# 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 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 generalized variance function (GVF) standard error estimates for each year of CRSS can be found on the following pages. The GVF standard error estimates use the final model for 2016 to 2019 CRSS estimates at crash, vehicle, and person levels.

| 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 |
| *: $ste(X) = e^{a+b\ln(X)+c\ln(X)^2}$ | | | | | |
| a = 1.92772<br>b = 0.38750<br>c = 0.01947 | | a = 1.17146<br>b = 0.53866<br>c = 0.01425 | | a = 1.79032<br>b = 0.40622<br>c = 0.01930 | |

| 2017 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 | 1,500 | 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<br>b = 0.30826<br>c = 0.02344 | | a = 1.43152<br>b = 0.48824<br>c = 0.01629 | | a = 2.05394<br>b = 0.35287<br>c = 0.02119 | |

| 2018 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 | 1,500 | 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<br>b = 0.31521<br>c = 0.02258 | | a = 1.69299<br>b = 0.44262<br>c = 0.01787 | | a = 2.02774<br>b = 0.35777<br>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<br>b = 0.33465<br>c = 0.02185 | | a = 1.70176<br>b = 0.43713<br>c = 0.01826 | | a = 2.14416<br>b = 0.32619<br>c = 0.02238 | |