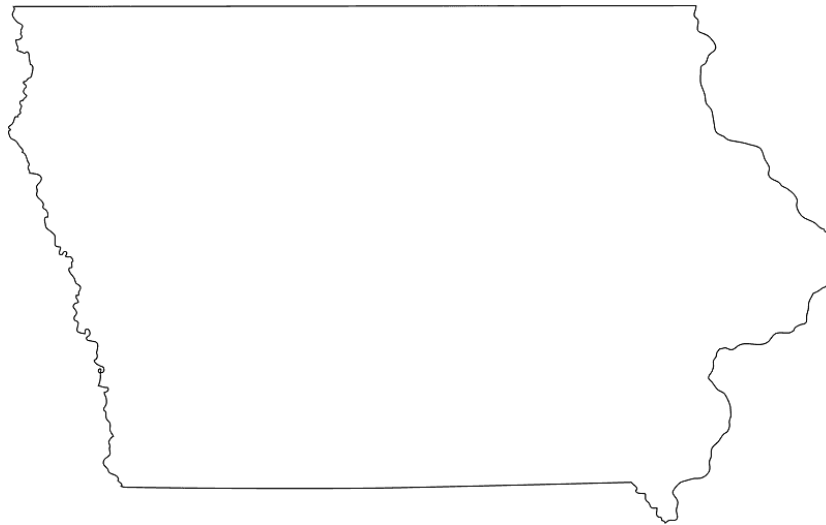


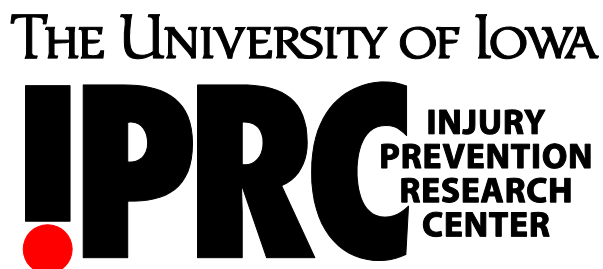
CODES

Iowa Crash Outcomes Data Evaluation System



2022 Year-End Report

*Prepared by the
University of Iowa Injury Prevention Research Center
Under contract to Iowa Governor's Traffic Safety Bureau and Iowa Department of
Transportation*



PROJECT DESCRIPTION

The goal of the CODES project is to examine outcomes (injuries, long-term disability, hospital charges, discharge status) related to motor vehicle crash-related injuries in the State of Iowa. This will be accomplished by probabilistically linking identified person (patient)-level crash, hospital, and mortality data.

The hospital data (inpatient and emergency department) sources are the Iowa State Inpatient Database (SID) and Iowa State Emergency Department Database (SEDD), which comes from AHRQ's Healthcare Cost and Utilization Project (HCUP). Crash data are obtained from the Iowa Department of Transportation and mortality data are obtained from the NHTSA's Fatality Analysis Reporting System (FARS).

CURRENT STATUS

We performed probabilistic linkage to link the Iowa police crash reports with Iowa Emergency Department data, Iowa Hospital Inpatient data, and FARS fatal motor vehicle crashes from 2016 through 2020 to get a single and comprehensive dataset for analysis.

TEEN DRIVER CULPABILITY ANALYSES

We analyzed the direct medical charges of teen-involved vehicle crashes by culpability. The teen drivers aged 14 through 17 involved in a crash from 2016 through 2020 were examined to identify their characteristics. Independence analyses were conducted on sex, age, day of week, time, drug or alcohol related, rurality, contributing circumstances of environment, road system, and vehicle configuration with culpability. Direct medical charges were estimated from charges through linkage to the Iowa Hospital Inpatient and the Iowa Emergency Department Databases.

Figure 1 shows the flow chart of the frequency of teen drivers vs. non-culpable teen drivers. The criteria for injured people is the people with inpatient or emergency department charges. Other parties mean drivers and passengers other than the teen driver. There are 1240 crashes involving more than 1 teen driver. The flow chart is at the individual level, so, all teen drivers are entered even if in the same crash.

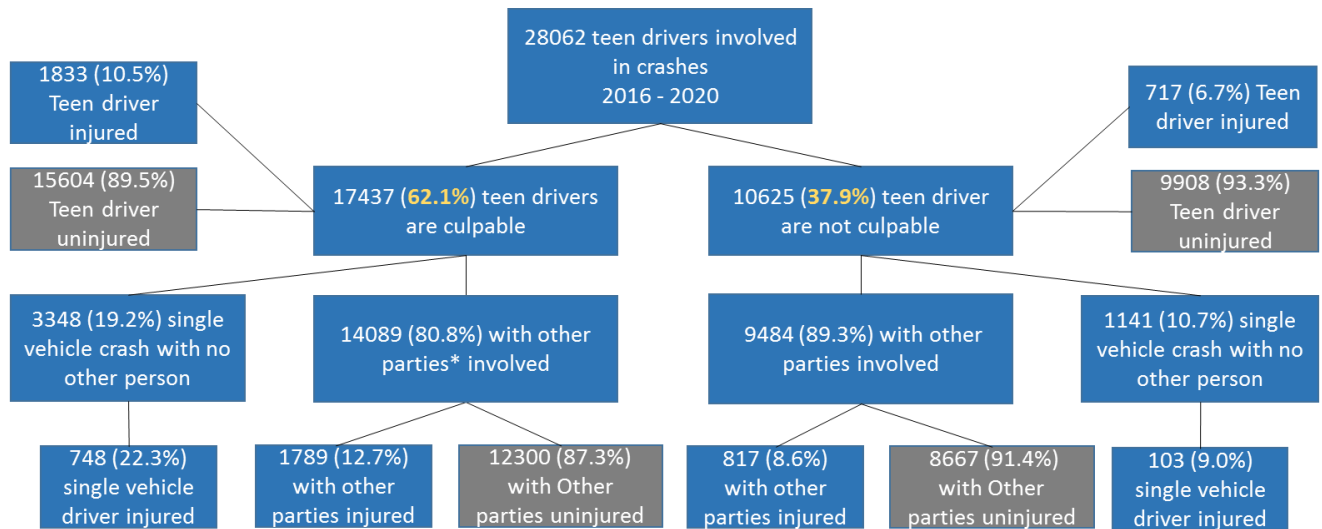


Figure 1. The flow chart of the frequency of teen drivers vs. non-culpable teen drivers

We are using the 2016 and 2020 linked dataset so far to explore the medical charge. Table 1 shows the Inpatient and Emergency Department charges for teen drivers involved in crashes (the teen drivers only) by teen driver culpability. Table 2 shows Inpatient and Emergency Department charges for teen driver's passengers by culpability. Table 3 shows Inpatient and Emergency Department charges for other parties in teen driver-involved crashes by culpability. Table 4 shows the Inpatient and Emergency Department charges for crash level by culpability.

Table 1: Inpatient and Emergency Department charges for teen drivers by culpability (\$)

	Inpatient					Emergency dept					Total
	Tot.	Num	Ave.	Media n	IQR*	Tot.	Num	Ave	Media n	IQR	
Culpable	9,507,687	119	79,897	40,020	49,667	8,903,196	1,754	5,076	3,467	5,174	18,410,883
Non-culpable	2,236,312	24	*93,180	44,827	80,025	2,659,458	701	3,794	2,345	3,566	4,895,770

* Six individuals were charges over \$100k in total.

* IQR: interquartile range.

Table 2: Inpatient and Emergency Department charges for teen driver's passengers by culpability (\$)

	Inpatient					Emergency dept					Total
	Tot.	Num	Ave.	Media n	IQR	Tot.	Num	Ave.	Media n	IQR	
Culpable	4,801,822	70	68,598	37,831	57,061	3,507,837	649	5,405	3,308	5,487	8,309,660
Non-culpable	508,446	*	50,845	50,260	44,369	742,534	176	4,219	2,700	3,724	1,250,980

Table 3: Inpatient and Emergency Department charges for other parties in teen driver-involved crashes by culpability (\$) *

	Inpatient					Emergency dept					Total
	Tot.	Num.	Ave.	Median	IQR	Tot.	Num.	Ave.	Median	IQR	
Culpable	6,222,940	104	59,836	44,015	55,556	6,320,733	1,424	4,439	2,944	4,538	12,543,673
Non-culpable	4,447,691	68	65,407	39,579	43,871	3,444,960	632	5,451	3,437	5,620	7,892,651

Table 4: Inpatient and Emergency Department charges for crash level by culpability (\$) *

	Inpatient					Emergency dept					Total
	Tot.	Num.	Ave.	Median	IQR	Tot.	Num.	Ave.	Median	IQR	
Culpable	20,532,449	293	70,077	41,302	52,703	18,731,766	3,827	4,895	3,242	5,029	39,264,215
Non-culpable	6,983,087	98	71,256	41,246	60,711	6,630,131	1,425	4,653	2,846	4,419	13,613,218

*The 1240 crashes involving culpable and non-culpable teen drivers have been labeled to be culpable.

The main results from the analysis:

- Culpable teen drivers were more likely to injure themselves (10.5%) compared with non-culpable teen drivers (6.7%).
- The proportion of culpability in males (65.75%) is a little higher than in females (60.14%). The age of 14 had the highest proportion of culpability (68.05%), and the age of 17 had the lowest (59.52%), compared to other ages.
- Culpable teen drivers were more likely to injure themselves (10.5%) compared with non-culpable teen drivers (6.7%).
- In a crash with other parties involved, culpable teen drivers are more likely to have other parties injured (12.7%) compared with non-culpable teen drivers (8.6%).
- Sunday and Saturday were both in higher proportions of culpability (65.9% and 63.2%) than other days in a week.
- Though culpable teen drivers were 62% of the teen drivers, they accounted for 74% of the medical charges.

ROBLEMS/LIMITATIONS

1. Missingness in the police crash reports: 27.8% missingness in gender, 3.4% in residence 5-dige zip code, and 2.3% in birth year and month.
2. In crash data, an issue about the unitnum (vehicle unit number) arose from 2018. The unitnum was input wrongly to the occupants. It will not be possible to reliably figure out if and how many passengers the teen drivers had in the vehicle with them, except it's a single-vehicle crash or a multi-vehicle crash with unit(s) contain only the driver(s).

NEXT STEPS

1. Examine outcomes related to vehicle crashes:
 - Examine benefits of safety devices (e.g., seat belts, helmets)
 - Estimate the medical and economic burdens of vehicle crashes
 - Monitor trends in vehicle crashes and related injury outcomes for high-risk and vulnerable road user populations, specific injury types, and specific crash and vehicle characteristics (e.g., older drivers, motorcyclists, traumatic brain injuries).
2. Add more years of data (2021) to analyze.

Appendix A

Iowa's 2022 CODES Project Personnel

Conducted by the University of Iowa Injury Prevention Research Center
Under contract to Iowa Governor's Traffic Safety Bureau and Iowa Department of
Transportation

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