COMMERCIAL VEHICLES 2020



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In 2020:

- Of the 175,821 Indiana collisions reported in 2020, 8% (14,221) involved commercial vehicles (CV) and there were 134 fatal collisions involving CVs (17% of all fatal collisions).
- During the past five years, CV collisions decreased annually about 6%. From 2019 to 2020, collisions involving large trucks decrease 19% and bus collisions decreased 40%. Rates of large truck and bus collisions also declined, though not as dramatically, over the 5-year period.
- In 2020, fatal CV collisions occurred predominately on the highways of the state: 78% of CV-involved fatal collisions occurred on Indiana interstates, state roads, and US routes.
- In 2020, 157 persons died in CV collisions—a 6% increase from 2019. Of these, only 21 persons were in the CVs (20 drivers and 1 occupant).
- In 2020, there were 2,589 persons injured in CV collisions—of these, 32% were CV occupants.
- Considering all motor vehicle collisions from 2016 to 2020, the occupants of CVs and the occupants of non-CVs were properly restrained about 87% of the time; vehicle occupants killed in CV collisions were properly restrained at substantially lower rates.
- Compared to non-CV collisions, CV collisions drop substantially on Saturdays and Sundays, but during Monday through Friday CV collisions peak around 2pm to 3pm, ahead of the typical later afternoon peak seen in 2020 non-CV collisions.

INTRODUCTION

This fact sheet summarizes Indiana traffic collisions involving commercial vehicles (CV), by examining collision characteristics, the types of vehicles, and individuals involved from 2016 to 2020. Collision severity, person type, personal injury status, restraint use, and other selected aspects of collisions are examined for CVs and other involved (non-CV) traffic units. Indiana collision data are collected by Indiana State Police officers and submitted to the Automated Reporting Information Exchange System (ARIES). ARIES data analyzed in this report were extracted March 29, 2021.

DEFINITION TEXT BOX

As categorized by ARIES, commercial vehicles (CV) are defined as:

(1) large trucks (single 2 axle, 6 tires; single 3 or more axles; truck/trailer--not semi; tractor--cab only, no trailer; tractor/one semi-trailer; tractor/double trailer; tractor/triple trailer),

- (2) combination vehicles,
- (3) pickup trucks over 10,000 pounds,
- (4) buses (15+ passengers with driver),
- (5) school buses, or

(6) any vehicle with a hazardous materials (hazmat) placard.

The pandemic and traffic safety in 2020

The COVID-19 pandemic affected a traffic safety in 2020. Preliminary analyses of traffic safety fatalities by the National Highway Traffic Safety Administration (NHTSA)— using data from the Fatality Analysis Reporting System (FARS)—estimates that while vehicle miles travelled were down nationally in 2020 from 2019, the number of fatalities and the fatality rate per 100 million VMT were higher (NCSA, 2021a). Fatalities among passenger vehicle occupants, motorists, and pedalcyclists are estimated to be up 5%, 9%, and 5%, respectively (NCSA, 2021b). NHTSA's analysis also suggests risky traffic behaviors increased in 2020 (OBSR, 2021). For example, national fatality counts for unrestrained occupants of passenger vehicles are estimated to be up 15% and deaths from occupant ejections up 20%.

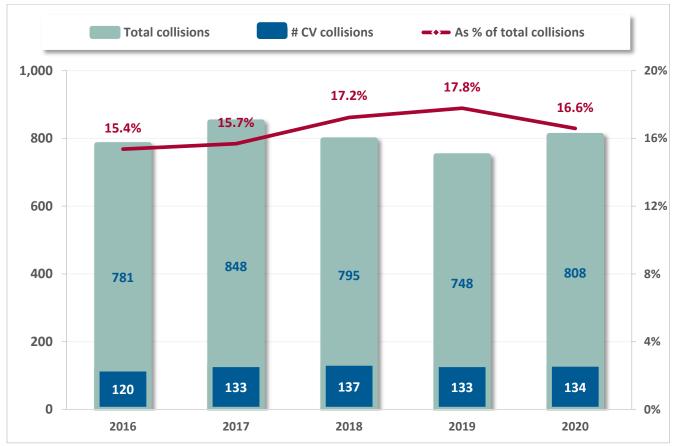
The 2020 Indiana traffic safety data and analysis should be considered carefully in light of the potentially anomalous effects of the pandemic. Further analysis may be needed to evaluate whether the challenges in Indiana were similar to those identified nationally, whether those challenges continue, and whether the addition or adjustment of countermeasures is warranted.

Sources:

- National Center for Statistics and Analysis. (2021a, (revised)). Early estimates of motor vehicle traffic fatalities and fatality rate by sub-categories in 2020 (Crash Stats Brief Statistical Summary. Report No. DOT HS 813 118). National Highway Traffic Safety Administration.
- National Center for Statistics and Analysis. (2021b). Early estimate of motor vehicle traffic fatalities in 2020 (Crash Stats Brief Statistical Summary. Report No. DOT HS 813 115). National Highway Traffic Safety Administration.
- Office of Behavioral Safety Research. (2021, June). Update to special reports on traffic safety during the COVID-19 public health emergency: Fourth quarter data (Report No. DOT HS 813 135). National Highway Traffic Safety Administration.

CV COLLISIONS AND UNITS INVOLVED

In 2020, there were 14,221 traffic collisions involving one or more CVs; of these, 90% (12,841) involved large trucks (Table 1). CV collisions have decreased from 2016 to 2020 by about 4% per year, slightly faster than the average five-year change in all collisions (6% decline). From 2019 to 2020, there was a 3% decrease in collisions involving large trucks, while collisions involving buses declined by 13%. In 2020, there was a 3% increase in CV-involved fatal collisions, compared to 1% decrease for all fatal collisions. Of the 134 fatal collisions that included a CV in 2020, 94% (126) involved large trucks. Compared to their involvement in all collisions (7%), CV collisions account for 17% of fatal collisions (Table 1 and Figure 1).





Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Type of CV involved/collision		Cou	Annual rate of change					
severity	2016 2017 2018 2019				2020	2019-20 2016-20		
Total collisions	223,961	219,317	217,276	217,578	175,821	-19.2%	-5.9%	
Fatal	781	848	795	748	808	8.0%	0.9%	
Injury	35,337	34,226	32,412	31,213	26,303	-15.7%	-7.1%	
Property damage	187,843	184,243	184,069	185,617	148,710	-19.9%	-5.7%	
Any CV	16,897	16,928	17,551	17,874	14,221	-20.4%	-4.2%	
Fatal	120	133	137	133	134	0.8%	2.8%	
Injury	2,222	2,074	2,136	2,111	1,758	-16.7%	-5.7%	
Property damage	14,555	14,721	15,278	15,630	12,329	-21.1%	-4.1%	
Any CV as percent total	7.5%	7.7%	8.1%	8.2%	8.1%			
CV fatal as percent all fatal	15.4%	15.7%	17.2%	17.8%	16.6%			
Collisions involving a large truck	14,733	14,893	15,434	15,759	12,841	-18.5%	-3.4%	
Fatal	114	128	133	126	126	0.0%	2.5%	
Injury	1,974	1,860	1,910	1,901	1,617	-14.9%	-4.9%	
Property damage	12,645	12,905	13,391	13,732	11,098	-19.2%	-3.2%	
Large truck as percent total	6.6%	6.8%	7.1%	7.2%	7.3%			
Large truck fatal as percent all fatal	14.6%	15.1%	16.7%	16.8%	15.6%			
Collisions involving a bus	2,043	1,951	2,046	1,973	1,193	-39.5%	-12.6%	
Fatal	7	7	5	8	6	-25.0%	-3.8%	
Injury	249	217	220	200	130	-35.0%	-15.0%	
Property damage	1,787	1,727	1,821	1,765	1,057	-40.1%	-12.3%	
Bus as percent total	0.9%	0.9%	0.9%	0.9%	0.7%			
Bus fatal as percent all fatal	0.9%	0.8%	0.6%	1.1%	0.7%			

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021 Notes:

1) Includes any collisions involving one or more commercial vehicles, one or more large trucks, or one or more buses, as designated by ARIES.

2) Collisions involving a bus or a large truck are not mutually exclusive (e.g., collision involving truck and bus would be counted twice).

Compared to non-CV fatal collisions, those involving CVs occur disproportionately on interstates, state roads, and US routes (e.g., in 2020, 7% of non-CV fatal collisions happened on interstates, compared to 34% of CV collisions) (Figure 2). Fatal non-CV collisions are much more likely to occur on local, city, and county roads

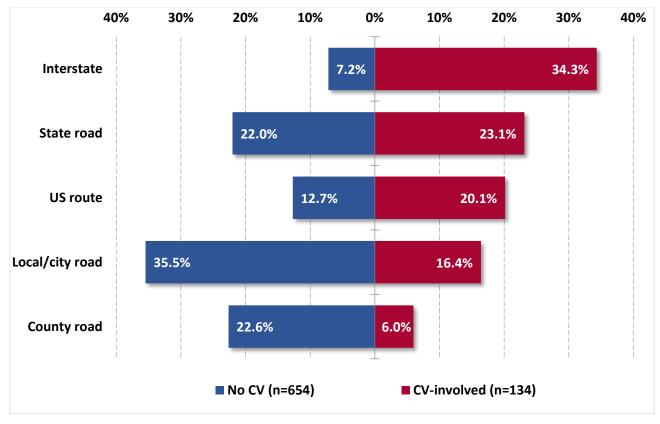


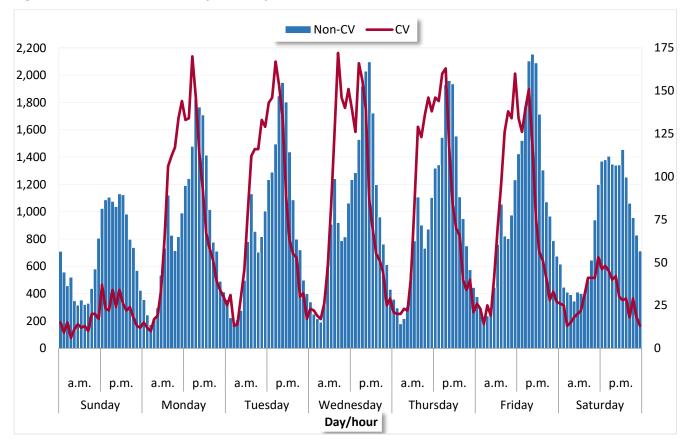
Figure 2. Percent of total fatal collisions, by commercial vehicle (CV) involvement and road class, 2020

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021 Notes:

1) Excludes cases with unknown road class.

2) Percentages refer to fatal collisions in road class as percent of all fatal collisions

CV collisions occurred predominately during the Monday-Friday work week, and drop substantially on Saturday and Sunday, and more so than do non-CV collisions (Figure 3). In comparison to non-CV collisions, the peak hours of CV collisions typically hover around 2-3pm, generally preceding the non-CV collision peaks during the work week.





Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

INDIVIDUALS INVOLVED IN CV COLLISIONS

Individuals involved in Indiana CV collisions include CV operators and passengers, the operators and passengers of other vehicles (motorists), and non-motorists. In 2020, this included 14,614 persons in CVs, as well as 9,390 other motorists and 66 non-motorists (Table 2). Persons involved in commercial vehicle collisions represent about 9% of all collision-involved individuals, but comprise about 17% of those killed. The disproportionality of CV-related fatalities is consistent across the five-year period. In 2020, there were 21 CV occupant fatalities in 2020 and 116 other motorists were killed in CV-involved collisions.

		Cou	Annual rate of change				
Vehicle type/injury status	2016	2017	2018	2019	2020	2019-20	2016-20
Individuals in all collisions	364,358	358,134	352,419	350,900	275,671	-21.4%	-6.7%
Individuals in CV collisions	28,924	28,935	29,809	30,078	24,070	-20.0%	-4.5%
Percent of all in CV collisions	7.9%	8.1%	8.5%	8.6%	8.7%		
Persons in CV	16,972	17,066	17,661	17,962	14,614	-18.6%	-3.7%
Fatal	19	20	27	18	21	16.7%	2.5%
Injured	1,214	1,071	1,110	1,146	823	-28.2%	-9.3%
Not injured	15,739	15,975	16,524	16,798	13,770	-18.0%	-3.3%
Other motorists	11,867	11,796	12,074	12,039	9,390	-22.0%	-5.7%
Fatal	95	124	111	119	116	-2.5%	5.1%
Injured	2,281	2,184	2,196	2,077	1,735	-16.5%	-6.6%
Not injured	9,491	9,488	9,767	9,843	7,539	-23.4%	-5.6%
Non-motorists	85	73	74	77	66	-14.3%	-6.1%
Fatal	13	11	14	11	20	81.8%	11.4%
Injured	54	46	48	47	31	-34.0%	-13.0%
Not injured	18	16	12	19	15	-21.1%	-4.5%
Fatalities in CV collisions	127	155	152	148	157	6.1%	5.4%
All Indiana fatalities	834	925	880	808	896	10.9%	1.8%
Percent of all in CV collisions	15.6%	20.0%	16.8%	15.2%	16.7%		
Fatal injury rates, CV collisions							
In CV	0.1%	0.1%	0.2%	0.1%	0.1%		
Other motorists	0.8%	1.1%	0.9%	1.0%	1.2%		
Non-motorists	15.3%	15.1%	18.9%	14.3%	30.3%		
Non-fatal injury rates, CV collisions							
In CV	7.2%	6.3%	6.3%	6.4%	5.6%		
Other motorists	19.2%	18.5%	18.2%	17.3%	18.5%		
Non-motorists	63.5%	63.0%	64.9%	61.0%	47.0%		

Table 2. Individuals in Indiana collisions involving a commercial vehicle (CV) by vehicle type and injury status, 2016-20

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Note: Injured includes incapacitating, non-incapacitating, possible, unknown, or refused treatment.

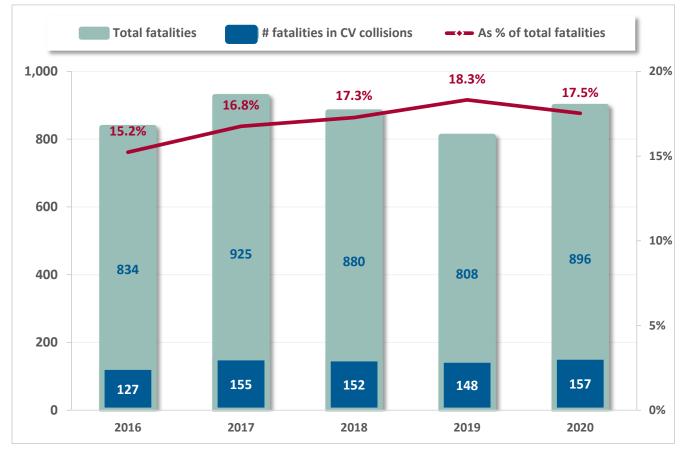


Figure 4. Indiana fatalities that involve commercial vehicles, 2016–20

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Persons not in CVs are more likely to be injured or killed than CV occupants. Not surprisingly, 2020 fatality and injury rates for other motorist and non-motorists in CV collisions were high: 30% of non-motorists died and 47% were injured. CV occupants had lower fatality and injury rates (less than 1% and 6%, respectively) than other involved motorists (1% and 19%, respectively). Thus, non-CV drivers and their passengers comprised the largest numbers of individuals killed in CV collisions, 74% (Figure 5). In 2020 the CV drivers comprised the next largest group killed (13%). In terms of 2,589 individuals with non-fatal injuries in 2020 CV-involved collisions, non-CV drivers and CV drivers were the largest number of those hurt (over three-quarters), followed by non-CV occupants and CV occupants (Figure 5).

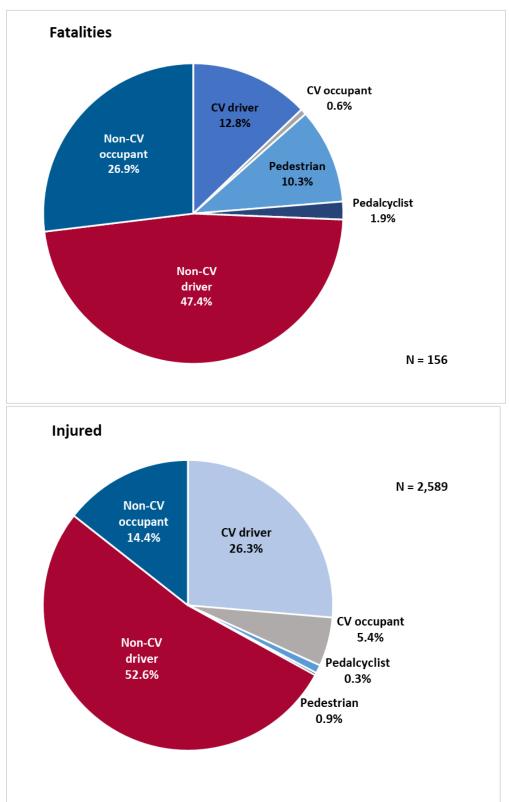


Figure 5. Individuals killed and injured in Indiana collisions involving commercial vehicles (CV), by person type, 2020

RESTRAINT USE

In 2020, approximately 87% of CV occupants were properly restrained (Table 3). There has been a slightly decline in this overall restraint use in CV collisions from 2016 to 2020. However, individuals killed or injured in CV collisions have considerably lower restraint use rates. For example, the individuals killed in CVs were restrained only about 38% of the time in 2020, compared to a 59% restraint use rate for other motorists killed. In terms of those suffering non-fatal injuries in CV collisions, the restraint use rates of individuals in CVs have typically been much lower than those of the non-CV occupants in each of the five years.

		Cou	Annual rate of change				
All involved	2016	2017	2018	2019	2020	2019-20	2016-20
CV occupants	16,972	17,066	17,661	17,962	14,614	-18.6%	-3.7%
Properly restrained	15,275	15,437	15,912	16,127	12,637	-21.6%	-4.6%
% restraint use	90.0%	90.5%	90.1%	89.8%	86.5%		
Non-CV occupants	11,867	11,796	12,074	12,039	9,390	-22.0%	-5.7%
Properly restrained	10,939	10,871	11,129	10,937	8,224	-24.8%	-6.9%
% restraint use	92.2%	92.2%	92.2%	90.8%	87.6%		
Fatal injuries							
CV occupants	19	20	27	18	21	16.7%	2.5%
Properly restrained	13	14	11	9	8	-11.1%	-11.4%
% restraint use	68.4%	70.0%	40.7%	50.0%	38.1%		
Non-CV occupants	95	124	111	119	116	-2.5%	5.1%
Properly restrained	50	72	56	63	68	7.9%	8.0%
% restraint use	52.6%	58.1%	50.5%	52.9%	58.6%		
Non-fatal injuries							
CV occupants	1,214	1,071	1,110	1,146	823	-28.2%	-9.3%
Properly restrained	823	774	763	847	640	-24.4%	-6.1%
% restraint use	67.8%	72.3%	68.7%	73.9%	77.8%		
Non-CV occupants	2,281	2,184	2,196	2,077	1,735	-16.5%	-6.6%
Properly restrained	2,014	1,952	1,971	1,794	1,479	-17.6%	-7.4%
% restraint use	88.3%	89.4%	89.8%	86.4%	85.2%		

Table 3. Safety equipment use among individuals involved in Indiana commercial vehicle (CV) collisions, by injury severity and person type, 2016-2020

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Notes

1) Excludes non-motorists.

2) Totals include individuals with 'NULL' and unknown restraint use.

PRIMARY FACTORS IN CV COLLISIONS

Law enforcement officers assign a primary factor to each collision in Indiana, and indicate whether the driver or operator of the involved units 'contributed' to the collision occurrence (ARIES calls this 'contributing circumstance'). When a driver's contributing circumstance to a collision matches the primary factor of the collision, the driver is said to be attributable in the crash; roughly speaking, this means that when attributable, the driver is at least partly 'at fault' in the collision. In a multi-vehicle collision, both vehicles can be attributable.

For all CVs and non-CVs in multi-vehicle collisions involving at least one CV, Table 4 shows counts and proportions of vehicles that were attributable across the various primary factors assigned to collisions in 2020. There were 22,798

vehicles involved in multi-vehicle CV collisions, of which 12,484 were CVs and 10,314 were other motor vehicles and/or non-motorists. Overall, 50% of CVs were attributable (to the primary factor) and 48% of other involved vehicles. However, attributability varies by which primary factor was assigned to the collision. The primary factors for about 94% of traffic units involved in multivehicle CV collisions are linked to driver-related actions for both CVs and non-CVs, the most common of which include unsafe lane movement, following too closely, unsafe backing (for which CVs were more attributable); failure to yield, improper turning, and improper lane usage.

Table 4. Primary factor attributability by commercial vehicles (CV) and non-CV traffic units in Indiana multi-vehicle CV
collisions, 2020

	CV involved:			Non-	CV vehicles in	Percent of total		
Primary factor in collision	Total Attributable to CV			Total Attributable to non-CV			vehicles involved	
		Count	%		Count	%	CV	Non-CV
Total	12,484	6,211	49.8%	10,314	4,902	47.5%	100.0%	100.0%
Driver-related	11,705	5,745	49.1%	9,605	4,625	48.2%	93.8%	93.1%
Unsafe lane movement	2,265	1,059	46.8%	1,899	964	50.8%	18.1%	18.4%
Following too closely	1,799	847	47.1%	1,556	706	45.4%	14.4%	15.1%
Unsafe backing	1,493	1,010	67.6%	915	177	19.3%	12.0%	8.9%
Failure to yield right of way	1,421	552	38.8%	1,357	810	59.7%	11.4%	13.2%
Improper turning	969	642	66.3%	605	141	23.3%	7.8%	5.9%
Improper lane usage	535	291	54.4%	451	182	40.4%	4.3%	4.4%
Disregard signal/reg sign	349	136	39.0%	381	219	57.5%	2.8%	3.7%
Left of center	331	119	36.0%	292	193	66.1%	2.7%	2.8%
Speed too fast for weather conditions	310	62	20.0%	302	231	76.5%	2.5%	2.9%
Improper passing	298	96	32.2%	251	165	65.7%	2.4%	2.4%
Driver distracted	284	104	36.6%	243	130	53.5%	2.3%	2.4%
Unsafe speed	270	67	24.8%	262	156	59.5%	2.2%	2.5%
Overcorrecting/oversteering	210	96	45.7%	139	65	46.8%	1.7%	1.3%
Ran off road right	79	27	34.2%	76	46	60.5%	0.6%	0.7%
Driver asleep or fatigued	77	15	19.5%	76	56	73.7%	0.6%	0.7%
Wrong way on one way	16	7	43.8%	14	7	50.0%	0.1%	0.1%
Cell phone usage	11	2	18.2%	7	6	85.7%	0.1%	0.1%
Driver illness	8	2	25.0%	13	8	61.5%	0.1%	0.1%
Other - driver	980	611	62.3%	766	363	47.4%	7.9%	7.4%
Other telematics in use	0	0	N/A	0	0	N/A	0.0%	0.0%
Environment-related	287	162	56.4%	264	162	61.4%	2.3%	2.6%
Animal on roadway	100	52	52.0%	96	62	64.6%	0.8%	0.9%
Other - environment	66	39	59.1%	56	32	57.1%	0.5%	0.5%
Roadway surface condition	62	35	56.5%	55	44	80.0%	0.5%	0.5%
View obstructed	34	21	61.8%	34	12	35.3%	0.3%	0.3%
Lane marking obscured	8	6	75.0%	4	2	50.0%	0.1%	0.0%
Obstruction not marked	7	2	28.6%	10	4	40.0%	0.1%	0.1%
Holes/ruts in surface	5	3	60.0%	5	5	100.0%	0.0%	0.0%
Severe crosswinds	3	3	100.0%	1		0.0%	0.0%	0.0%
Traffic control problem	2	1	50.0%	3	1	33.3%	0.0%	0.0%
Vehicle-related	492	304	61.8%	445	115	25.8%	3.9%	4.3%

Source: Analysis provided by the Indiana University Public Policy using data downloaded from the Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021

Notes:

1) Primary factors are counts of vehicles involved in multi-vehicle collisions with that primary factor. Note that more than one vehicle may have contributing circumstances that match the primary factor in multi-vehicle collisions.

2) Attributable/Attributablity: a vehicle and/or driver is considered attributable in a collision when linked by the reporting officer to the primary factor or cause of the collisions.

3) Excludes unknown or unspecified primary factors.

DEFINITIONS

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 2016 to 2020, it is calculated as (Value in 2016/Value in 2020)^{1/4} – 1.

Commercial vehicle - Units identified within ARIES as (1) large trucks (single 2 axle, 6 tires; single 3 or more axles; truck/trailer--not semi; tractor--cab only, no trailer; tractor/one semi-trailer; tractor/double trailer; tractor/triple trailer), (2) combination vehicles, (3) pickup trucks over 10,000 pounds, (4) buses (15+ passengers with driver), (5) school buses, or (6) any vehicle displaying a hazardous materials (hazmat) placard.

Contributing circumstance - Actions of the driver, apparent environmental conditions, or apparent vehicle conditions that contributed to the collision.

Motorists - Drivers/operators of collision-involved motor vehicles and the injured occupants in those vehicles.

Non-motorist - Pedestrians, pedalcyclists, or animal-drawn vehicle operators.

Primary factor - The single factor that the investigating officer believes to be the main or primary factor that contributed to the collision's occurrence. Each collision may have only one primary factor.

Vehicle (unit) attributability – The vehicle's contributing circumstance is the same as the collision primary factor. A vehicle and/or driver is considered attributable in an Indiana collision when linked by the reporting officer to the primary factor or cause of the collisions.

Restraint use – Vehicle occupants injured in Indiana collisions are counted as having been restrained when the investigating officer selects any one of the following passenger vehicle safety equipment categories on the Indiana Crash Report: (1) lap belt only; (2) harness; (3) airbag deployed and harness; (4) child restraint; (5) lap and harness; or (6) shoulder belts.

DATA SOURCES

Indiana State Police Automated Reporting Information Exchange System (ARIES), as of March 29, 2021.