

## Crash Report Sampling System (CRSS) Estimates and Standard Errors

As for any probability-based sample, the estimates generated from CRSS data are subject to sampling errors. The sampling error is a measure of the variability of an estimator from its mean under repeated sample selections. The magnitude of sampling error depends on the study variable, the estimator used, and the CRSS sample design. Failing to consider the complex survey design features in CRSS estimation can bias both point estimates and their associated standard error estimates.

For a quick assessment of the magnitude of the standard errors of CRSS estimates, the generalized variance functions (GVFs) can be used to generate ballpark standard error estimates for a large quantity of estimates. For more information on the CRSS GVFs, including examples of how to use them, refer to NHTSA Technical Report DOT HS 813 041, [Crash Report Sampling System: Generalized Variance Functions](#).

CRSS estimates and GVF standard error estimates for 2016 to 2021 CRSS can be found on the following pages. The GVF standard error estimates use the final model for 2016 to 2021 CRSS estimates at crash, vehicle, and person levels. For more details on these standard errors refer to **Appendix F: Standard Errors** in the [Crash Report Sampling System Analytical User's Manual, 2016-2021](#).

2016 CRSS Estimates and GVF Standard Error Estimates					
Crash		Vehicle		Person	
Estimate (X)	Standard Error*	Estimate (X)	Standard Error*	Estimate (X)	Standard Error*
1,000	300	1,000	300	1,000	200
5,000	800	5,000	900	5,000	800
6,000	900	10,000	1,500	10,000	1,300
7,000	1,000	20,000	2,700	20,000	2,200
8,000	1,100	30,000	3,800	30,000	3,100
9,000	1,200	40,000	4,800	40,000	3,900
10,000	1,300	50,000	5,800	50,000	4,700
20,000	2,200	60,000	6,800	60,000	5,400
30,000	3,000	70,000	7,700	70,000	6,200
40,000	3,700	80,000	8,700	80,000	6,900
50,000	4,400	90,000	9,600	90,000	7,600
60,000	5,200	100,000	10,500	100,000	8,300
70,000	5,800	200,000	19,300	200,000	15,100
80,000	6,500	300,000	27,800	300,000	21,700
90,000	7,200	400,000	36,000	400,000	28,000
100,000	7,900	500,000	44,100	500,000	34,300
200,000	14,200	600,000	52,100	600,000	40,600
300,000	20,200	700,000	60,000	700,000	46,800
400,000	26,000	800,000	67,900	800,000	53,000
500,000	31,700	900,000	75,700	900,000	59,100
600,000	37,400	1,000,000	83,500	1,000,000	65,300
700,000	43,000	2,000,000	160,500	2,000,000	126,300
800,000	48,600	3,000,000	236,700	3,000,000	187,500
900,000	54,200	4,000,000	312,800	4,000,000	249,100
1,000,000	59,700	5,000,000	388,800	5,000,000	311,200
2,000,000	114,500	6,000,000	464,900	6,000,000	373,800
3,000,000	169,000	7,000,000	541,200	7,000,000	436,900
4,000,000	223,600	8,000,000	617,700	8,000,000	500,500
5,000,000	278,600	9,000,000	694,300	9,000,000	564,500
6,000,000	333,800	10,000,000	771,200	10,000,000	629,000
6,500,000	361,500	11,000,000	848,300	11,000,000	693,800
7,000,000	389,300	12,000,000	925,500	12,000,000	759,200
*: $ste(X) = e^{a+bln(X)+cln(X)^2}$					
a = 1.92772 b = 0.38750 c = 0.01947		a = 1.17146 b = 0.53866 c = 0.01425		a = 1.79032 b = 0.40622 c = 0.01930	

<b>2017 CRSS Estimates and GVF Standard Error Estimates</b>					
<b>Crash</b>		<b>Vehicle</b>		<b>Person</b>	
<b>Estimate (X)</b>	<b>Standard Error*</b>	<b>Estimate (X)</b>	<b>Standard Error*</b>	<b>Estimate (X)</b>	<b>Standard Error*</b>
1,000	300	1,000	300	1,000	200
5,000	800	5,000	900	5,000	700
6,000	900	10,000	1,500	10,000	1,200
7,000	1,000	20,000	2,600	20,000	2,100
8,000	1,100	30,000	3,600	30,000	2,800
9,000	1,200	40,000	4,600	40,000	3,500
10,000	1,300	50,000	5,500	50,000	4,200
20,000	2,200	60,000	6,500	60,000	4,900
30,000	3,000	70,000	7,400	70,000	5,600
40,000	3,800	80,000	8,300	80,000	6,200
50,000	4,500	90,000	9,100	90,000	6,900
60,000	5,200	100,000	10,000	100,000	7,500
70,000	5,900	200,000	18,400	200,000	13,600
80,000	6,600	300,000	26,400	300,000	19,400
90,000	7,300	400,000	34,200	400,000	25,100
100,000	8,000	500,000	41,900	500,000	30,700
200,000	14,600	600,000	49,600	600,000	36,300
300,000	20,900	700,000	57,200	700,000	41,800
400,000	27,100	800,000	64,700	800,000	47,300
500,000	33,300	900,000	72,200	900,000	52,800
600,000	39,400	1,000,000	79,700	1,000,000	58,300
700,000	45,500	2,000,000	153,900	2,000,000	112,900
800,000	51,700	3,000,000	227,900	3,000,000	167,700
900,000	57,800	4,000,000	302,000	4,000,000	223,000
1,000,000	63,900	5,000,000	376,400	5,000,000	278,900
2,000,000	125,300	6,000,000	451,200	6,000,000	335,300
3,000,000	187,800	7,000,000	526,300	7,000,000	392,300
4,000,000	251,400	8,000,000	601,800	8,000,000	449,700
5,000,000	316,100	9,000,000	677,700	9,000,000	507,700
6,000,000	381,700	10,000,000	753,900	10,000,000	566,100
6,500,000	414,900	11,000,000	830,500	11,000,000	625,000
7,000,000	448,400	12,000,000	907,400	12,000,000	684,300
*: $ste(X) = e^{a+b\ln(X)+c\ln(X)^2}$					
a = 2.33171 b = 0.30826 c = 0.02344		a = 1.43152 b = 0.48824 c = 0.01629		a = 2.05394 b = 0.35287 c = 0.02119	

<b>2018 CRSS Estimates and GVF Standard Error Estimates</b>					
<b>Crash</b>		<b>Vehicle</b>		<b>Person</b>	
<b>Estimate (X)</b>	<b>Standard Error*</b>	<b>Estimate (X)</b>	<b>Standard Error*</b>	<b>Estimate (X)</b>	<b>Standard Error*</b>
1,000	300	1,000	300	1,000	200
5,000	800	5,000	900	5,000	700
6,000	900	10,000	1,500	10,000	1,200
7,000	1,000	20,000	2,500	20,000	2,000
8,000	1,100	30,000	3,500	30,000	2,800
9,000	1,200	40,000	4,400	40,000	3,500
10,000	1,300	50,000	5,300	50,000	4,100
20,000	2,100	60,000	6,200	60,000	4,800
30,000	2,900	70,000	7,000	70,000	5,400
40,000	3,700	80,000	7,800	80,000	6,100
50,000	4,400	90,000	8,700	90,000	6,700
60,000	5,100	100,000	9,500	100,000	7,300
70,000	5,800	200,000	17,300	200,000	13,200
80,000	6,400	300,000	24,800	300,000	18,800
90,000	7,100	400,000	32,100	400,000	24,200
100,000	7,700	500,000	39,300	500,000	29,600
200,000	14,000	600,000	46,400	600,000	34,900
300,000	19,900	700,000	53,500	700,000	40,200
400,000	25,700	800,000	60,500	800,000	45,400
500,000	31,500	900,000	67,500	900,000	50,700
600,000	37,200	1,000,000	74,500	1,000,000	55,900
700,000	42,800	2,000,000	143,800	2,000,000	107,600
800,000	48,500	3,000,000	213,000	3,000,000	159,400
900,000	54,100	4,000,000	282,500	4,000,000	211,400
1,000,000	59,700	5,000,000	352,300	5,000,000	263,900
2,000,000	115,700	6,000,000	422,500	6,000,000	316,800
3,000,000	172,100	7,000,000	493,200	7,000,000	370,100
4,000,000	229,200	8,000,000	564,300	8,000,000	423,800
5,000,000	286,900	9,000,000	635,700	9,000,000	477,900
6,000,000	345,300	10,000,000	707,600	10,000,000	532,300
6,500,000	374,700	11,000,000	779,900	11,000,000	587,200
7,000,000	404,300	12,000,000	852,600	12,000,000	642,400
*: $ste(X) = e^{a+b\ln(X)+c\ln(X)^2}$					
a = 2.33242 b = 0.31521 c = 0.02258		a = 1.69299 b = 0.44262 c = 0.01787		a = 2.02774 b = 0.35777 c = 0.02075	

2019 CRSS Estimates and GVF Standard Error Estimates					
Crash		Vehicle		Person	
Estimate (X)	Standard Error*	Estimate (X)	Standard Error*	Estimate (X)	Standard Error*
1,000	300	1,000	300	1,000	200
5,000	800	5,000	900	5,000	700
6,000	900	10,000	1,400	10,000	1,100
7,000	1,000	20,000	2,500	20,000	1,900
8,000	1,100	30,000	3,500	30,000	2,700
9,000	1,200	40,000	4,400	40,000	3,300
10,000	1,200	50,000	5,300	50,000	4,000
20,000	2,100	60,000	6,100	60,000	4,600
30,000	2,900	70,000	7,000	70,000	5,300
40,000	3,600	80,000	7,800	80,000	5,900
50,000	4,300	90,000	8,600	90,000	6,500
60,000	5,000	100,000	9,500	100,000	7,100
70,000	5,700	200,000	17,300	200,000	12,800
80,000	6,400	300,000	24,800	300,000	18,400
90,000	7,000	400,000	32,200	400,000	23,800
100,000	7,700	500,000	39,400	500,000	29,100
200,000	13,800	600,000	46,600	600,000	34,400
300,000	19,700	700,000	53,800	700,000	39,700
400,000	25,500	800,000	60,900	800,000	44,900
500,000	31,200	900,000	68,000	900,000	50,200
600,000	36,900	1,000,000	75,100	1,000,000	55,400
700,000	42,500	2,000,000	145,500	2,000,000	107,800
800,000	48,100	3,000,000	215,900	3,000,000	160,700
900,000	53,600	4,000,000	286,900	4,000,000	214,200
1,000,000	59,200	5,000,000	358,300	5,000,000	268,500
2,000,000	114,700	6,000,000	430,200	6,000,000	323,400
3,000,000	170,400	7,000,000	502,700	7,000,000	378,900
4,000,000	226,800	8,000,000	575,700	8,000,000	435,100
5,000,000	283,700	9,000,000	649,100	9,000,000	491,800
6,000,000	341,200	10,000,000	723,100	10,000,000	549,000
6,500,000	370,200	11,000,000	797,500	11,000,000	606,800
7,000,000	399,300	12,000,000	872,300	12,000,000	665,100
*: $ste(X) = e^{a+b\ln(X)+c\ln(X)^2}$					
a = 2.19494 b = 0.33465 c = 0.02185		a = 1.70176 b = 0.43713 c = 0.01826		a = 2.14416 b = 0.32619 c = 0.02238	

2020 CRSS Estimates and GVF Standard Error Estimates					
Crash		Vehicle		Person	
Estimate (X)	Standard Error*	Estimate (X)	Standard Error*	Estimate (X)	Standard Error*
1,000	200	1,000	300	1,000	200
5,000	700	5,000	800	5,000	700
6,000	800	10,000	1,300	10,000	1,100
7,000	900	20,000	2,300	20,000	1,900
8,000	1,000	30,000	3,200	30,000	2,600
9,000	1,100	40,000	4,100	40,000	3,200
10,000	1,200	50,000	4,900	50,000	3,900
20,000	2,000	60,000	5,700	60,000	4,500
30,000	2,700	70,000	6,500	70,000	5,100
40,000	3,400	80,000	7,200	80,000	5,700
50,000	4,100	90,000	8,000	90,000	6,300
60,000	4,700	100,000	8,800	100,000	6,800
70,000	5,400	200,000	16,000	200,000	12,400
80,000	6,000	300,000	23,000	300,000	17,700
90,000	6,600	400,000	29,800	400,000	22,900
100,000	7,200	500,000	36,500	500,000	28,000
200,000	13,100	600,000	43,200	600,000	33,000
300,000	18,600	700,000	49,900	700,000	38,100
400,000	24,000	800,000	56,500	800,000	43,100
500,000	29,400	900,000	63,100	900,000	48,100
600,000	34,700	1,000,000	69,700	1,000,000	53,100
700,000	39,900	2,000,000	135,200	2,000,000	102,600
800,000	45,100	3,000,000	201,000	3,000,000	152,400
900,000	50,300	4,000,000	267,200	4,000,000	202,500
1,000,000	55,500	5,000,000	334,000	5,000,000	253,100
2,000,000	106,700	6,000,000	401,400	6,000,000	304,200
3,000,000	157,800	7,000,000	469,300	7,000,000	355,700
4,000,000	209,100	8,000,000	537,700	8,000,000	407,700
5,000,000	260,700	9,000,000	606,600	9,000,000	460,000
6,000,000	312,600	10,000,000	676,000	10,000,000	512,800
6,500,000	338,700	11,000,000	745,900	11,000,000	566,000
7,000,000	364,900	12,000,000	816,200	12,000,000	619,500
*: $ste(X) = e^{a+b\ln(X)+c\ln(X)^2}$					
a = 1.81266 b = 0.38881 c = 0.01959		a = 1.69637 b = 0.42507 c = 0.01877		a = 1.88630 b = 0.36439 c = 0.02074	

2021 CRSS Estimates and GVF Standard Error Estimates					
Crash		Vehicle		Person	
Estimate (X)	Standard Error*	Estimate (X)	Standard Error*	Estimate (X)	Standard Error*
1,000	200	1,000	300	1,000	200
5,000	700	5,000	800	5,000	700
6,000	800	10,000	1,400	10,000	1,200
7,000	900	20,000	2,400	20,000	2,000
8,000	1,000	30,000	3,400	30,000	2,700
9,000	1,100	40,000	4,300	40,000	3,400
10,000	1,200	50,000	5,200	50,000	4,100
20,000	2,000	60,000	6,000	60,000	4,700
30,000	2,800	70,000	6,900	70,000	5,400
40,000	3,500	80,000	7,700	80,000	6,000
50,000	4,200	90,000	8,500	90,000	6,600
60,000	4,900	100,000	9,300	100,000	7,300
70,000	5,500	200,000	17,000	200,000	13,200
80,000	6,200	300,000	24,500	300,000	18,900
90,000	6,800	400,000	31,700	400,000	24,500
100,000	7,400	500,000	38,900	500,000	30,000
200,000	13,400	600,000	46,100	600,000	35,500
300,000	19,200	700,000	53,100	700,000	41,000
400,000	24,900	800,000	60,200	800,000	46,400
500,000	30,500	900,000	67,200	900,000	51,800
600,000	36,000	1,000,000	74,200	1,000,000	57,200
700,000	41,500	2,000,000	143,800	2,000,000	111,300
800,000	47,000	3,000,000	213,500	3,000,000	165,900
900,000	52,500	4,000,000	283,500	4,000,000	221,000
1,000,000	58,000	5,000,000	354,000	5,000,000	276,900
2,000,000	112,700	6,000,000	425,100	6,000,000	333,300
3,000,000	168,000	7,000,000	496,600	7,000,000	390,400
4,000,000	223,900	8,000,000	568,600	8,000,000	448,000
5,000,000	280,600	9,000,000	641,100	9,000,000	506,100
6,000,000	337,900	10,000,000	714,000	10,000,000	564,800
6,500,000	366,800	11,000,000	787,300	11,000,000	624,000
7,000,000	395,900	12,000,000	861,100	12,000,000	683,600
*: $ste(X) = e^{a+bln(X)+cln(X)^2}$					
a = 1.81266 b = 0.38881 c = 0.01959		a = 1.69637 b = 0.42507 c = 0.01877		a = 1.88630 b = 0.36439 c = 0.02074	