U.S. Department of Transportation
National Highway Traffic Safety Administration

TRAFFIC SAFETY FACTS
Research Note

NHTSA

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Overview of the 2020 Crash Investigation Sampling System

Summary

Data from the 2020 Crash Investigation Sampling System (CISS) show that there were an estimated 2,425,374 police-reported motor vehicle crashes nationwide where at least one passenger vehicle (passenger car, light truck, or van[1]) was towed from the crash scene. These crashes resulted in an estimated 893,960 injured occupants. Among these crashes, 2.5 percent (60,800) were crashes with highest injury levels of serious or above, 19.6 percent (475,418) were crashes with moderate or minor injury levels, and 57.3 percent (1,388,714) were crashes with no injuries.

Introduction

The National Highway Traffic Safety Administration is releasing the fourth year of data from the recently modernized CISS—a replacement of the National Automotive Sampling System Crashworthiness Data System (NASS CDS). NHTSA designed CISS to select a more efficient and flexible sample compared to CDS using updated traffic and demographic information and optimizing the sample to better meet data users' needs. For more information see *Crash Investigation Sampling System: Sample Design and Weighting* (Zhang, Noh, et al., 2019a). In 2020 motor vehicle traffic crashes that involved at least one passenger vehicle towed from the scene of the crash were sampled, investigated, and coded at 32 selected sites across the Nation. Statistical weighting procedures generated nationally representative estimates of relevant crashes. This Research Note presents a summary of key estimates of crashes in 2020.[2] For a more detailed explanation of the sample design, estimation protocols, and guidance on how to analyze the new data, please refer to the *Crash Investigation Sampling System: Design Overview, Analytic Guidance and FAQs* (Zhang, Subramanian, et al., 2019b). In addition to sample design and weighting enhancements, several improvements were made to information technology infrastructure and operational protocols of CISS to gather more relevant, accurate, and nationally representative data.

Due to the COVID-19 pandemic and associated stay-at-home orders, CISS data collection technicians were unable to visit crash scenes and inspect vehicles in-person for some crashes. Technicians used other source material and/or data collection methods to collect information about these crashes. The sources included police crash reports, news articles, third-party images, phone interviews, and satellite imagery. Although CISS has used this method of data collection for cases previously, the number of such cases substantially increased in 2020. This resulted in an increase of the "unknown" attribute for some data elements in the 2020 data. Users should be aware of this when analyzing the 2020 CISS data.

Results

Crashes: As shown in Table 1 and Figure 1, there were an estimated 2,425,374 police-reported crashes where at least one passenger vehicle was towed from the scene in 2020. The Crash Abbreviated Injury Scale[3] (CAIS) is the basis of Table 1 and Figure 1. CAIS is the most severe injury level among the occupants of towed in-transport CISS-applicable vehicles involved in a crash. There were an estimated 60,800 [46,774 serious; 7,337 severe; 3,784 critical; 2,905 maximum] crashes with injury levels of serious or above. An estimated 475,418 [382,560+92,858] crashes had minor or moderate injury levels, and an estimated 1.389 million crashes had no injuries.

[1] Light trucks or vans include pickups, vans, and SUVs.

[2] This Research Note does not include comparisons to the 2019 CISS. For more information on CISS 2019, see *Overview of the 2019 Crash Investigation Sampling System*.

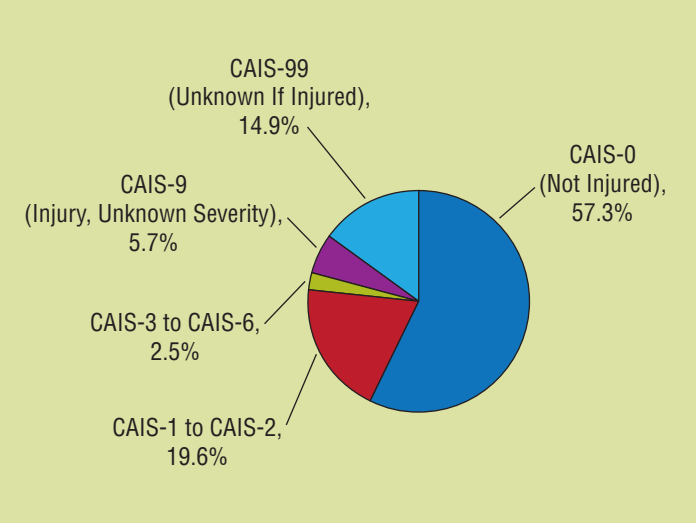
[3] For more information, see www.aaam.org/abbreviated-injury-scale-ais/

Table 1
CISS-Applicable Police-Reported Motor Vehicle Crashes in 2020, by Crash AIS

Crash AIS (CAIS)	Estimates [Standard Error]	Percent of Total Crashes
0-Not Injured	**1,388,714 [76,006]**	**57.3%**
1-Minor	382,560 [41,893]	15.8%
2-Moderate	92,858 [10,832]	3.8%
Subtotal (CAIS-1 to CAIS-2)	**475,418**	**19.6%**
3-Serious	46,774 [5,720]	1.9%
4-Severe	7,337 [2,119]	0.3%
5-Critical	3,784 [936]	0.2%
6-Maximum (Untreatable)	2,905 [1,048]	0.1%
Subtotal (CAIS-3 to CAIS-6)	**60,800**	**2.5%**
9-Injury, Unknown Severity	139,132 [29,249]	5.7%
Subtotal (CAIS-1 to CAIS-9)	**675,350**	**27.8%**
99-Unknown If Injured	361,310 [44,410]	14.9%
Total	**2,425,374 [129,744]**	**100.0%**

Source: 2020 CISS. Some components may not add to subtotals or totals due to independent rounding.

Figure 1
CISS Applicable Police-Reported Motor Vehicle Crashes in 2020, by Crash AIS



Source: 2020 CISS

Vehicles Involved: As shown in Table 2, there were an estimated 4.308 million vehicles involved in police-reported motor vehicle crashes where at least one passenger vehicle was towed in 2020. Of the 4.308 million vehicles, 2.333 million vehicles were passenger cars (54.1%) and 1.836 million vehicles were light trucks or vans (42.6%).

Table 2
Passenger Vehicles Involved in CISS-Applicable Crashes in 2020, by Vehicle Type

Vehicle Type	Estimates [Standard Error]	Percent of Total Vehicles
Passenger Cars	2,332,672 [166,009]	54.1%
Light Trucks or Vans (SUVs, Vans, and Pickup Trucks)	1,836,301 [149,266]	42.6%
Subtotal	**4,168,973**	**96.8%**
Total*	**4,308,389 [274,743]**	**100.0%**

Source: 2020 CISS. Some components may not add to subtotals or totals due to independent rounding.

*Total includes non-light passenger vehicles (i.e., large trucks, motorcycles, buses, other, and unknown vehicle types). The results are not displayed because minimal information is collected in CISS on non-light passenger vehicles.

Occupants Involved: Table 3 shows the maximum AIS (MAIS) of occupants of towed in-transport passenger vehicles involved in crashes where at least one passenger vehicle was towed. MAIS is the maximum AIS severity for an occupant of a towed in-transport passenger vehicle. In 2020 an estimated 4,295,149 occupants of towed in-transport passenger vehicles were involved in CISS crashes. Of these 4,295,149 occupants, 3,293 (0.1%) had a maximum (untreatable) injury; 4,160 (0.1%) had a critical injury; 7,706 (0.2%) had a severe injury; 51,690 (1.2%) had a serious injury; 105,705 (2.5%) had a moderate injury; 514,957 (12.0%) had a minor injury; and 2,837,316 (66.1%) had no injuries.

Table 3
Occupants of Towed In-Transport Passenger Vehicles Involved in CISS Crashes in 2020, by Maximum AIS

Maximum AIS (MAIS)	Estimates [Standard Error]	Percent of Total Occupants
0-Not Injured	**2,837,316 [158,144]**	**66.1%**
1-Minor	514,957 [58,754]	12.0%
2-Moderate	105,705 [11,201]	2.5%
Subtotal (MAIS-1 to MAIS-2)	**620,662**	**14.5%**
3-Serious	51,690 [5,639]	1.2%
4-Severe	7,706 [2,152]	0.2%
5-Critical	4,160 [1,108]	0.1%
6-Maximum (Untreatable)	3,293 [1,242]	0.1%
Subtotal (MAIS-3 to MAIS-6)	**66,849**	**1.6%**
9-Injury, Unknown Severity	206,449 [44,753]	4.8%
Subtotal (MAIS-1 to MAIS-9)	**893,960**	**20.8%**
99-Unknown If Injured	563,874 [76,441]	13.1%
Total	**4,295,149 [242,024]**	**100.0%**

Source: 2020 CISS. Some components may not add to subtotals or totals due to independent rounding.

Table 4 shows the mortality of occupants of towed in-transport passenger vehicles and the injury status of non-fatal occupants.[4] Of the estimated 4.295 million occupants, 20,320 (0.5%) died within 30 days of the motor vehicle crash and 875,513 (20.3%) were non-fatally injured.

Table 4
Occupants of Towed In-Transport Passenger Vehicles Involved in CISS Crashes in 2020, by Mortality and Injured Status

Mortality	Injured Status	Estimates [Standard Error]	Percentage of Total Occupants
Fatal		20,320[1,665]	0.5%
Non-Fatal	Not Injured	2,837,147[158,149]	66.1%
	Injured*	873,513[77,889]	20.3%
	Unknown if Injured	563,761[76,453]	13.1%
	Subtotal (Non-Fatal)	**4,274,421[241,230]**	**99.5%**
Total**		**4,295,149[242,024]**	**100.0%**

Source: 2020 CISS. Some components may not add to subtotals or totals due to independent rounding.

*Includes Injured, detail unknown.
**Includes Fatal – ruled disease

Table 5 shows the percentage of injured occupants of towed in-transport passenger vehicles in CISS crashes by age group and MAIS. For injured occupants under the age of 16, approximately 60 percent had a minor or moderate injury and about 4 percent had a serious injury or above. Almost 73 percent of injured occupants from the ages of 16 to 24 had a minor or moderate injury and approximately 6 percent had a serious injury or above. For injured occupants from the ages of 25 to 44, almost 67 percent had a minor or moderate injury and almost 8 percent had a serious injury or above. Approximately 74 percent of injured occupants between the ages of 45 and 64 had a minor or moderate injury and a little over 6 percent had serious injury or above. For occupants over the age of 65, 68 percent had a minor or moderate injury and almost 14 percent had a serious injury or above.

Table 5
Injured Occupants of Towed In-Transport Passenger Vehicles in CISS Crashes in 2020, by Age Group and MAIS

MAIS	Age Group					
	Percent					
	<16	16–24	25–44	45–64	65+	Total*
MAIS-1 to MAIS-2	60.2%	72.5%	66.6%	74.1%	68.0%	69.4%
MAIS-3 to MAIS-6	4.3%	6.2%	7.9%	6.1%	13.9%	7.5%
MAIS-9 (Injury, Unknown Severity)	35.6%	21.3%	25.4%	19.8%	18.1%	23.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

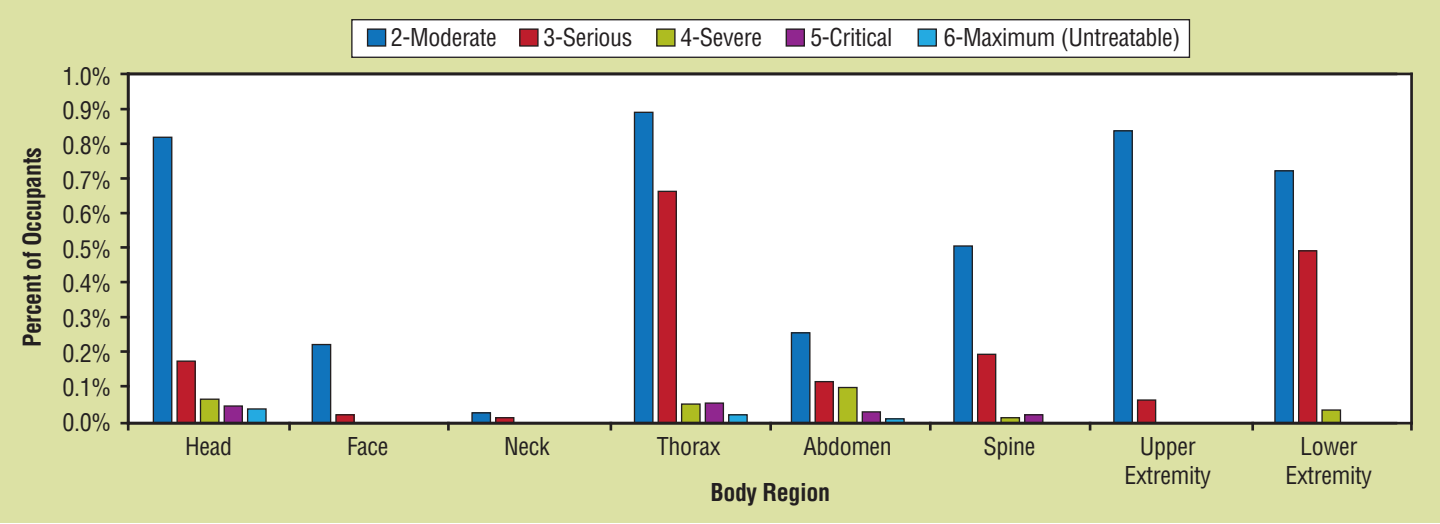
Source: 2020 CISS. Some components may not add to subtotals or totals due to independent rounding.

*Includes unknown age.

[4] It is important to note the fatal estimate presented in Table 4 is different from the Fatality Analysis Reporting System (FARS). FARS includes all passenger vehicle occupants (regardless of tow status), other vehicle occupants, and nonoccupant fatalities.

Figure 2 shows the percentage of occupants with injury of AIS-2 or above by body region. The body regions that most frequently sustained an injury of AIS-2 or higher were the thorax and lower extremities. The same body regions most frequently sustained an injury of AIS-3 or higher.

Figure 2
Percentage of Occupants in CISS Crashes With AIS-2 or Higher by Body Region



Source: 2020 CISS. The results shown are not mutually exclusive between each body region.

Drivers Involved: As shown in Table 6 and Figure 3, among the estimated 3.176 million drivers age 16 and older of towed in-transport passenger vehicles involved in CISS crashes, 1.745 million (54.9%) were male and 1.339 million (42.2%) were female. The corresponding estimates of drivers were 944,061 (55.3%) male and 742,105 (43.5%) female in no-injury crashes; 539,333 (55.2%) male and 432,272 (44.2%) female in injury crashes. Crashes with injury levels of serious or above (CAIS-3 to CAIS-6) involved 60,314 (65.9%) male drivers (16 and older) of towed in-transport passenger vehicles, which is around twice of 31,085 female drivers (34%). Figure 3 shows that the percentage of male drivers is highest in the maximum (untreatable) injury crashes (89.8%) followed by critical injury crashes (74.7%), severe injury crashes (65.7%), and serious injury crashes (64%).

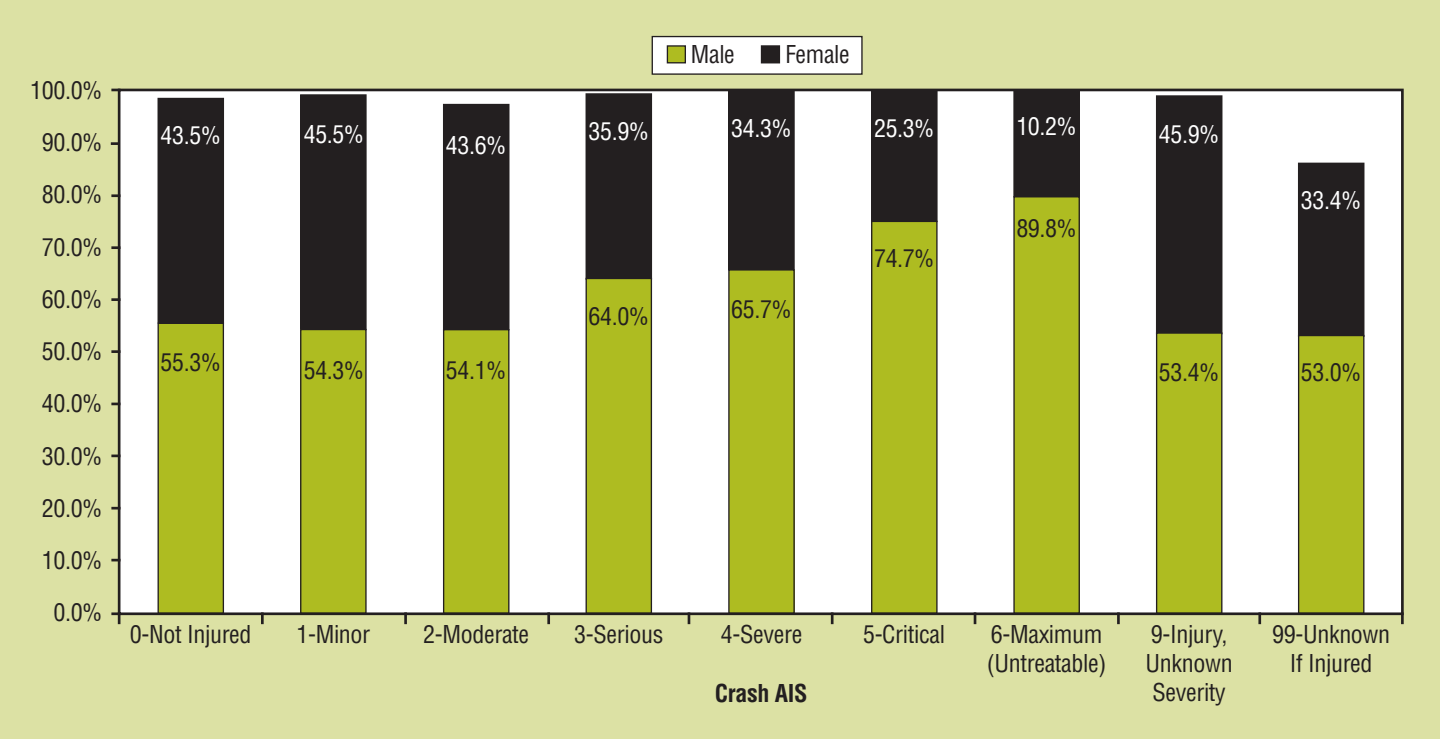
Table 6
Drivers (≥ 16 Years Old) of Towed In-Transport Passenger Vehicles Involved in CISS Crashes in 2020, by Sex and Crash AIS

Crash AIS	Sex		
	Male	Female	Total*
	Estimates [Standard Error]	Estimates [Standard Error]	Estimates [Standard Error]
0-Not Injured	**944,061[63,953]**	**742,105[68,497]**	**1,705,761[108,480]**
1-Minor	293,039[32,204]	245,703[36,934]	540,044[64,199]
2-Moderate	81,275[13,670]	65,507[10,293]	150,131[21,019]
Subtotal (CAIS-1 to CAIS-2)	**374,314**	**311,210**	**690,175**
3-Serious	45,890[7,346]	25,779[5,229]	71,729[10,423]
4-Severe	6,764[2,074]	3,534[861]	10,298[2,490]
5-Critical	4,010[1,387]	1,359[398]	5,369[1,637]
6-Maximum (Untreatable)	3,650[1,444]	413[204]	4,063[1,600]
Subtotal (CAIS-3 to CAIS-6)	**60,314**	**31,085**	**91,459**
9-Injury, Unknown Severity	104,705[19,005]	89,977[31,910]	196,201[44,348]
Subtotal (CAIS-1 to CAIS-9)	**539,333**	**432,272**	**977,835**
99-Unknown If Injured	261,124[25,023]	164,252[22,144]	492,235[51,498]
Total	**1,744,516[97,192]**	**1,338,630[102,040]**	**3,175,832[183,515]**

Source: 2020 CISS. Some components may not add to subtotals or totals due to independent rounding.

*Total includes unknown sex.

Figure 3
Drivers (≥ 16 years old) of Towed In-Transport Passenger Vehicles Involved CISS Crashes in 2020, by Sex and Crash AIS



Source: CISS 2020. Note: Percentages may not add to 100% due to unknown sex.

Comparisons of CISS With CDS, FARS, and CRSS

Comparisons of CISS estimates with CDS estimates should be performed with caution because they are two completely independent sample surveys designed more than 30 years apart. CISS and CDS have slightly different target populations. The CISS target population represents crashes where at least one passenger vehicle is towed from the scene (for any reason), whereas the CDS target population represented crashes where at least one passenger vehicle is towed due to disabling damage. Also, CISS case selection is based on newer vehicles with higher severity injuries, whereas, CDS case selection was first based on injury severity, then the model year of the vehicle. Since CDS is a subpopulation of CISS, it is possible to combine both data systems. For more information on combining CDS and CISS, refer to *Crash Investigation Sampling System: Design Overview, Analytic Guidance and FAQs* (Zhang, Subramanian, et al., 2019b).

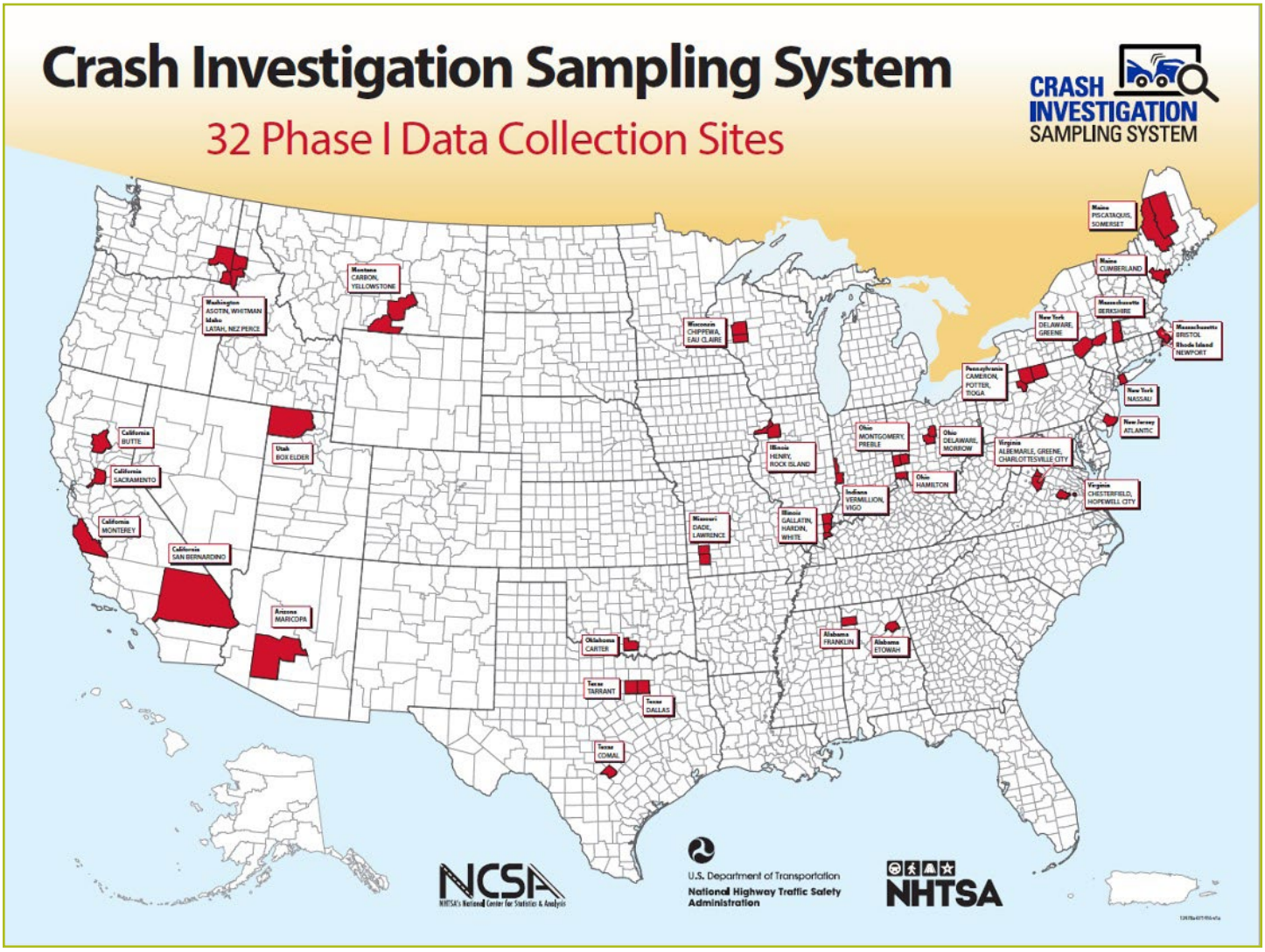
Additionally, CISS target population is a sub-population of the Crash Report Sampling System (CRSS) target population. CRSS targets police-reported crashes on a trafficway in the United States. Estimates of total crashes from CISS are similar to the estimates of total crashes from the corresponding CRSS sub-population.

FARS is a national census of fatal crashes. CISS in-scope fatal crashes are also a sub-population of FARS. However, CISS data is normally collected within one or two weeks after the crash, while FARS has much more time to identify and collect fatal crash data. Due to the nature of serious crashes and injury outcomes, CISS fatal crash counts and FARS may not be comparable.

The 2020 CISS Sample

The map below shows the 32 data collection sites selected for CISS.

Figure 4
CISS Data Collection Sites



In 2020 CISS selected 4,054 police-reported crashes from 227 police jurisdictions in 32 sites across the country. Each police-reported crash is categorized into 10 analysis domains which were created based on internal and external data needs. Table 7 shows the target sample allocation for each analysis domain compared to the actual sampled cases for 2020 CISS. The distribution of the 2020 CISS sampled cases is consistent with target sample allocation distribution. Among the 4,054 crashes, 3,700 crashes[5] were eligible to be investigated and included in the final analytic files for estimation.

[5] Out-of-scope cases and replaced sample cases are not investigated or included in the final analytic files.

Table 7
CISS Sample Allocation Versus 2020 CISS Sampled Cases

CISS Analysis Domains	Description	Target Percentage of Sample Allocation	2020 Percentage of Sampled Cases
1	At least one occupant of towed passenger vehicle is killed	4.5%	6.1%
2	Crashes not in Stratum 1 involving: • A recent model year passenger vehicle in which at least one occupant is incapacitated	8.0%	8.4%
3	Crashes not in Stratum 1 or 2 involving: • A recent model year passenger vehicle in which all occupants are not injured	22.0%	18.7%
4	Crashes not in Stratum 1-3 involving: • A recent model year passenger vehicle in which all occupants are not injured	15.5%	14.9%
5	Crashes not in Stratum 1-4 involving: • A mid-model year passenger vehicle in which at least one occupant is incapacitated	6.0%	5.6%
6	Crashes not in Stratum 1-5 involving: • A mid-model year passenger vehicle in which at least one occupant is non-incapacitated, possibly injured or injured but severity is unknown	12.0%	12.5%
7	Crashes not in Stratum 1-6 involving: • A mid-model year passenger vehicle in which all occupants are not injured	10.0%	11.4%
8	Crashes not in Stratum 1-7 involving: • An older model year passenger vehicle in which at least one occupant is incapacitated	6.0%	5.5%
9	Crashes not in Stratum 1-8 involving: • An older model year passenger vehicle in which at least one occupant is non-incapacitated, possibly injured or injured but severity is unknown	10.0%	10.2%
10	Crashes not in Stratum 1-9 involving: • An older model year passenger vehicle in which all occupants are not injured	6.0%	6.5%
Total		**100%**	**100%**

Source: 2020 CISS. Components may not add to 100 percent due to independent rounding.
Recent model year (or late model year): vehicles that are 4 years old or newer (i.e., any model year of 2016–2021)
Mid-model year: 5- to 9-year-old vehicles (i.e., any model year of 2011–2015)
Older model year: vehicles that are 10 years old or older (i.e., any model year up to 2010)

Downloading and Analyzing 2019 and 2020 CISS Data

The 2019 CISS can be downloaded here: www.nhtsa.gov/file-downloads?p=nhtsa/downloads/CISS/2019/

The 2020 CISS can be downloaded here: www.nhtsa.gov/file-downloads?p=nhtsa/downloads/CISS/2020/

The *Crash Investigation Sampling System 2020 Analytical User's Manual* can be found here: https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813243

The *NHTSA Field Crash Investigation 2020 Coding and Editing Manual* can be found here: https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813221

The *Crash Investigation Sampling System 2020 Data Manual* providing weighted and unweighted univariate distributions of the variables in CISS can be found at: https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813247

The CISS crash viewer can be found here: https://crashviewer.nhtsa.dot.gov/CISS/SearchIndex

Crash Investigation Sampling System: Design Overview, Analytic Guidance, and FAQs can be found at: https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812801

Crash Investigation Sampling System: Sample Design and Weighting can be found at: https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812804

References

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