



Overview of the 2022 Crash Investigation Sampling System

Summary

Data from the 2022 Crash Investigation Sampling System (CISS) show that there were an estimated 2,643,568 police-reported motor vehicle traffic crashes nationwide where at least one passenger vehicle (i.e., passenger car, light truck or van¹ less than 10,000 lbs) was towed from the crash scene, which resulted in an estimated 997,491 injured occupants of in-transport towed passenger vehicles. Among these crashes, 3.0 percent (80,538) were crashes with the highest injury levels of serious or above, 19.5 percent (516,613) were crashes with moderate or minor injury levels, and 59.1 percent (1,561,730) were crashes with no injury. In 2022 CISS selected 3,343 police-reported crashes. Of the 3,343 selected crashes, 2,929 were eligible for investigation.

Introduction

The National Highway Traffic Safety Administration is releasing the sixth year of data from the 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 et al., 2019a). In 2022 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 2022.² For a more detailed explanation of the sample design, estimation protocols, and guidance on how to analyze the data, please refer to *Crash Investigation Sampling Design: Design Overview, Analytic Guidance and FAQs* (Zhang 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.

Results

Crashes: For 2022 CISS, 2,929 sampled police-reported crashes were investigated where at least one passenger vehicle was towed from the scene. This represents an estimated 2,643,568 police-reported crashes in the population (Table 1). The Crash Abbreviated Injury Scale³ (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 80,538 (57,316 serious; 15,932 severe; 4,932 critical; 2,358 maximum) crashes with injury levels of serious or above. An estimated 516,613 (408,809+107,803) crashes were minor or moderate injury level crashes, and an estimated 1,561,730 crashes were no-injury crashes.

² This research note does not include comparisons to 2021 CISS. For more information on CISS 2021 refer to National Center for Statistics and Analysis. (2022, December). *Overview of the 2021 Crash Investigation Sampling System* (Traffic Safety Facts Research Note. Report No. DOT HS 813 397). National Highway Traffic Safety Administration. <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813397>

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

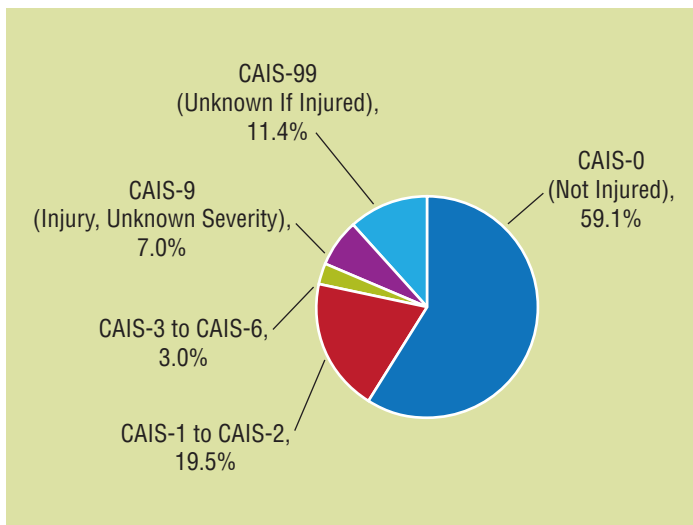
¹ Lights trucks or vans include pickups, vans, and SUVs.

Table 1
CISS-Applicable Police-Reported Motor Vehicle Crashes in 2022, by Crash AIS

Crash AIS (CAIS)	Estimates (Standard Error)	Percent of Total Crashes
0-Not Injured	1,561,730 (105,890)	59.1%
1-Minor	408,809 (29,844)	15.5%
2-Moderate	107,803 (20,210)	4.1%
Subtotal (CAIS-1 to CAIS-2)	516,613 (36,965)	19.5%
3-Serious	57,316 (10,933)	2.2%
4-Severe	15,932 (4,261)	0.6%
5-Critical	4,932 (2,136)	0.2%
6-Maximum (Untreatable)	2,358 (883)	0.1%
Subtotal (CAIS-3 to CAIS-6)	80,538 (11,868)	3.0%
9-Injury, Unknown Severity	184,128 (29,972)	7.0%
Subtotal (CAIS-1 to CAIS-9)	781,279 (48,687)	29.6%
99-Unknown If Injured	300,559 (46,585)	11.4%
Total	2,643,568 (127,192)	100.0%

Source: 2022 CISS. Some components may not add to subtotals or totals due to independent rounding.

Figure 1
CISS-Applicable Police-Reported Motor Vehicle Crashes in 2022, by Crash AIS



Source: 2022 CISS

Vehicles Involved: The 2,929 sampled police-reported crashes where at least one passenger vehicle was towed in 2022 involved 5,166 vehicles. This represents an estimated 4,732,455 vehicles in the population. Table 2 shows among the estimated 4,732,455 vehicles, 4,531,794 (95.8%) were passenger vehicles⁴ which includes 2,165,477 passenger cars (45.8%) and 2,347,385 light trucks or vans (49.6%).

Table 2
Vehicles in CISS-Applicable Crashes in 2022, by Vehicle Type

Vehicle Type	Estimates (Standard Error)	Percent of Total Vehicles
Passenger Cars	2,165,477 (148,393)	45.8%
Light Trucks or Vans (SUVs, Vans, and Pickup Trucks)	2,347,385 (136,942)	49.6%
Unknown Type of Passenger Vehicles*	18,932 (7,432)	0.4%
Subtotal	4,531,794 (256,892)	95.8%
Total**	4,732,455 (268,566)	100.0%

Source: 2022 CISS. Some components may not add to subtotals or totals due to independent rounding.

*These vehicles were identified as light passenger vehicles, but the vehicle type is unknown based on vPIC.

**Total includes large trucks, motorcycles, buses, other, and unknown vehicle types. The estimated number of non-passenger vehicles are not displayed because CISS collects minimal information for those vehicles.

Occupants Involved: In 2022 there were 5,730 occupants of towed in-transport passenger vehicles in sampled CISS crashes where at least one passenger vehicle was towed. Table 3 shows the maximum AIS (MAIS) of those occupants. MAIS is the maximum AIS severity for an occupant. In 2022 an estimated 4,657,094 occupants of towed in-transport passenger vehicles were involved in CISS crashes. Of the 4,657,094 occupants, 2,358 (0.1%) had a maximum (untreatable) injury; 5,046 (0.1%) had a critical injury; 17,621 (0.4%) had a severe injury; 62,266 (1.3%) had a serious injury; 118,462 (2.5%) had a moderate injury; 525,396 (11.3%) had a minor injury; and 3,141,291 (67.5%) had no injury.

⁴ In 2021 NHTSA began using vPIC Body Class as the source for vehicle classification. However, passenger vehicles are identified using Body Type. For more information on vPIC, refer to: National Center for Statistics and Analysis. (2023, April). *Product information catalog and vehicle listing (vPIC) analytical user's manual, 2021* (Report No. DOT HS 813 348). National Highway Traffic Safety Administration. <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813348>

Table 3

Occupants of Towed In-Transport Passenger Vehicles Involved in CISS Crashes in 2022, by Maximum AIS

Maximum AIS (MAIS)	Estimates (Standard Error)	Percent of Total Occupants
0-Not Injured	3,141,291 (222,965)	67.5%
1-Minor	525,396 (43,509)	11.3%
2-Moderate	118,462 (20,371)	2.5%
Subtotal (MAIS-1 to MAIS-2)	643,858 (53,192)	13.8%
3-Serious	62,266 (11,179)	1.3%
4-Severe	17,621 (4,399)	0.4%
5-Critical	5,046 (2,152)	0.1%
6-Maximum (Untreatable)	2,358 (883)	0.1%
Subtotal (MAIS-3 to MAIS-6)	87,291 (11,877)	1.9%
9-Injury, Unknown Severity	266,341 (45,532)	5.7%
Subtotal (MAIS-1 to MAIS-9)	997,491 (66,348)	21.4%
99-Unknown If Injured	518,313 (68,977)	11.1%
Total	4,657,094 (278,488)	100.0%

Source: 2022 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.⁵ Of the estimated 4,657,094 occupants, 20,759 (0.4%) died within 30 days of the motor vehicle crash, and 976,424 (21.0%) were non-fatally injured.

Table 5

Injured Occupants of Towed In-Transport Passenger Vehicles in CISS Crashes in 2022, by Age Group and Maximum AIS

MAIS	Age Group					
	Percentage					
	<16	16–24	25–44	45–64	65+	Total*
MAIS-1 to MAIS-2	56.9%	63.9%	69.5%	61.2%	63.2%	64.5%
MAIS-3 to MAIS-6	2.2%	11.7%	4.9%	14.1%	10.1%	8.8%
MAIS-9 (Injury, Unknown Severity)	40.9%	24.4%	25.7%	24.8%	26.7%	26.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: 2022 CISS. Some components may not add to subtotals or totals due to independent rounding.

*Includes unknown age

⁵ It is important to note the fatal estimate presented in Table 5 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.

Table 4

Occupants of Towed In-Transport Passenger Vehicles Involved in CISS Crashes in 2022, by Mortality and Injured Status

Mortality	Injured Status	Estimates (Standard Error)	Percent of Total Occupants
Fatal		20,759 (1,738)	0.4%
Non-Fatal	Not Injured	3,140,802(223,169)	67.4%
	Injured*	976,424 (65,926)	21.0%
	Unknown if Injured	518,313 (68,977)	11.1%
	Subtotal (Non-Fatal)	4,635,539 (278,771)	99.5%
Total**		4,657,094 (278,488)	100.0%

Source: 2022 CISS. Some components may not add to subtotals or totals due to independent rounding.

*Includes Injured, details 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 age 16, there were 57 percent who had a minor or moderate injury and 2 percent who had a serious injury or above. Sixty-four percent of injured occupants from age 16 to 24 had a minor or moderate injury, and 12 percent had a serious injury or above. For injured occupants from age 25 to 44, there were 69 percent who had a minor or moderate injury and 5 percent who had a serious injury or above. Sixty-one percent of injured occupants from age 45 to 64 had a minor or moderate injury, and 14 percent had a serious injury or above. For occupants over age 65, there were 63 percent who had a minor or moderate injury and 10 percent who had a serious injury or above.

Table 6 shows injured occupants with MAIS-3 or above of towed in-transport passenger vehicles in CISS crashes by sex and MAIS. Of the estimated 87,291 occupants with a MAIS-3 or above, 49,247 (56.4%) were males and 38,044 (43.6%) were females. For males, 37,237 (75.6%) had a serious injury; 6,933

(14.1%) had a severe injury; 3,615 (7.3%) had a critical injury; and 1,462 (3.0%) had a maximum (untreatable) injury. For females, 25,029 (65.8%) had a serious injury; 10,688 (28.1%) had a severe injury; 1,431 (3.8%) had a critical injury; and 896 (2.4%) had a maximum (untreatable) injury.

Table 6

Seriously Injured Occupants of Towed In-Transport Passenger Vehicles Involved in CISS Crashes in 2022, by Sex and Maximum AIS

MAIS	Sex					
	Male		Female		Total*	
	Estimates (Standard Error)	Percent of Injured Occupants	Estimates (Standard Error)	Percent of Injured Occupants	Estimates (Standard Error)	Percent of Injured Occupants
3-Serious	37,237 (11,796)	75.6%	25,029 (7,437)	65.8%	62,266 (11,179)	71.3%
4-Severe	6,933 (1,665)	14.1%	10,688 (3,553)	28.1%	17,621 (4,399)	20.2%
5-Critical	3,615 (1,846)	7.3%	1,431 (621)	3.8%	5,046 (2,152)	5.8%
6-Maximum (Untreatable)	1,462 (654)	3.0%	896 (357)	2.4%	2,358 (883)	2.7%
Total	49,247 (11,637)	100.0%	38,044 (7,515)	100.0%	87,291 (11,877)	100.0%

Source: 2022 CISS. Some components may not add to subtotals or totals due to independent rounding.

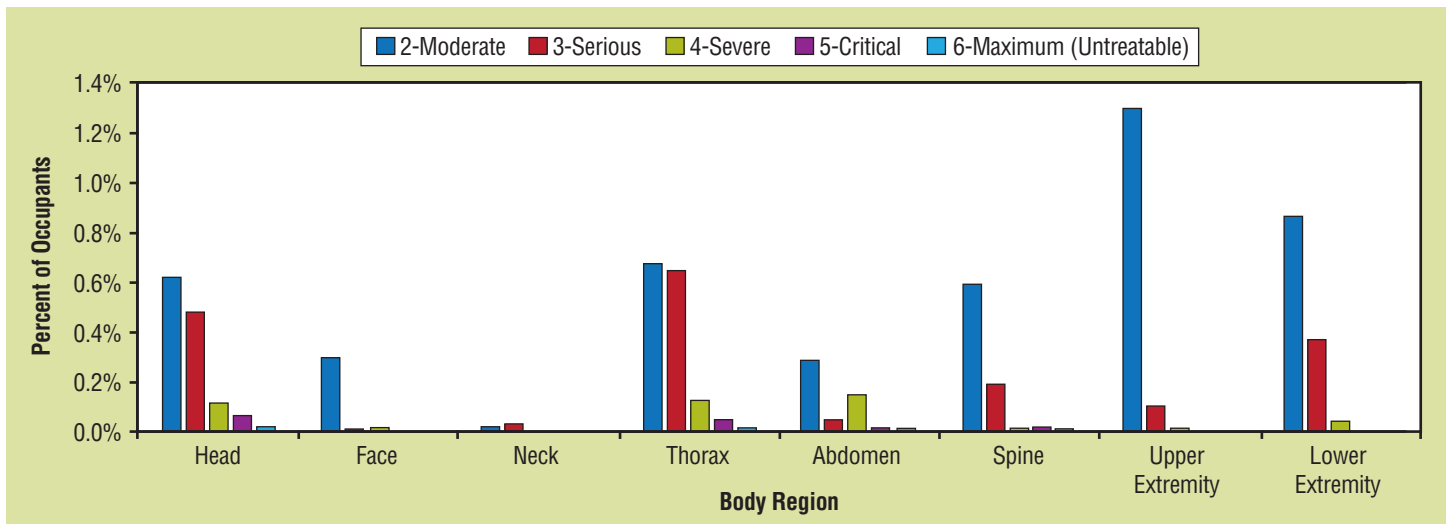
*Total includes unknown sex.

Figure 2 shows the percentage of occupants with injury of AIS-2 or above by body region and AIS. The body regions that most frequently sustained an injury of AIS-2 or higher (AIS-2 to AIS-6) were the thorax, upper extremities, head,

and lower extremities. Thorax, head, and lower extremities most frequently sustained an injury of AIS-3 or higher (AIS-3 to AIS-6).

Figure 2

Percentage of Occupants in CISS Crashes With AIS-2 or Above by Body Region and AIS



Source: 2022 CISS. The results shown are not mutually exclusive between body regions.

Drivers Involved: As shown in Table 7, among the estimated 3,537,847 drivers 16 and older of towed in-transport passenger vehicles involved in CISS crashes, 1,933,990 (54.7%) were male and 1,501,204 (42.4%) were female. The corresponding estimates of drivers were 1,109,003 (57.5%) male and 774,243 (40.1%) female in no-injury crashes; and 613,225 (52.5%) male and 549,262 (47.0%) female in injury crashes. Crashes with

injury levels of serious or above (CAIS-3 to CAIS-6) involved 81,111 (58.1%) male drivers (16 and older) of towed in-transport passenger vehicles compared to 58,054 female drivers (41.6%). Figure 3 shows that the percentage of male drivers is highest in maximum (untreatable) injury crashes (62.8%) followed by critical injury crashes (62.6%).

Table 7

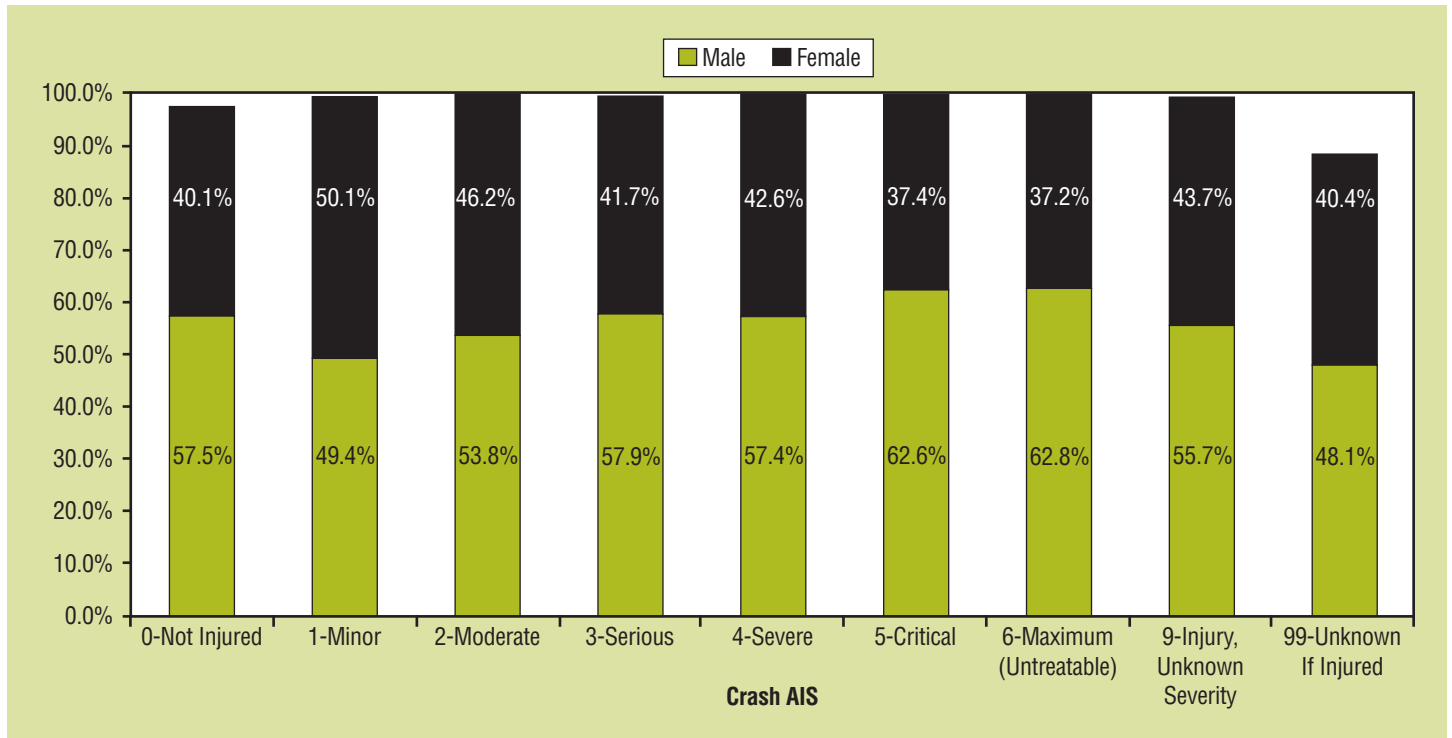
Drivers (≥ 16 Years Old) of Towed In-Transport Passenger Vehicles Involved in CISS Crashes in 2022, by Sex and Crash AIS

CAIS	Sex		
	Male	Female	Total*
	Estimates (Standard Error)	Estimates (Standard Error)	Estimates (Standard Error)
0-Not Injured	1,109,003 (110,358)	774,243 (64,671)	1,930,350 (140,064)
1-Minor	291,933 (26,011)	296,040 (22,502)	590,877 (40,809)
2-Moderate	91,632 (15,780)	78,706 (20,421)	170,351 (33,901)
Subtotal (CAIS-1 to CAIS-2)	383,565 (28,249)	374,746 (33,467)	761,228 (53,402)
3-Serious	61,668 (20,275)	44,456 (10,566)	106,506 (29,664)
4-Severe	13,694 (4,277)	10,177 (2,460)	23,871 (6,256)
5-Critical	4,035 (1,871)	2,406 (1,601)	6,441 (3,237)
6-Maximum (Untreatable)	1,714 (761)	1,015 (391)	2,730 (1,035)
Subtotal (CAIS-3 to CAIS-6)	81,111 (19,998)	58,054 (12,062)	139,548 (30,873)
9-Injury, Unknown Severity	148,550 (25,928)	116,461 (30,647)	266,676 (51,327)
Subtotal (CAIS-1 to CAIS-9)	613,225 (42,972)	549,262 (41,168)	1,167,452 (72,385)
99-Unknown If Injured	211,762 (34,823)	177,699 (25,866)	440,045 (58,981)
Total	1,933,990 (118,592)	1,501,204 (80,798)	3,537,847 (182,537)

Source: 2022 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 in CISS Crashes in 2022, by Sex and Crash AIS

Source: CISS 2022. Note: Percentages may not add to 100 percent 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 represents crashes where at least one passenger vehicle is towed *due to disabling damage*. 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 Design: Design Overview, Analytic Guidance and FAQs* (Zhang et al., 2019b).

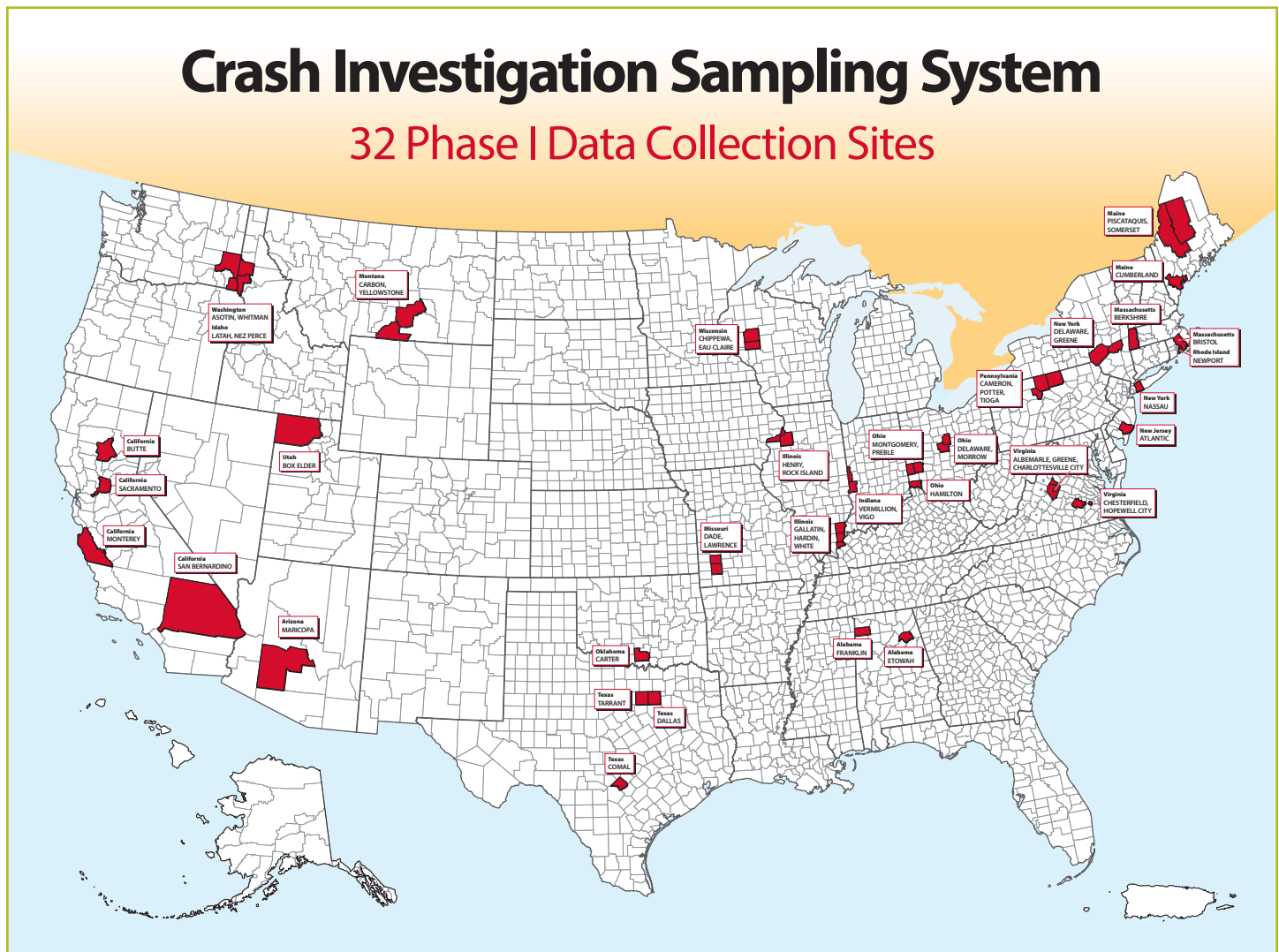
Additionally, CISS target population is a sub-population of the Crash Report Sampling System (CRSS) target population. CRSS targets police-reported crashes on a trafficway in the United States. Past estimates of total crashes from CISS are similar to the estimates of total crashes from the corresponding 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 1 to 2 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 estimates and FARS counts may not be comparable.

The 2022 CISS Sample

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

Figure 4
CISS Data Collection Sites



In 2022 CISS selected 3,343 police-reported crashes from 225 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 8 shows the target sample allocation for each analysis domain

compared to the actual sampled cases for 2022 CISS. The distribution of the 2022 CISS sampled cases is consistent with the target sample allocation distribution. Among the 3,343 crashes, 2,929 crashes⁶ were eligible to be investigated and included in the final analytic files for estimation.

Table 8
CISS Target Sample Allocation Versus 2022 CISS Sampled Cases

CISS Analysis Domains	Description	Target Percentage of Sample Allocation	2022 Percentage of Sampled Cases
1	At least one occupant of towed passenger vehicle is killed	4.5%	4.9%
2	Crashes not in Stratum 1 involving: <ul style="list-style-type: none"> • A recent model year passenger vehicle in which at least one occupant is incapacitated 	8.0%	7.7%
3	Crashes not in Stratum 1 or 2 involving: <ul style="list-style-type: none"> • A recent model year passenger vehicle in which at least one occupant is non-incapacitated, possibly injured, or injured but severity is unknown. 	22.0%	21.6%
4	Crashes not in Strata 1–3 involving: <ul style="list-style-type: none"> • A recent model year passenger vehicle in which all occupants are not injured 	15.5%	15.2%
5	Crashes not in Strata 1–4 involving: <ul style="list-style-type: none"> • A mid-model year passenger vehicle in which at least one occupant is incapacitated 	6.0%	6.0%
6	Crashes not in Strata 1–5 involving: <ul style="list-style-type: none"> • 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%	12.4%
7	Crashes not in Strata 1–6 involving: <ul style="list-style-type: none"> • A mid-model year passenger vehicle in which all occupants are not injured 	10.0%	9.9%
8	Crashes not in Strata 1–7 involving: <ul style="list-style-type: none"> • An older model year passenger vehicle in which at least one occupant is incapacitated 	6.0%	6.2%
9	Crashes not in Strata 1–8 involving: <ul style="list-style-type: none"> • 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%	9.8%
10	Crashes not in Strata 1–9 involving: <ul style="list-style-type: none"> • An older model year passenger vehicle in which all occupants are not injured 	6.0%	6.3%
Total		100%	100%

Source: 2022 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 2018–2023)
Mid-model year: 5- to 9-year-old vehicles (i.e., any model year of 2013–2017)
Older model year: vehicles that are 10 years old or older (i.e., any model year up to 2012)

⁶ Out-of-scope cases and replaced non-responding sample cases are not investigated or included in the final analytic files.

Downloading and Analyzing 2022 CISS Data

The 2022 CISS⁷ can be downloaded from www.nhtsa.gov/file-downloads?p=nhtsa/downloads/CISS/2022/.

The analytic user's manual can be found at <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813520>.

The CISS coding and editing manual can be found at <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813471>.

The CISS crash viewer can be found at <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>.

The DataBook application providing weighted and unweighted univariate distributions of the variables in CISS can be found at <https://cdan.dot.gov/DataBook/DataBook.htm>.

⁷ Prior CISS data can be downloaded from www.nhtsa.gov/file-downloads?p=nhtsa/downloads/CISS/.



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**National Highway
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References

Zhang, F., Noh, E. Y., Subramanian, R., & Chen, C.-L. (2019a, September). *Crash Investigation Sampling System: Sample design and weighting* (Report No. DOT HS 812 804). National Highway Traffic Safety Administration. <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812804>

Zhang, F., Subramanian, R., Chen, C.-L., & Young Noh, E. Y. (2019b, September). *Crash Investigation Sampling System: Design overview, analytic guidance, and FAQs* (Report No. DOT HS 812 801). National Highway Traffic Safety Administration. <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812801>

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