



INDIANA

TRAFFIC SAFETY FACTS

MOTORCYCLES, 2013

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Based on data from the Indiana Automated Reporting and Information Exchange System (ARIES) as of March 21, 2014, this factsheet summarizes general aspects of motorcycle collisions, selected demographic characteristics of persons involved, license types and status, helmet use, the incidence of alcohol impairment, and geographical locations of collisions. 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, unless noted otherwise).

Persons involved, fatalities, and injuries in motorcycle and moped collisions¹

The large drop in 2013 motorcycle fatalities comes after a peak year in 2012 fatalities. In 2012, Indiana experienced the largest number of motorcycle injuries and fatalities during the 2003–2012 period as measured by ARIES data. As a result, 2013 fatalities appear to be a return to pre-2012 levels. From 2007 to 2013, fatalities per 100,000 motorcycle registrations dropped from 64 to 53; injuries per 100,000 registrations dropped from 1,473 to 1,243 (Table 1). After the 2012 peak, there was a 15 percent decrease in the number of persons involved in motorcycle collisions in 2013 (Table 2). In 2013, there were 118 fatalities from collisions involving motorcycles or mopeds. Including non-motorcyclists, there were 2,962 persons with non-fatal injuries.

Table 1. Indiana motorcyclist fatalities and injuries and fatality and injury rates, 2007-2013

Year	Fatalities	Injuries	Motorcycle registrations	Rates per 100,000 MC reg	
				Fatalities	Injuries
2007	122	2,799	190,073	64.2	1,472.6
2008	130	2,995	204,386	63.6	1,465.4
2009	111	2,486	202,878	54.7	1,225.4
2010	110	2,712	208,918	52.7	1,298.1
2011	118	2,719	214,903	54.9	1,265.2
2012	151	3,279	223,989	67.4	1,463.9
2013	118	2,755	221,715	53.2	1,242.6

Sources:

Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014
Indiana Bureau of Motor Vehicles, as of April 4, 2014

Notes:

- 1) Moped and motorcycle riders are included in *fatalities* and *injuries*.
- 2) *Injuries* includes *incapacitating, non-incapacitating, and other injury* categories.

¹The 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.

HIGHLIGHTS

In 2013, the 113 Indiana fatal collisions involving motorcycles resulted in 118 fatalities. The 118 fatalities involved 81 motorcycle operators, 23 moped operators, 12 motorcycle passengers, and 2 moped passengers.

After peak numbers of motorcycle collisions (4,104) and fatal motorcycle collisions (146) in 2012, the number of fatal collisions in 2013 decreased 23 percent, to 113.

There were 3,522 collisions in 2013 involving motorcycles or mopeds, a 14 percent decrease from 2012. Thirty-three fewer motorcycle and moped riders died in 2013 than in 2012 (22 percent decrease).

Unlicensed moped operators involved in collisions increased about 13 percent annually from 2009 to 2013. In 2013, 44 percent of collision-involved moped operators reported no license. Moped-related injuries are a growing proportion of all motorcyclist injuries.

Among collision-involved motorcyclists, fatality rates for helmeted riders (1.9 percent) were lower than the fatality rate for unhelmeted riders (3.4 percent).

Highest helmet use among collision-involved motorcyclists in 2013 (38 percent) was among riders aged 65 years or older, and 55 to 64 years (30 percent). The lowest rate was for riders 35 to 44 years of age (18 percent).





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Table 2. Persons involved in Indiana motorcycle or moped collisions by person type and injury, 2009-2013

Injury status and person type	Count of individuals					Annual rate of change	
	2009	2010	2011	2012	2013	2009-13	2012-13
All persons involved	5,134	5,524	5,708	6,611	5,654	2.4%	-14.5%
Fatal	113	114	118	151	118	1.1%	-21.9%
Injured	2,690	2,916	2,904	3,477	2,962	2.4%	-14.8%
Not injured	2,331	2,494	2,686	2,983	2,574	2.5%	-13.7%
Motorcycle	2,758	2,858	2,850	3,187	2,647	-1.0%	-16.9%
Driver	2,513	2,553	2,574	2,877	2,381	-1.3%	-17.2%
Fatal	88	93	92	112	81	-2.1%	-27.7%
Injured	1,683	1,736	1,718	1,983	1,605	-1.2%	-19.1%
Not injured	742	724	764	782	695	-1.6%	-11.1%
Passenger	245	305	276	310	266	2.1%	-14.2%
Fatal	4	10	4	15	12	31.6%	-20.0%
Injured	235	292	268	286	248	1.4%	-13.3%
Not injured	6	3	4	9	6	--	--
Moped	728	864	959	1,271	1,146	12.0%	-9.8%
Driver	667	785	882	1,144	1,054	12.1%	-7.9%
Fatal	19	7	21	23	23	4.9%	0.0%
Injured	513	611	661	888	816	12.3%	-8.1%
Not injured	135	167	200	233	215	12.3%	-7.7%
Passenger	61	79	77	127	92	10.8%	-27.6%
Fatal	0	0	1	1	2	--	100%
Injured	55	73	72	122	86	11.8%	-29.5%
Not injured	6	6	4	4	4	--	--
Other vehicle	1,648	1,802	1,899	2,153	1,861	3.1%	-13.6%
Fatal	2	4	0	0	0	-100%	--
Injured	204	204	185	198	207	0.4%	4.5%
Not injured	1,442	1,594	1,714	1,955	1,654	3.5%	-15.4%

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

Notes:

1) Other vehicle counts include non-motorists.

2) Passengers classified as not injured should not be in ARIES; they are included here as reported in ARIES.

MOTORCYCLE COLLISIONS

From 2012 to 2013, the number of fatal motorcycle collisions decreased 23 percent (Table 3), partly the result of a peak in fatal motorcycle collisions in 2012. The largest decrease in fatal collisions from 2012 to 2013

was in the fatal multi-vehicle category (27 percent decrease, from 83 to 61). For motorcyclists, multi-vehicle collision injury rates were typically lower than single-vehicle rates. Fatality rates for single- and multi-vehicle motorcycle collisions were similar from 2009 to 2013.

Table 3. Collisions involving motorcycles by collision severity and vehicles involved, 2009-2013

Collision type and severity	Count of collisions					Annual rate of change	
	2009	2010	2011	2012	2013	2009-13	2012-13
All collisions	3,276	3,429	3,551	4,104	3,522	1.8%	-14.2%
Fatal	111	110	117	146	113	0.4%	-22.6%
Injury	2,224	2,410	2,421	2,892	2,441	2.4%	-15.6%
Property damage	941	909	1,013	1,066	968	0.7%	-9.2%
Single vehicle	1,493	1,557	1,566	1,768	1,491	0.0%	-15.7%
Fatal	48	49	54	63	52	2.0%	-17.5%
Injury	1,162	1,236	1,231	1,427	1,175	0.3%	-17.7%
Property damage	283	272	281	278	264	-1.7%	-5.0%
Multi-vehicle	1,783	1,872	1,985	2,336	2,031	3.3%	-13.1%
Fatal	63	61	63	83	61	-0.8%	-26.5%
Injury	1,062	1,174	1,190	1,465	1,266	4.5%	-13.6%
Property damage	658	637	732	788	704	1.7%	-10.7%
Fatal collision as % total							
Single vehicle	3.2%	3.1%	3.4%	3.6%	3.5%		
Multi-vehicle	3.5%	3.3%	3.2%	3.6%	3.0%		
Injury collision as % total							
Single vehicle	77.8%	79.4%	78.6%	80.7%	78.8%		
Multi-vehicle	59.6%	62.7%	59.9%	62.7%	62.3%		

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

Notes:

1) Motorcycles includes mopeds.

2) Multi-vehicle collision includes other vehicles and non-motorists.

GENDER AND AGE²

Far more males than females are involved in Indiana motorcycle collisions—in 2013, 85 percent of 3,792 collision-involved motorcycle riders were males (calculated from Table 4). Overall, the number of male motorcycle riders killed in crashes decreased 25 percent in 2013. The number of male operators killed dropped 26 percent from 2012 to 2013. The number of collision-involved female operators decreased 10 percent in 2013.

From 2009 to 2013, the largest numbers of motorcyclists killed were typically within three age groupings: 25-34, 35-44, and 45-54 years (Figure 1). This changed somewhat in 2012-2013. In 2013, there was a notable decline in the number of 25-34 year old motorcyclists killed in comparison to 2012 (from 33 to 15). Only one age group saw an increase in fatalities from 2012 to 2013: the number of motorcyclists killed under 20 years of age increased in 2013 (from 5 to 9). The pattern of fatality rates per 100 motorcyclists involved shows differences among age groups (Figure 2).

Table 4. Injury status of motorcycle and moped riders by gender and person type, 2009-2013

						2009-13	2012-13
All riders	3,482	3,721	3,808	4,451	3,792	2.2%	-14.8%
Male	2,967	3,122	3,221	3,802	3,224	2.1%	-15.2%
Fatal	100	99	109	135	101	0.2%	-25.2%
Injured	2,042	2,177	2,196	2,714	2,251	2.5%	-17.1%
Not injured	825	846	916	953	872	1.4%	-8.5%
Female	515	599	587	649	568	2.5%	-12.5%
Fatal	11	11	9	16	17	11.5%	6.3%
Injured	444	535	522	562	504	3.2%	-10.3%
Not injured	60	53	56	71	47	-5.9%	-33.8%
Operators only	3,176	3,337	3,456	4,016	3,434	2.0%	-14.5%
Male	2,910	3,044	3,146	3,702	3,151	2.0%	-14.9%
Fatal	100	96	109	135	100	0.0%	-25.9%
Injured	1,992	2,110	2,124	2,620	2,187	2.4%	-16.5%
Not injured	818	838	913	947	864	1.4%	-8.8%
Female	266	293	310	314	283	1.6%	-9.9%
Fatal	7	4	4	0	4	-13.1%	--
Injured	204	237	255	250	234	3.5%	-6.4%
Not injured	55	52	51	64	45	-4.9%	-29.7%
Passengers	306	384	352	435	358	4.0%	-17.7%
Male	57	78	75	100	73	6.4%	-27.0%
Fatal	0	3	0	0	1	--	--
Injured	50	67	72	94	64	6.4%	-31.9%
Not injured	7	8	3	6	8	--	--
Female	249	306	277	335	285	3.4%	-14.9%
Fatal	4	7	5	16	13	34.3%	-18.8%
Injured	240	298	267	312	270	3.0%	-13.5%
Not injured	5	1	5	7	2	--	--

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

Notes:

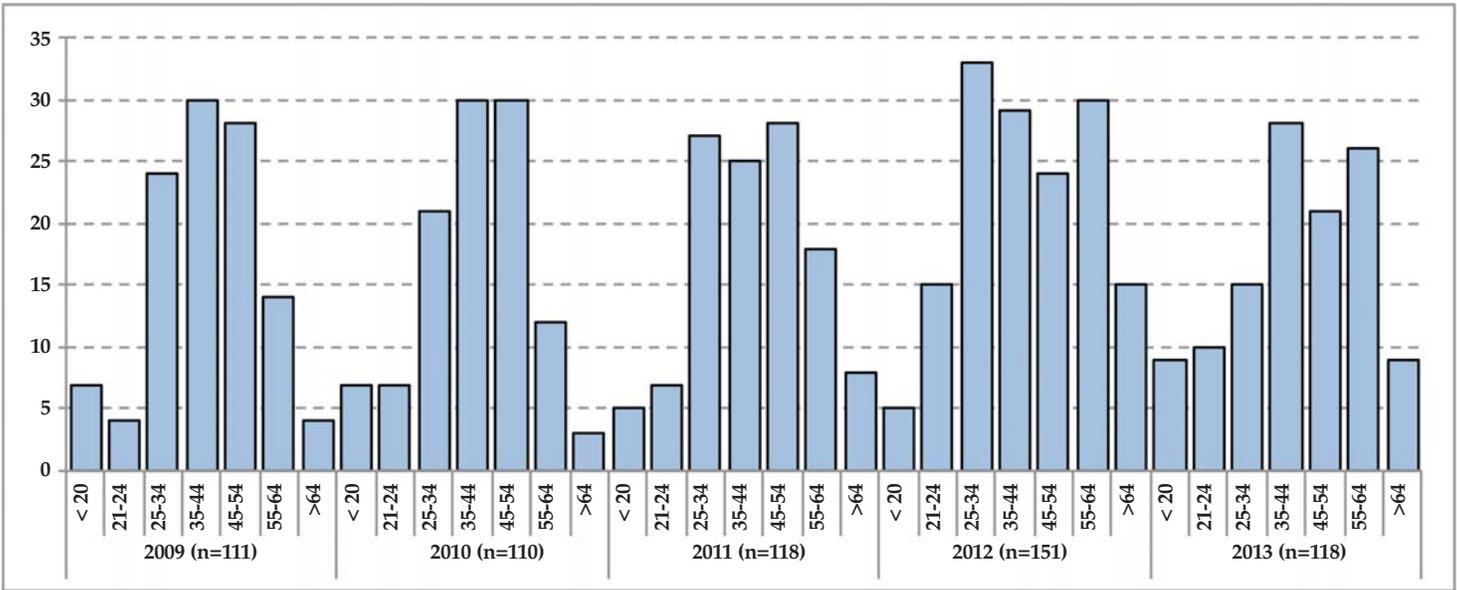
- 1) Excludes cases where gender or injury status were unknown.
- 2) Passengers classified as *not injured* should not be in ARIES; they are included here as reported in ARIES.

²This section excludes cases where gender, age, or injury status is unknown, unless otherwise noted. In addition, motorcycles and mopeds are combined as a single group.



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Figure 1. Count of motorcyclists killed, by age, 2009-2013

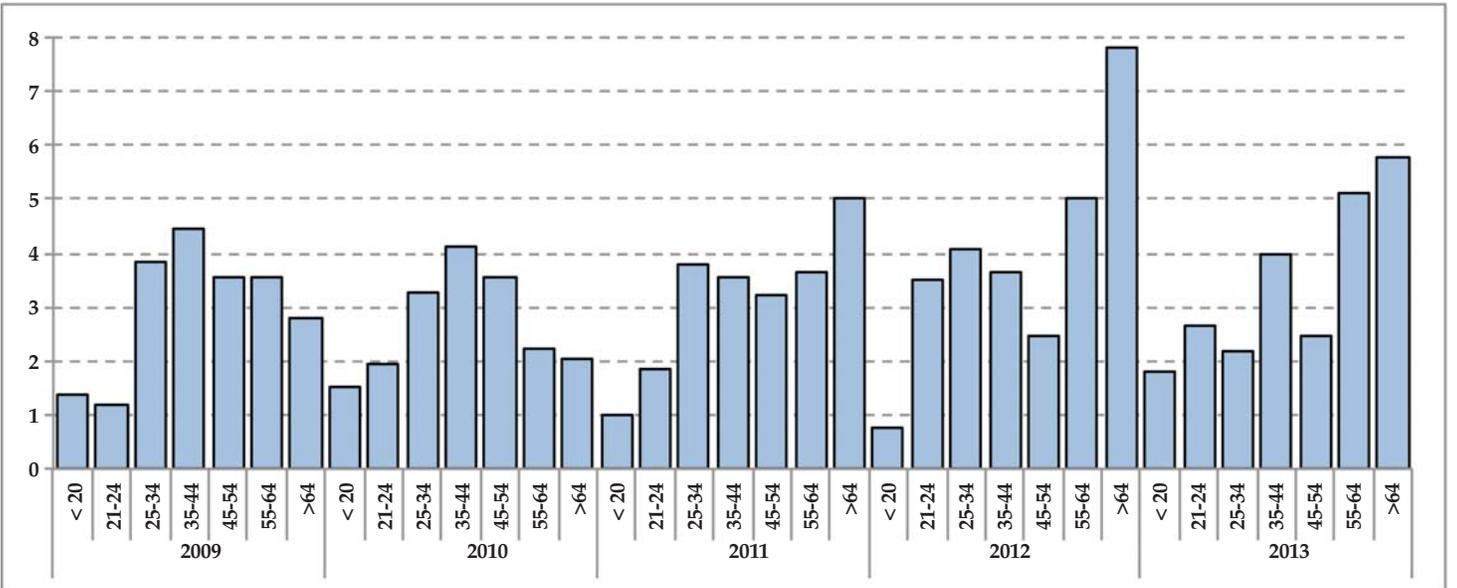


Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

Notes:

- 1) Motorcyclists includes moped riders.
- 2) Excludes *unknown* age group.

Figure 2. Fatality rate per 100 motorcyclists involved, by age, 2009-2013



Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

Notes:

- 1) Motorcyclists includes moped riders.
- 2) Excludes *unknown* age group.

LICENSING IN MOTORCYCLE COLLISIONS

ARIES data collected at collision sites by the police include the operator license type reported for the drivers involved. Generally, the types of driver's licenses reported for motorcycle operators differed from moped

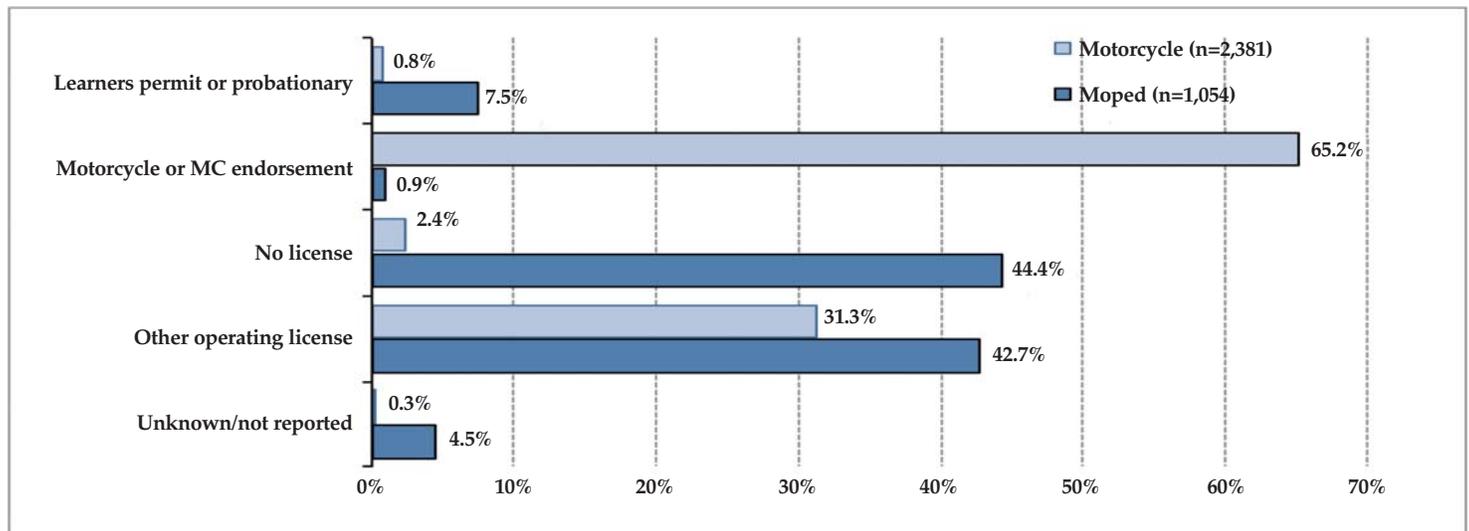
operators in several ways (Table 5). From 2009 to 2013, collision-involved motorcycle operators with proper motorcycle endorsements comprised slightly less than two-thirds of all motorcycle operators involved. Figure 3 shows the license types of collision-involved motorcycle and moped operators.

Table 5. License type of motorcycle and moped operators involved in collisions, 2009-2013

	2009	2010	2011	2012	2013	Annual rate of change	
						2009-13	2012-13
All operators	3,180	3,338	3,456	4,021	3,435	1.9%	-14.6%
Motorcycle	2,513	2,553	2,574	2,877	2,381	-1.3%	-17.2%
Motorcycle endorsement	1,593	1,636	1,590	1,831	1,552	-0.6%	-15.2%
Other operating license	832	851	893	935	746	-2.7%	-20.2%
No license	57	46	73	75	56	-0.4%	-25.3%
Learners permit/probationary	19	13	12	22	20	1.3%	-9.1%
Unknown/not reported	12	7	6	14	7	-12.6%	-50.0%
Moped	667	785	882	1,144	1,054	12.1%	-7.9%
Motorcycle endorsement	14	13	8	14	10	-8.1%	-28.6%
Other operating license	287	348	423	550	450	11.9%	-18.2%
No license	284	332	366	451	468	13.3%	3.8%
Learners permit/probationary	42	49	49	82	79	17.1%	-3.7%
Unknown/not reported	40	43	36	47	47	4.1%	0.0%
Moped as percent all operators	21.0%	23.5%	25.5%	28.5%	30.7%		
Percent by license type							
Motorcycle	100%	100%	100%	100%	100%		
Motorcycle endorsement	63.4%	64.1%	61.8%	63.6%	65.2%		
Other operating license	33.1%	33.3%	34.7%	32.5%	31.3%		
No license	2.3%	1.8%	2.8%	2.6%	2.4%		
Learners permit/probationary	0.8%	0.5%	0.5%	0.8%	0.8%		
Unknown/not reported	0.5%	0.3%	0.2%	0.5%	0.3%		
Moped	100%	100%	100%	100%	100%		
Motorcycle endorsement	2.1%	1.7%	0.9%	1.2%	0.9%		
Other operating license	43.0%	44.3%	48.0%	48.1%	42.7%		
No license	42.6%	42.3%	41.5%	39.4%	44.4%		
Learners permit/probationary	6.3%	6.2%	5.6%	7.2%	7.5%		
Unknown/not reported	6.0%	5.5%	4.1%	4.1%	4.5%		

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

Figure 3. Percentage of motorcycle and moped operators involved in collisions, by license type, 2013



Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014



HELMET USE

Based on roadside observational surveys of motorcycle helmet use in Indiana from 2005 to 2013, helmet usage has ranged between 35 and 47 percent, with a mean of about 41 percent.³ Collision-involved motorcyclists reflect substantially lower helmet use rates. From 2009 to 2013, the rate of helmet use among motorcycle riders involved in collisions was approximately one in four (Table 6), with the annual rate of change declining about 2 percent each year. Considering known helmet use, fatality rates for helmeted riders were roughly one-half the fatality rates for unhelmeted riders. Similarly, helmeted riders had lower non-fatal injury rates than did those unhelmeted. From 2009 to 2013, helmet use

was unknown or unreported for approximately 8 to 9 percent of collision-involved motorcyclists.

Helmet use in Indiana motorcycle collisions varies somewhat by age, but less so by gender. The highest rate of helmet use among collision-involved motorcyclists in 2013 (39 percent) was among riders aged 65 years or older (Figure 4). The lowest rate was for riders between 35 and 44 years of age (18 percent). Male and female motorcycle riders involved in collisions had similar reported rates of helmet use during the period (Table 7). Less than 30 percent of female and male motorcycle and moped riders in collisions were classified as using helmets. Regardless of gender, motorcycle passengers injured in collisions generally have slightly lower rates of helmet use than motorcycle operators.

Table 6. Helmet use by motorcyclists in Indiana collisions by individual injury severity, 2009-2013

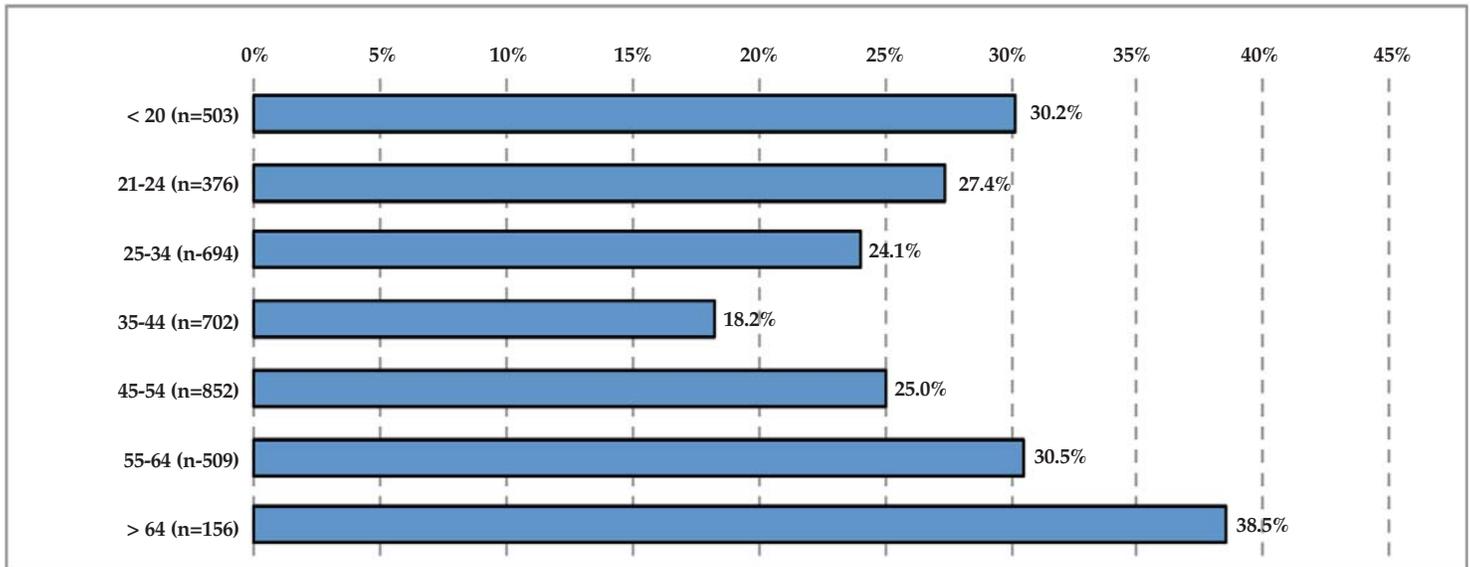
Helmet Use	2009	2010	2011	2012	2013	Annual rate of change	
						2009-13	2012-13
All motorcyclists	3,486	3,722	3,809	4,458	3,793	2.1%	-14.9%
No helmet reported	63.5%	64.6%	64.7%	66.5%	66.1%	1.0%	-0.6%
Helmet reported	28.3%	26.5%	25.8%	24.7%	25.8%	-2.3%	4.3%
Unknown	8.1%	8.9%	9.6%	8.8%	8.1%	0.0%	-7.6%
No helmet reported	2,215	2,403	2,463	2,963	2,506	3.1%	-15.4%
Fatal	3.8%	3.6%	3.9%	3.9%	3.4%	-3.3%	-14.4%
Injured	74.4%	74.1%	74.1%	75.2%	74.8%	0.1%	-0.5%
Not injured	21.7%	22.3%	22.0%	20.9%	21.8%	0.1%	4.7%
Helmet reported	987	986	981	1,102	978	-0.2%	-11.3%
Fatal	2.1%	1.8%	1.8%	2.6%	1.9%	-2.2%	-26.2%
Injured	68.0%	72.5%	69.4%	72.8%	72.0%	1.4%	-1.1%
Not injured	29.9%	25.7%	28.7%	24.6%	26.1%	-3.4%	6.0%
Unknown	284	333	365	393	309	2.1%	-21.4%
Fatal	1.8%	1.5%	1.4%	1.5%	4.9%	28.9%	218.0%
Injured	58.5%	65.2%	58.1%	63.1%	57.0%	-0.6%	-9.7%
Not injured	39.8%	33.3%	40.5%	35.4%	38.2%	-1.0%	8.0%

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

Note:
Includes motorcycle and moped riders.

³Center for Road Safety, 2014. *Indiana Roadside Observational Survey of Safety Belt and Motorcycle Helmet Use*. Purdue University.

Figure 4. Percent helmet use reported for motorcyclists involved in collisions by age of rider, 2013



Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

Notes:

- 1) Cases with unknown helmet use are classified as no helmet use.
- 2) Cases with unknown age are excluded.
- 3) Motorcycle and moped riders are combined in this figure.

Table 7. Helmet use for motorcycle and moped riders in crashes, by gender, 2009-2013

	2009	2010	2011	2012	2013	Annual rate of change	
						2009-13	2012-13
All riders							
Male	2,967	3,122	3,221	3,802	3,224	2.1%	-15.2%
Helmet reported	854	834	830	941	848	-0.2%	-9.9%
% helmet	28.8%	26.7%	25.8%	24.8%	26.3%	-2.2%	6.3%
Female	515	599	587	649	568	2.5%	-12.5%
Helmet reported	132	152	150	160	130	-0.4%	-18.8%
% helmet	25.6%	25.4%	25.6%	24.7%	22.9%	-2.8%	-7.2%
Operators only							
Male	2,910	3,044	3,146	3,702	3,151	2.0%	-14.9%
Helmet reported	843	819	813	918	833	-0.3%	-9.3%
% helmet	29.0%	26.9%	25.8%	24.8%	26.4%	-2.3%	6.6%
Female	266	293	310	314	283	1.6%	-9.9%
Helmet reported	78	84	94	88	67	-3.7%	-23.9%
% helmet	29.3%	28.7%	30.3%	28.0%	23.7%	-5.2%	-15.5%
Passengers only							
Male	57	78	75	100	73	6.4%	-27.0%
Helmet reported	11	15	17	23	15	8.1%	-34.8%
% helmet	19.3%	19.2%	22.7%	23.0%	20.5%	1.6%	-10.7%
Female	249	306	277	335	285	3.4%	-14.9%
Helmet reported	54	68	56	72	63	3.9%	-12.5%
% helmet	21.7%	22.2%	20.2%	21.5%	22.1%	0.5%	2.9%

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

Note:

Excludes cases with unknown gender or unknown helmet reported.



ALCOHOL INVOLVEMENT

With respect to levels and numbers of impaired motorcycle and moped operators, it should be noted that reporting rates for alcohol-impairment and BAC levels in ARIES were substantially lower in 2013 than 2012 (from 61 percent to 42 percent), so the interpretation of the comparatively lower impairment rates in 2013 should be made with care. From 2009 to 2013, the numbers of impaired motorcycle and moped operators involved in collisions generally increased at about 1 percent per year (Table 8). The percentage of all operators classified as impaired declined from 5 to 4 percent from 2012 to 2013. Considering all collisions, impaired operators comprised an average of about 4 percent for motorcycles and 5 percent of mopeds (calculated from Table 8). In 2013, 14 percent of motorcycle oper-

ator fatalities were classified as impaired (down from 23 percent in 2012), compared to 5 percent of moped operator fatalities.

When examined in terms of BAC among motorcycle and moped operators killed in collisions, the number of operators classified with a BAC of 0.08 g/dL or greater dropped sharply (from 32 to 12) (Table 9). The percentage of fatalities with reported results in ARIES ranged from a high of about 66 percent in 2011 to a new low of 42 percent in 2013. Considering only those tested, the percentage of (killed) operators with 0.08 g/dL or greater drifted upward from 2009 to nearly 51 percent in 2011, then dropped to under 40 percent in 2012 and 27 percent in 2013. While there might be 'real' reductions in impaired motorcycle and moped riding in 2013, the true magnitude of this decrease is masked by low ARIES reporting in 2013.

Table 8. Operators involved in collisions, by alcohol impairment and injury status, 2009-2013

Operators by alcohol impairment and injury status	2009	2010	2011	2012	2013	Annual rate of change	
						2009-13	2012-13
Unimpaired	3,045	3,178	3,276	3,812	3,292	2.0%	-13.6%
Motorcycle	2,415	2,451	2,450	2,736	2,289	-1.3%	-16.3%
Fatal	69	71	60	86	70	0.4%	-18.6%
Injured	1,627	1,665	1,641	1,892	1,544	-1.3%	-18.4%
Not injured	719	715	749	758	675	-1.6%	-10.9%
Moped	630	727	826	1,076	1,003	12.3%	-6.8%
Fatal	18	5	15	17	22	5.1%	29.4%
Injured	481	562	620	835	775	12.7%	-7.2%
Not injured	131	160	191	224	206	12.0%	-8.0%
Impaired	135	160	180	209	143	1.4%	-31.6%
Motorcycle	98	102	124	141	92	-1.6%	-34.8%
Fatal	19	22	32	26	11	-12.8%	-57.7%
Injured	56	71	77	91	61	2.2%	-33.0%
Not injured	23	9	15	24	20	-3.4%	-16.7%
Moped	37	58	56	68	51	8.4%	-25.0%
Fatal	1	2	6	6	1	0.0%	-83.3%
Injured	32	49	41	53	41	6.4%	-22.6%
Not injured	4	7	9	9	9	22.5%	0.0%
% impaired--overall	4.2%	4.8%	5.2%	5.2%	4.2%		
Motorcycle	3.9%	4.0%	4.8%	4.9%	3.9%		
Moped	5.5%	7.4%	6.3%	5.9%	4.8%		
% impaired--fatal injuries	18.7%	24.0%	33.6%	23.7%	11.5%		
Motorcycle	21.6%	23.7%	34.8%	23.2%	13.6%		
Moped	5.3%	28.6%	28.6%	26.1%	4.3%		

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

Table 9. Motorcycle and moped operators killed in collisions, by blood alcohol content, 2009-2013

BAC (g/dL) range	2009	2010	2011	2012	2013	Annual rate of change	
						2009-13	2012-13
Operators killed	107	100	113	135	104	-0.7%	-23.0%
Not reported or no test	58	44	38	53	60	0.9%	13.2%
0	21	29	32	45	26	5.5%	-42.2%
0.01 < 0.08	8	3	5	5	6	-6.9%	20.0%
0.08 < 0.15	11	10	13	12	2	-34.7%	-83.3%
0.15+	9	14	25	20	10	2.7%	-50.0%
Operators with 0.08 +	20	24	38	32	12	-12.0%	-62.5%
% with reported results	45.8%	56.0%	66.4%	60.7%	42.3%		
% 0.08 or higher (of all reported results)	40.8%	42.9%	50.7%	39.0%	27.3%		

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

GEOGRAPHY AND LOCATION

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* from 2009 through 2013 (Table 10). Since 2009, motorcycle collisions involving non-fatal injuries ranged from about 63 to 66 percent *urban* in 2012.

When the state of Indiana is divided into *urban*, *suburban*, *exurban*, and *rural* categories (based on 2010 US Census definitions of urban places) reflecting a continuum of population density, roughly 70 to 75 percent of fatal collisions occurred in urban and suburban locations.⁴ In 2013, about 14 percent of fatal crashes were located in purely *rural* areas (i.e., areas five or more miles away from the outer boundaries of U.S. Census-

defined urban areas). Most fatal and injury collisions involving motorcycles occurred within *urban* and *suburban* areas. In 2012 and 2013, about 80 percent of non-fatal injury collisions occurred in *urban* and *suburban* areas.

Indiana counties vary in their rates of motorcycle collisions as a percentage of total collisions in the county (Map 1). Large population counties have lower (overall) motorcycle collision rates (e.g., Marion or Lake). Counties with the highest overall motorcycle collision rates in 2013 were located in the southern half of Indiana. Point-level patterns of fatal collisions were distributed less systematically among various areas within the state in 2013, although it is possible to identify clusters in various counties (e.g., Marion, Lake, Vanderburgh, Allen, Tippecanoe). Eight counties had high rates of motorcycle-involved collisions but no fatal motorcycle collisions.

Table 10. Collisions involving motorcycles or mopeds, by severity and locality, 2009-2013

Collisions by location	2009	2010	2011	2012	2013
Incorporated limits					
Fatal	111	110	117	146	113
Urban	42.3%	49.1%	40.2%	47.3%	42.5%
Rural	57.7%	50.9%	59.0%	52.7%	57.5%
Unknown	0.0%	0.0%	0.9%	0.0%	0.0%
Non-fatal	3,165	3,319	3,434	3,958	3,409
Urban	63.1%	62.8%	64.5%	66.3%	64.3%
Rural	36.8%	37.1%	35.5%	33.6%	35.6%
Unknown	0.1%	0.1%	0.1%	0.2%	0.1%
Locality					
Fatal	111	110	117	146	113
Urban	45.0%	50.9%	49.6%	49.3%	44.2%
Suburban	27.0%	17.3%	20.5%	25.3%	25.7%
Exurban	9.0%	7.3%	9.4%	9.6%	14.2%
Rural	16.2%	16.4%	15.4%	13.7%	14.2%
Unknown	2.7%	8.2%	5.1%	2.1%	1.8%
Non-fatal	3,165	3,319	3,434	3,958	3,409
Urban	64.2%	61.5%	66.4%	67.5%	67.1%
Suburban	12.9%	13.1%	13.4%	13.6%	13.2%
Exurban	6.2%	7.4%	6.3%	6.5%	6.7%
Rural	9.5%	9.9%	9.5%	7.9%	10.0%
Unknown	7.2%	8.1%	4.4%	4.5%	2.9%

Source: Indiana State Police Automated Reporting Information Exchange System, as of March 21, 2014

Notes:

- 1) *Locality* classification is defined as follows: *Urban* = urban place boundary defined by the U.S. Census. *Suburban* = 2.5 mile wide band around urban. *Exurban* = 2.5 mile wide band around suburban. *Rural* = everywhere > 5 miles from boundary of an urban area.
- 2) *Non-fatal* includes *incapacitating*, *non-incapacitating*, and *property damage* collisions.

⁴The US Census delineation of urban places changed in 2010 after the most recent decennial census. ARIES data for 2008 to 2012 are "geotagged" with the 2010 urban place boundaries.

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.
- **Annual rate of change (ARC)** – The rate that a beginning value must increase/decrease each period (e.g. month, quarter, year) in a time series to arrive at the ending value in the time series. ARC is a “smoothed” rate of change because it measures change in a variable as if the change occurred at a steady rate each period with compounding. For example, to measure change in a variable from 2009 to 2013, it is calculated as $(\text{Value in 2013}/\text{Value in 2009})^{1/4} - 1$.
- **Census locality** — 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).

DATA SOURCES

Indiana Bureau of Motor Vehicles, current as of April 4, 2014.

Indiana State Police Automated Reporting Information Exchange System (ARIES), current as of March 21, 2014.



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

This publication is one of a series of 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 ICJI and the National Highway Traffic Safety Administration.

An electronic copy of this document can be accessed via the PPI website (www.policyinstitute.iu.edu), the ICJI website (www.in.gov/cji/), or you may contact the PPI at 317-261-3000.

Traffic Safety Project

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 Public Policy Institute is collaborating with the Indiana Criminal Justice Institute to analyze 2013 vehicle crash data from the Automated Reporting Information Exchange System (ARIES), maintained by the Indiana State Police. This marks the eighth year of this partnership. Research findings are summarized in a series of fact sheets on various aspects of traffic collisions, including alcohol-related crashes, trucks, dangerous driving, children, motorcycles, occupant protection, and drivers. An additional publication provides information on county and municipality data, and the final publication produced is 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, 2013, approximately 99 percent of all collisions are entered electronically through ARIES. Trends in collisions incidence as reported in these publications incorporate the effects of changes to data elements on the Crash Report, agency-specific enforcement policy changes, re-engineered roadways, driver safety education programs, and other unspecified effects. 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 Public Policy Institute (PPI) is a collaborative, multidisciplinary research institute within the Indiana University School of Public and Environmental Affairs (SPEA), Indianapolis. PPI 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. PPI also supports the Indiana Advisory Commission on Intergovernmental Relations (IACIR).

The National Highway Traffic Safety Administration (NHTSA)

NHTSA provides leadership to the motor vehicle and highway safety community through the development of innovative approaches to reducing motor vehicle crashes and injuries. The mission of NHTSA is to save lives, prevent injuries and reduce economic costs due to road traffic crashes, through education, research, safety standards and enforcement activity.



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