State Police

Table 15. Motorcycle and moped operators killed in collisions, by blood alcohol content, 2007-2011

BAC (g/dL) range	2007	2008	2009	2010	2011	Annual rate of change 2007-11	Annual rate of change 2010-11
Operators killed	**113**	**118**	**107**	**100**	**113**	**0.0%**	**13.0%**
Not reported or no test	45	42	58	44	38	-4.1%	-13.6%
0	34	44	21	29	32	-1.5%	10.3%
0.01 < 0.08	5	5	8	3	5	0.0%	66.7%
0.08 < 0.15	10	12	11	10	13	6.8%	30.0%
0.15+	19	15	9	14	25	7.1%	78.6%
% with reported results	**60.2%**	**64.4%**	**45.8%**	**56.0%**	**66.4%**		
% 0.08 or greater (of all tested)	**42.6%**	**35.5%**	**40.8%**	**42.9%**	**50.7%**		

Source: Indiana State Police

GEOGRAPHY AND LOCATION

The Indiana Automated Reporting and Information Exchange System (ARIES) has traditionally classified collisions as *urban* or *rural*, based on whether a collision was within the *incorporated limits* of a municipality. By this criterion, the majority of fatal motorcycle collisions were classified as rural in 2007 and 2009 to 2011 (the 2008 *rural* rate was 48 percent). During the 2007 to 2011 period, motorcycle collisions involving non-fatal injuries ranged from 57 percent to 62 percent *urban* (Table 16).

When the state of Indiana is divided into *urban, suburban, exurban*, and *rural* categories (based on US Census definitions of urban places) reflecting a continuum of population density, the majority of fatal motorcycle collisions—ranging from about 63 percent in 2007 to 70 percent in 2011—occurred in urban and suburban locations.[4] In 2011, only about 15 percent of fatal crashes were located in purely rural areas (i.e., areas five or more miles away from the outer boundaries of more densely populated urban areas). Thus, most fatal and injury collisions involving motorcycles occurred within built-up urban and suburban areas. In 2010 and 2011, from 75 percent to 80 percent of non-fatal injury collisions occurred in urban and suburban areas.

Indiana counties vary in their rates of motorcycle and moped collisions per 10,000 county motorcycle registrations (Map 1). As in past years, counties with the highest collision rates in 2011 were located in south central and southeastern Indiana, areas marked by scenic driving areas (e.g., Brown County) and tourist destinations (e.g., riverboat gambling sites). Predictably, the predominantly urban counties in the state had the heaviest concentrations of motorcycle and moped collisions, although when normalized by motorcycle registrations, large counties tend to have lower rates. Patterns of fatal collisions were distributed less systematically among various areas within the state.

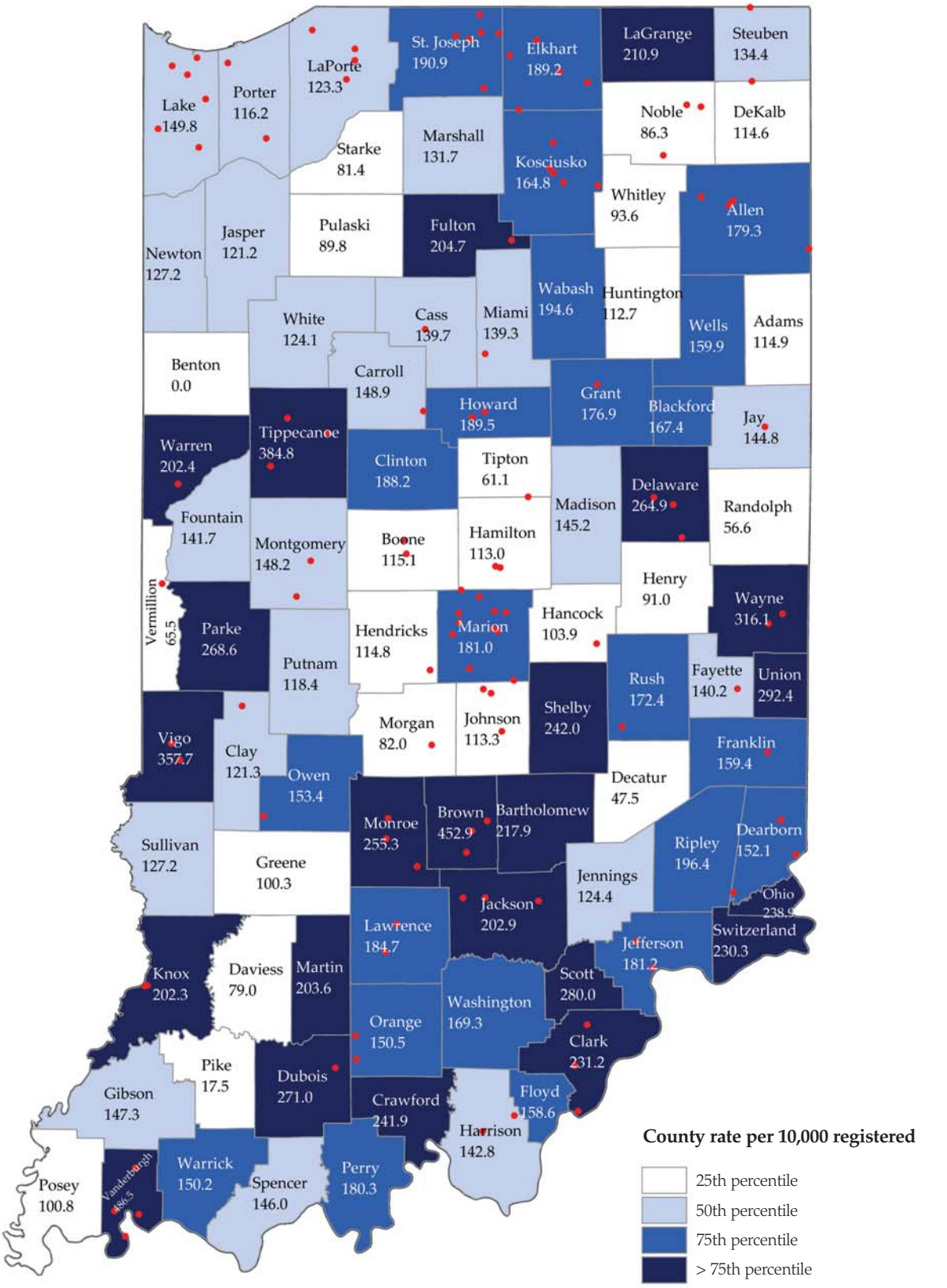
Table 16. Injury collisions involving motorcycles or mopeds by severity and location, 2007-2011

Collisions by location	2007	2008	2009	2010	2011
Incorporated limts					
Fatal	**117**	**125**	**111**	**110**	**117**
Urban	39.3%	52.0%	42.3%	49.1%	40.1%
Rural	60.7%	48.0%	57.7%	50.9%	59.0%
Unknown	0.0%	0.0%	0.0%	0.0%	0.9%
Non-fatal injury	**2,494**	**2,646**	**2,224**	**2,410**	**2,421**
Urban	56.9%	57.9%	60.3%	60.2%	62.0%
Rural	43.0%	42.0%	39.7%	39.7%	38.0%
Unknown	0.1%	0.1%	0.0%	0.1%	0.0%
Census locality					
Fatal	**117**	**125**	**111**	**110**	**117**
Urban	36.8%	49.6%	45.9%	50.9%	49.6%
Suburban	26.5%	24.8%	25.2%	17.3%	20.5%
Exurban	21.4%	9.6%	9.0%	7.3%	9.4%
Rural	15.4%	15.2%	17.1%	16.4%	15.4%
Unknown	0.0%	0.8%	2.7%	8.2%	5.1%
Non-fatal injury	**2,494**	**2,646**	**2,224**	**2,410**	**2,421**
Urban	52.0%	58.0%	60.1%	60.5%	65.6%
Suburban	13.0%	19.0%	16.9%	15.3%	14.6%
Exurban	6.0%	8.3%	8.0%	8.4%	6.7%
Rural	8.2%	10.9%	11.1%	11.4%	10.7%
Unknown	20.8%	3.7%	4.0%	4.5%	2.5%

Sources: Indiana State Police; US Census Bureau

Note: Some portion of changes in percentages within census locality categories from the 2007-09 period to the 2010-11 period is attributable to an expansion of the urban locale as reported by the US Census for 2010.

Map 1. Indiana motorcycle collisions per 10,000 registered motorcycles and location of fatal motorcycle collisions, 2011



Sources: Indiana State Police; Indiana Bureau of Motor Vehicles.

END NOTES

[1]Please note that the classification of motorized two-wheel vehicles as mopeds or motorcycles is not standardized among Indiana law enforcement, to the extent that some of the variation in moped counts could be because of changing classification practices among police investigators.

[2]There has been substantial variation in the registration numbers reported by the Indiana BMV from year to year. Therefore, some of the variation in the fatality rate among registered vehicles is partly due to measurement error in BMV reporting rather than real changes in collision rates.

[3]This section excludes cases where gender, age, or injury status is unknown. In addition, motorcycles and mopeds are combined as a single group.

[4]The US Census delineation of urban places changed in 2010 after the most recent decennial census. ARIES data for 2010 and 2011 are "geotagged" with the new 2010 urban place boundaries, while 2007 to 2009 data are geotagged with the 2000 urban place boundaries. Thus, some of the growth in collisions with urban/suburban locales is attributable to an expansion of the urban locale variable.

DEFINITIONS

Alcohol-impaired: A driver is classified as *alcohol-impaired* when the driver has a blood alcohol content (BAC) test result at or above 0.08 g/dL.

Census locality: *Urban* is defined as Census 2000 Urban Areas (2007-2009) or Census 2010 Urban Areas (2010-2011), *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-fatal injury: A *non-fatal injury* includes those reported as i*ncapacitating, non-incapacitating, possible, not reported, unknown, refused (treatment)*, and invalid injury categories.

DATA SOURCES

Fatality Analysis Reporting System, National Highway Traffic Safety Administration, current as of March 30, 2012 (see http://www-fars.nhtsa.dot.gov/Main/index.aspx).

Indiana Bureau of Motor Vehicles, current as of March 20, 2012.

Indiana State Police Automated Reporting Information Exchange System (ARIES), current as of March 20, 2012.

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 2011 vehicle crash data from the Automated Reporting Information Exchange System (ARIES), maintained by the Indiana State Police. This marks the sixth 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, 2011, 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 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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