

## Appendix. Source and Reliability of Estimates

### SOURCE OF DATA

The estimates of school enrollment in 1981 are based on data obtained in October 1981 from the Current Population Survey (CPS) conducted by the Bureau of the Census. The CPS sample was initially selected from the 1970 census file and is updated continuously to reflect new construction where possible. The October sample was spread over 629 areas comprising 1,148 counties, independent cities and minor civil divisions with coverage in each of the 50 States and the District of Columbia. The sample is composed of approximately 60,500 occupied households that are eligible for interview. Of this number, about 2,500 occupied units were visited, but interviews were not obtained because the occupants were not found at home after repeated calls or were unavailable for some other reason. For a description of the CPS sample designs prior to 1980, see the detailed report for 1979 in this series.

The estimation procedure used for this survey involved the inflation of the weighted sample results to independent estimates of the civilian noninstitutional population of the United States by age, race and sex. These independent estimates are based on statistics from decennial censuses; statistics on births, deaths, immigration, and emigration; and statistics on the strength of the Armed Forces.

Two sets of estimates for 1981 are shown in some of the tables in this report; one set results from using independent population estimates based on the more up-to-date 1980 decennial census and the other set results from using 1970 census based population estimates. The 1970 based estimates have been included to provide continuity in the time series with previous years. Comparing the 1980 based estimates with the 1970 based estimates provides a measure of the effect of changing to the 1980 based estimation procedure.

### RELIABILITY OF ESTIMATES

Since the estimates in this report are based on a sample, they may differ somewhat from the figures that would have been obtained if a complete census had been taken using the same questionnaires, instructions, and enumerators. There are two types of errors possible in an estimate based on a sample survey: sampling and nonsampling. The standard errors provided for this report primarily indicate the magnitude of the sampling error. They also partially measure the effect of some nonsampling errors in response and enumeration, but do not measure any systematic biases in the data. The full extent of the nonsampling error is unknown. Conse-

quently, particular care should be exercised in the interpretation of figures based on a relatively small number of cases or on small differences between estimates.

**Use of school enrollment data for persons of Spanish origin.** Methodological changes which occurred in 1980 resulted in relatively large increases in the estimated number and proportion of children 3 to 13 years old who are of Spanish origin. Consequently, when using school enrollment data for persons of Spanish origin, particular care should be exercised in comparing estimates for 1980 and later years of the total number of children enrolled in nursery school, kindergarten, and/or elementary school with estimates from earlier years. These changes do not affect school enrollment rates reported for persons of Spanish origin.

**Sampling variability.** The standard errors presented in tables A-1 and A-2 are primarily measures of sampling variability; that is, of the variations that occurred by chance because a sample rather than the entire population was surveyed. The sample estimate and its standard error enable one to construct interval estimates that include the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under identical conditions using the same sample design; and an estimate and its standard error were calculated from each sample, then:

1. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
2. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

The average result of all possible samples may or may not be contained in any particular computed interval. However, for a particular sample one can say with specified confidence that the average result of all possible samples is included within the constructed interval.

All statements of comparison in the text have passed a hypothesis test at the 0.10 level of significance or better, and most have passed a hypothesis test at the 0.05 level of significance or better. This means that, for most differences cited

**Table A-1. Standard Errors of Estimated Numbers of Persons Enrolled in School, for the Total, Black, and Spanish-Origin Population: October 1981**

(Numbers in thousands)

Enrollment	Total		Black		Spanish origin	
	Estimate	Standard error	Estimate	Standard error	Estimate	Standard error
Total enrolled.....	58,390	244	8,350	104	4,551	122
Nursery.....	2,058	68	284	26	131	18
Private.....	1,396	56	102	15	63	12
Kindergarten.....	3,161	82	474	33	306	27
Private.....	545	30	62	12	24	8
Elementary.....	27,795	129	4,291	94	2,474	74
Private.....	3,037	81	204	22	235	23
High school.....	14,642	155	2,168	64	1,130	64
College.....	10,734	137	1,133	48	510	37
Full time.....	7,569	118	815	42	343	29

Note: Data controlled to 1980 census base.

Source: Estimates from table 1.

in the text, the estimated difference between parameters is greater than twice the standard error of the difference. For the other difference mentioned the estimated difference between parameters is between 1.6 and 2.0 times the standard error of the difference. When this is the case, the statement of comparison will be qualified in some way; e.g., by use of the phrase "some evidence."

**Note when using small estimates.** Percent distributions are shown in this report only when the base of the percentage is greater than 75,000. Because of the large standard errors involved, there is little chance that percentages would reveal useful information when computed on a smaller base. Esti-

mated numbers of persons are shown, however, even though the relative standard errors of these numbers are larger than those for the corresponding percentages. These smaller estimates are provided primarily to permit those combinations of the categories which serves each user's needs.

**Standard errors for data based on CPS.** Since this is an advance report, standard errors are provided in table A-1 and A-2 and standard error parameters are provided in table A-3 for estimated numbers of persons and estimated percentages for only certain characteristics which are considered the most important among the data in the report. A more complete source and reliability statement for the 1981 data will be published with the forthcoming 1981 detailed report.

**Table A-2. Standard Errors of Estimated Percentages of Persons 3 to 34 Years Old Enrolled in School, for the Total, Black, and Spanish-Origin Population: October 1981**

Age	Total		Black		Spanish origin	
	Estimate	Standard error	Estimate	Standard error	Estimate	Standard error
Total, 3 to 34 years.....	48.9	0.2	52.5	0.6	49.0	1.0
3 and 4 years.....	36.0	0.9	36.7	2.4	24.5	2.5
5 and 6 years.....	94.0	0.5	94.5	1.3	90.4	1.8
7 to 9 years.....	99.2	0.14	98.8	0.4	99.2	0.5
10 to 13 years.....	99.3	0.11	99.4	0.3	99.1	0.4
14 and 15 years.....	98.0	0.2	97.1	0.8	94.0	1.8
16 and 17 years.....	90.6	0.5	91.3	1.3	82.8	2.8
18 and 19 years.....	49.0	0.8	48.2	2.2	37.8	3.6
20 and 21 years.....	31.6	0.7	23.4	1.9	20.6	2.9
22 to 24 years.....	16.5	0.5	14.7	1.4	12.3	2.1
25 to 29 years.....	9.0	0.3	9.9	0.9	8.3	1.4
30 to 34 years.....	6.9	0.3	7.2	0.9	5.0	1.2

Note: Data controlled to 1980 census base.

Source: Estimates from table 6.

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**Standard errors of estimated numbers and estimated percentages.** The approximate standard errors of estimated numbers and percentages can be computed directly with formulas (1) and (2) below, respectively. The formulas are

$$\sigma_x = \sqrt{ax^2 + bx} \quad (1)$$

where "x" is the size of the estimate and "a" and "b" are the parameters associated with the characteristic; and

$$\sigma_{(x,p)} = \sqrt{\frac{b}{x} \cdot p \cdot (100-p)} \quad (2)$$

where "x" is the size of the subclass of the population which is the base of the percentage, "p" is the percentage ( $0 \leq p \leq 100$ ), and "b" is the parameter associated with the characteristic.

Table A-3 provides the values of the "a" and "b" parameters that are used in formulas (1) and (2) to approximate

standard errors of estimated numbers of persons and estimated percentages.

**Standard error of a difference.** For a difference between two sample estimates, the standard error is approximately equal to

$$\sigma_{(x-y)} \doteq \sqrt{\sigma_x^2 + \sigma_y^2} \quad (5)$$

where  $\sigma_x$  and  $\sigma_y$  are the standard errors of the estimates x and y; the estimates can be numbers, percents, ratios, etc. This will represent the estimated standard error quite accurately for the difference between two estimates of the same characteristic in two different areas, or for the difference between two separate and uncorrelated characteristics in the same area. If, however, there is a high positive (negative) correlation between the two characteristics, the formula will overestimate (underestimate) the true standard error.

**Table A-3. Parameters To Be Used for Each School Enrollment Characteristic for the Direct Computation of Standard Errors**

Characteristic	Parameters <sup>1</sup>	
	a	b
Persons enrolled in school, 3-34 years old:		
Total or White.....	-0.000017	2,014
Black.....	-0.000117	2,265
Spanish origin.....	-0.000028	3,374
Persons enrolled in school, 14-34 years old:		
Total or White.....	-0.000025	2,014
Black.....	-0.000179	2,265
Spanish origin (level).....	<sup>2</sup> 0.001519	<sup>2</sup> 1,856
Spanish origin (percentage only).....	(X)	<sup>3</sup> 3,374
Children enrolled in school, 3-13 years old:		
All races and Spanish origin.....	-0.000063	2,350

(X) Not applicable.

<sup>1</sup>To obtain "a" and "b" parameters for 1965, multiply these parameters by 1.5.

<sup>2</sup>These "a" and "b" parameters are to be used to calculate standard errors of levels only for the October supplement. For the March supplement, Spanish origin, use a = 0.000901 b = 1101.

<sup>3</sup>This "b" parameter is to be used to calculate the standard error of percentages only. For the March supplement, use b = 2,002.