Appendix: Sampling Variability

Estimates based on sample data may differ from the figures that would have been obtained had all, rather than specified samples, of the records been used. These differences are termed sampling variability. The standard error is a measure of the sampling variability. About 68 percent of all possible probability samples selected with the same specifications will give estimates within one standard error of the figure obtained from a compilation of all records. Similarly, approximately 90 percent will give estimates within 1.645 standard errors, about 95 percent will give estimates within two standard errors, and about 99 percent will give estimates within two and one-half standard errors. The standard error of an estimate depends on the design elements such as the method of sampling, sample size, and the estimation process.

Because of the large number of data cells tabulated from the sample files, it is not practical to calculate the standard error for every possible cell. However, standard errors for a large number of cells were estimated. These estimates were used to fit regression curves to provide estimates of approximate standard errors associated with tabulated counts and proportions.

The tables showing the sampling variability provide a general order of magnitude for similar estimates from the various sample files. Table A-1 presents approximate standard errors for the estimated number of persons from the 1 percent and the 10 percent files. The reliability of an estimated percentage depends on both the size of the percentage and on the size of the total on which the percentage is based. Data in Table A-2 provide approximations of the standard errors of the estimated percentage of persons in the 1 percent and 10 percent files. The standard errors are expressed in percentage points, and the bases shown are in terms of inflated data.

Table A-1.

Approximations of standard errors of estimated number of persons

Standard error	Cina of actionate (inflated)	Ctandard array				
500 250 1,000 300 2,500 500 5,000 800 7,500 900 10,000 1,100 25,000 3,000 75,000 3,000 100,000 3,400 250,000 5,400 500,000 7,800 750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 57,700 50,000,000 76,100 50,000,000 76,100 50,000 70 1,000 30 50,000 70 1,000 300 50,000 70 1,000 300 50,000 700 1,000 300 50,000 700 1,000 300 50,000 700 1,000 300 50,000 700 1,000 300 50,000 700 1,000 300 50,000 700 1,000 300 50,000 700 1,000 300 50,000 700 1,000 300 50,000 700 1,000 3,200 2,200 1,000,000 5,300 5,000,000 5,300 5,000,000 5,300 5,000,000 6,500	Size of estimate (inflated)	Standard error				
1,000 300 2,500 500 5,000 800 7,500 900 10,000 1,100 25,000 1,700 50,000 2,400 75,000 3,000 100,000 3,400 250,000 5,400 500,000 7,800 750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 36,900 25,000,000 57,700 50,000,000 76,100 75,000,000 76,100 75,000,000 70 1,000 30 500 70 1,000 300 5,000 70 10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 3,300 5,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 <td colspan="6">1 percent file</td>	1 percent file					
2,500 500 5,000 800 7,500 900 10,000 1,100 25,000 1,700 50,000 2,400 75,000 3,000 100,000 3,400 250,000 5,400 500,000 7,800 750,000 9,600 1,000,000 25,800 10,000,000 36,900 25,000,000 57,700 50,000,000 76,100 75,000,000 76,100 75,000,000 76,100 75,000,000 30 500 70 1,000 30 5,000 225 10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 3,300 5,000,000 5,300 5,000,000 6,500 10,000,000 8,500	500	250				
5,000 800 7,500 900 10,000 1,100 25,000 1,700 50,000 2,400 75,000 3,000 100,000 3,400 250,000 5,400 500,000 7,800 750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 36,900 25,000,000 57,700 50,000,000 76,100 75,000,000 82,900 10 percent file 10 10,000 30 50,000 70 1,000 100 50,000 700 100,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 3,300 5,000,000 5,300 5,000,000 6,500 10,000,000 8,500	1,000	300				
7,500 900 10,000 1,100 25,000 1,700 50,000 2,400 75,000 3,000 100,000 3,400 250,000 5,400 500,000 7,800 750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 36,900 25,000,000 57,700 50,000,000 76,100 75,000,000 82,900 10 percent file 30 500 70 1,000 100 50,000 225 10,000 300 50,000 700 100,000 300 500,000 700 100,000 3,200 2,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	2,500	500				
10,000 1,100 25,000 1,700 50,000 2,400 75,000 3,000 100,000 3,400 250,000 5,400 500,000 7,800 750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 36,900 25,000,000 76,100 75,000,000 76,100 75,000,000 76,100 75,000,000 30 500 70 1,000 30 50,000 225 10,000 300 50,000 700 100,000 300 500,000 700 100,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	5,000	800				
25,000 1,700 50,000 2,400 75,000 3,000 100,000 3,400 250,000 5,400 500,000 7,800 750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 36,900 25,000,000 76,100 75,000,000 76,100 75,000,000 82,900 10,000 30 500 70 1,000 30 50,000 225 10,000 300 50,000 700 100,000 300 500,000 700 100,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	7,500	900				
50,000 2,400 75,000 3,000 100,000 3,400 250,000 5,400 500,000 7,800 750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 36,900 25,000,000 57,700 50,000,000 76,100 75,000,000 82,900 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 300 500,000 700 100,000 3,200 2,200 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	10,000	1,100				
75,000 3,000 100,000 3,400 250,000 5,400 500,000 7,800 750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 36,900 25,000,000 76,100 75,000,000 76,100 75,000,000 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 300 50,000 700 100,000 3,200 2,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	25,000	1,700				
100,000 3,400 250,000 5,400 500,000 7,800 750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 36,900 25,000,000 57,700 50,000,000 76,100 75,000,000 82,900 10 percent file 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	50,000	2,400				
250,000 5,400 500,000 7,800 750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 57,700 50,000,000 76,100 75,000,000 82,900 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 225 10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	75,000	3,000				
500,000 7,800 750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 57,700 50,000,000 76,100 75,000,000 82,900 10 percent file 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 300 50,000 700 1,000,000 1,000 5,000,000 2,200 1,000,000 5,300 5,000,000 5,300 10,000,000 6,500 10,000,000 8,500	100,000	3,400				
750,000 9,600 1,000,000 11,100 5,000,000 25,800 10,000,000 57,700 50,000,000 76,100 75,000,000 82,900 10 percent file 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 300 500,000 700 1,000,000 1,000 5,000,000 2,200 1,000,000 5,300 5,000,000 5,300 10,000,000 6,500 10,000,000 8,500	250,000	5,400				
1,000,000 11,100 5,000,000 25,800 10,000,000 36,900 25,000,000 57,700 50,000,000 76,100 75,000,000 82,900 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 3,000 500,000 1,000 1,000,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	500,000	7,800				
5,000,000 25,800 10,000,000 36,900 25,000,000 57,700 50,000,000 76,100 75,000,000 82,900 10 percent file 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 1,000 500,000 7,000 1,000,000 2,200 1,000,000 3,200 2,000,000 4,300 5,000,000 5,300 5,000,000 6,500 10,000,000 8,500	750,000	9,600				
10,000,000 36,900 25,000,000 57,700 50,000,000 76,100 75,000,000 10 percent file 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	1,000,000	11,100				
25,000,000 57,700 50,000,000 76,100 75,000,000 82,900 10 percent file 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	5,000,000	25,800				
50,000,000 76,100 75,000,000 82,900 10 percent file 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	10,000,000	36,900				
75,000,000 82,900 10 percent file 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	25,000,000	57,700				
10 percent file 100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	50,000,000	76,100				
100 30 500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	75,000,000	82,900				
500 70 1,000 100 5,000 225 10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	10 perc	cent file				
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5,00022510,00030050,000700100,0001,000500,0002,2001,000,0003,2002,000,0004,3003,000,0005,3005,000,0006,50010,000,0008,500	500	70				
10,000 300 50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	1,000	100				
50,000 700 100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	5,000	225				
100,000 1,000 500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	10,000	300				
500,000 2,200 1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	50,000	700				
1,000,000 3,200 2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	100,000	1,000				
2,000,000 4,300 3,000,000 5,300 5,000,000 6,500 10,000,000 8,500	500,000	2,200				
3,000,0005,3005,000,0006,50010,000,0008,500	1,000,000	3,200				
5,000,0006,50010,000,0008,500	2,000,000	4,300				
10,000,000 8,500	3,000,000	5,300				
	5,000,000	6,500				
20,000,000 9,300	10,000,000	8,500				
	20,000,000	9,300				

Table A-2.
Approximations of standard errors of estimated percentage of persons

Size of base	0.5% 00	5 av 05	10 or	25 or	50	
(inflated)	2 or 98	5 or 95	90	75	50	
	1 percent file					
1,000	4.7	7.3	10.1	14.5	16.8	
10,000	1.5	2.3	3.2	4.6	5.3	
50,000	0.7	1.0	1.4	2.1	2.4	
100,000	0.5	0.7	1.0	1.5	1.7	
500,000	0.2	0.3	0.4	0.7	0.8	
1,000,000	0.1	0.2	0.3	0.5	0.5	
5,000,000	0.1	0.1	0.1	0.2	0.2	
10,000,000	а	0.1	0.1	0.2	0.2	
50,000,000	а	а	а	0.1	0.1	
100,000,000	а	а	а	а	а	
	10 percent file					
500	1.9	3.0	4.1	5.9	6.8	
1,000	1.3	2.1	2.9	4.1	4.8	
2,500	8.0	1.3	1.8	2.6	3.0	
10,000	0.4	0.6	0.9	1.3	1.5	
50,000	0.2	0.3	0.4	0.6	0.7	
100,000	0.1	0.2	0.3	0.4	0.5	
500,000	а	0.1	0.1	0.2	0.2	
1,000,000	а	0.1	0.1	0.1	0.2	
5,000,000	а	а	а	а	0.1	
10,000,000	а	а	а	а	а	
50,000,000	a	a	a	а	а	

a. Less than 0.05 percent.