



U.S. Department of Education
Institute of Education Sciences
NCES 2005-063

Estimating Undergraduate Enrollment in Postsecondary Education Using National Center for Education Statistics Data

Research and Development Report





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March 2005

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Executive Summary

A number of National Center for Education Statistics (NCES) surveys can be used to estimate enrollment levels in postsecondary education. Generating consistent enrollment estimates across surveys, however, is complicated by differences in surveys that lead to different enrollment counts. This Research and Development (R&D) report describes the process of generating comparable estimates of undergraduate enrollment in postsecondary institutions across four NCES datasets—the National Postsecondary Student Aid Study (NPSAS), a sample survey of postsecondary students; the Integrated Postsecondary Education Data System (IPEDS), a universe survey of postsecondary institutions; the National Household Education Surveys Program (NHES) Adult Education Survey, a sample survey of adults in households; and the October school enrollment supplement to the Current Population Survey (CPS), a sample survey of adults in households. The purpose of the report is to highlight differences across surveys that may affect postsecondary enrollment estimates and to describe how largely comparable estimates can be derived, given these differences.

For each dataset, the analysis estimated the number of individuals enrolled in postsecondary education in the 1989–90, 1995–96, and 1999–2000 school years, or the closest available time period to those dates. Enrollment counts were estimated for the traditional college age group, ages 18 to 24, as well as for those individuals ages 18 to 64. Each estimate was placed over the relevant population age group to obtain an estimate of the percentage of the population enrolled in postsecondary education, using resident population counts (for April 1990, 1996, and 2000) provided by the U.S. Census Bureau.

Preliminary estimates for undergraduate and graduate students combined, with minimal corrections for survey differences, revealed inconsistencies in enrollment levels within years and in trends across years from one survey to another. Survey differences that may contribute to these inconsistencies include the following:

- Sources of information: Whether a student, postsecondary institution, or household member provided enrollment information, and whether proxy respondents are allowed. For example, CPS and NHES collect information from household members, NPSAS collects information from students, and IPEDS collects information from postsecondary institutions. In CPS surveys, an adult member of each household serves as a proxy respondent, providing information for all members of the household.
- Reference period: Whether the survey asked about enrollment at one point in time or over an entire school year or calendar year. For example, while NHES collects full-year enrollments, CPS collects fall-only enrollments.
- Definition of enrollment: Differences in the types of enrollment counted in the survey, such as whether students had to be in for-credit courses (e.g., NPSAS) or courses leading to a degree (e.g., NHES). Also, differences in the target population (e.g., whether military personnel are included in the population).
- Definition of postsecondary institution: Which postsecondary institutions were included in the survey and how eligible institutions were defined. Some surveys set

specific criteria in defining postsecondary institutions (e.g., IPEDS), whereas others rely primarily on respondent perception (e.g., CPS).

- Variations in survey administration: These differences are assumed to be largely corrected by sample weights, and include factors such as telephone-based sampling, time of year of administration, and differences in response rates.

The remainder of the report focuses on undergraduate enrollments only. The following adjustments were made to the datasets to obtain undergraduate enrollment estimates that are as comparable as possible.

NPSAS. To make NPSAS estimates comparable across time, the three waves of NPSAS data were restricted to Title IV eligible institutions (i.e., institutions eligible to participate in the federal student financial aid program) and excluded institutions in Puerto Rico. Because of inconsistencies in the inclusion of students in less-than-2-year institutions in the IPEDS and CPS datasets, students enrolled in less-than-2-year institutions were excluded as well. In cases where student age was missing, these data were imputed.

IPEDS. Because IPEDS generally does not collect enrollment by age categories from less-than-2-year institutions, these schools were excluded from the analysis, as were institutions in areas other than the 50 states and the District of Columbia. IPEDS provides both full-year and fall-only enrollment counts; however, because IPEDS full-year enrollment data are not disaggregated by age, this analysis used IPEDS fall-only enrollments. Age was imputed when missing.

NHES. The 1991 administration of NHES was not used to examine undergraduate enrollments because in the 1991 survey these enrollments could not be separated from graduate enrollments. In the remaining years, data were restricted to adults working on either an associate's or a bachelor's degree; cases in which adults indicated they were working on "another degree" were individually examined and recoded into these degree categories as necessary.

CPS. CPS includes separate questions about enrollments at a "regular" school and enrollments in "business, vocational, technical, secretarial, trade, or correspondence courses." Because the second question potentially includes a wide range of courses outside of postsecondary education, only responses to the first question were used in this analysis, effectively restricting the estimates to those enrolled in 2- or 4-year institutions. No other adjustments were made to the CPS estimates.

After making these adjustments, levels of enrollment were generally not significantly different for those surveys with similar reference periods (i.e., full-year NPSAS and NHES vs. fall-only IPEDS and CPS). As one would expect, full-year enrollments were often higher than fall-only enrollments. The remaining differences across surveys can be reasonably attributed to factors such as the population surveyed, the survey methodology, and the time of year in which the survey was administered.

Because of the potential effects of survey differences on postsecondary enrollment estimates, it is important that the analyst examining participation in postsecondary education note the reference period, levels of degrees, and institution types covered by the analysis, and the effects of this coverage related to other possible analyses and/or data sources. Which data sources to use, and which adjustments to make, will depend in large part on the questions the analyst wishes to answer.

Foreword

The Research and Development (R&D) series of reports at NCES has been initiated to

1. Share studies and research that are developmental in nature. The results of such studies may be revised as the work continues and additional data become available.
2. Share the results of studies that are, to some extent, on the “cutting edge” of methodological developments. Emerging analytical approaches and new computer software development often permit new and sometimes controversial analyses to be done. By participating in “frontier research,” we hope to contribute to the resolution of issues and improved analysis.
3. Participate in discussions of emerging issues of interest to educational researchers, statisticians, and the federal statistical community in general. Such reports may document workshops and symposia sponsored by NCES that address methodological and analytical issues or may share and discuss issues regarding NCES practices, procedures, and standards.

The common theme in all three goals is that these reports present results or discussions that do not reach definitive conclusions at this point in time, either because the data are tentative, the methodology is new and developing, or the topic is one on which there are divergent views. Therefore, the techniques and inferences made from the data are tentative and subject to revision. To facilitate the process of closure on the issues, we invite comment, criticism, and alternatives to what we have done. Such responses should be directed to

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Introduction

A number of National Center for Education Statistics (NCES) surveys can be used to estimate enrollment levels in postsecondary education. Generating consistent enrollment estimates across surveys, however, is complicated by differences in surveys that affect enrollment counts—for example, there are different definitions of “postsecondary institution” and differences in whether enrollment is estimated for a specific point in time or across the entire year. Given these differences, estimating participation in postsecondary education can be deceptively difficult, and analysts should consider a number of issues when making or interpreting such estimates, particularly when comparing estimates derived from different surveys. The purpose of this Research and Development (R&D) report is to highlight differences across surveys that may affect postsecondary enrollment estimates and to describe how largely comparable estimates can be derived, given these differences.

In this context, the survey estimates themselves are merely illustrative of the results that are likely under different “adjustment” scenarios, and the analyses focus on comparisons of estimates rather than on the values of the estimates themselves. Also, in this report, *consistent results* refers to consistent test results (e.g., all tests find a significant difference in the same direction) and should not be interpreted as indicating that estimates have been found to be equivalent. No tests of equivalence were performed. Given these caveats, the enrollment rate estimates presented in this report should be viewed only as tentative and should not be used without further testing to reach firm conclusions about postsecondary enrollment levels or trends.

Datasets

Four datasets were analyzed for this report: the National Postsecondary Student Aid Study (NPSAS), the Integrated Postsecondary Education Data System (IPEDS), the National Household Education Survey (NHES), and the October school enrollment supplement to the Current Population Survey (CPS).¹ These datasets were chosen because they are based on nationally representative samples of postsecondary students or adults (or a census of institutions in the case of IPEDS), collect enrollment data by age, and are available for at least three time points between 1989 and 1999. Each is described briefly below; the appendix provides additional details on each survey’s methodology.

National Postsecondary Student Aid Study

NPSAS is a nationwide study conducted by NCES that is designed to determine how students and their families pay for postsecondary education, and to describe demographic and other characteristics of those enrolled in postsecondary education. The study is based on a nationally representative sample of students in postsecondary education institutions, including undergraduate, graduate, and first-professional students. Students attending all types and levels of institutions are represented, including public and private not-for-profit

¹ Although the Bureau of the Census conducts the CPS for the Bureau of Labor Statistics, NCES funds the October enrollment supplement and it is therefore referred to as an NCES survey in this report.

and for-profit institutions, less-than-2-year institutions, community colleges, and 4-year colleges and universities. NPSAS data come from multiple sources, including institutional records, government databases, and student telephone interviews. Detailed data concerning participation in student financial aid programs are extracted from institutional records. Data pertaining to family circumstances, background demographic data, and educational and work experiences and expectations were collected from students using a computer-assisted telephone interview. The first NPSAS study was conducted during the 1986–87 school year (NPSAS:87); subsequent studies have been carried out during the school years 1989–90 (NPSAS:90), 1992–93 (NPSAS:93), 1995–96 (NPSAS:96), and 1999–2000 (NPSAS:2000). The sample sizes of the five NPSAS studies range from approximately 45,000 students in 975 institutions to 65,000 students in 1,100 institutions.

Integrated Postsecondary Education Data System

IPEDS is a comprehensive data collection system designed to encompass all institutions and organizations whose primary purpose is to provide postsecondary education. The IPEDS system is built around a series of interrelated surveys that collect institution-level data in such areas as enrollments, program completions, faculty, staff, and finances. The Fall Enrollment (EF) Survey in IPEDS is conducted annually and collects data on the number of students enrolled for credit in postsecondary institutions in the United States and its outlying areas in the fall of a given year. For the time period covered in this report (1989–90 to 1999–2000), enrollment counts by age categories were collected in odd years and generally only from institutions offering an associate’s degree or higher. Unlike the other data sources, which are based on samples, IPEDS is considered a census of postsecondary institutions and is therefore not subject to sampling error.²

National Household Education Survey

NHES is a system of telephone surveys of the civilian noninstitutionalized population of the United States. Of interest for this report are the NHES Adult Education surveys conducted in 1991, 1995, and 1999 (NHES:1991, NHES:1995, and NHES:1999). The Adult Education surveys ask persons 16 years of age and older who were not enrolled in elementary or secondary school at the time of the interview about their participation in basic skills courses, English as a Second Language (ESL) courses, credential (postsecondary degree or diploma) programs, apprenticeships, work-related courses, and personal development/interest courses over the previous year (typically spring to spring). Adults participating in programs or courses provide information about those activities, including the activity’s subject matter, duration, cost, location and sponsorship. The sample sizes for the Adult Education survey range from approximately 6,700 to 19,700 respondents age 16 or older (age 17 or older in 1991). When appropriately weighted, the NHES Adult Education Survey samples are nationally representative of all civilian, non-institutionalized adults (i.e., excluding military personnel and their families living on post and residents of institutions such as prisons) in the 50 states and the District of Columbia.

² As discussed in the section “Definition of Postsecondary Institution,” 1989 and 1995 IPEDS data represent the population of higher education institutions, and 1999 IPEDS data represent the population of institutions eligible to participate in the Title IV federal financial aid program.

Current Population Survey

CPS is a monthly household survey of approximately 50,000 dwelling units conducted by the U.S. Census Bureau. Households are interviewed for 4 consecutive months, are not contacted for the next 8 months, and then are interviewed for an additional 4 consecutive months. While the initial and fifth interviews typically are done in person, the remaining interviews generally are conducted over the telephone. (For a complete description of methodology, see U.S. Department of Commerce 2002). The monthly CPS is designed primarily to provide labor force data for the civilian noninstitutionalized population. NCES sponsors an October supplement to the CPS. This annual supplement includes questions about highest grade completed, level and grade of current enrollment, attendance status, type of courses, degree objective, and type of organization offering instruction for each member of the household. This survey is referred to here as the CPS School Enrollment Supplement.

Each of these four surveys was used to estimate the number of individuals enrolled in postsecondary education in the 1989–90, 1995–96, and 1999–2000 school years, or the closest available time period to those dates. Each estimate of the number enrolled was then placed over the relevant population age group to obtain an estimate of the percentage of the population enrolled in postsecondary education. For these population estimates, resident population counts provided by the U.S. Census Bureau (described below) were used. The same month and year of the resident population data (April of 1990, 1996, and 2000) were used so that only the numerator (i.e., the estimated number enrolled) would vary across estimates.³ Enrollments and population counts were estimated for the traditional college-age group, ages 18 to 24, along with those individuals ages 18 to 64.

The next section of this report presents a set of preliminary postsecondary enrollment estimates that include minimal adjustments for differences among surveys. The subsequent (and main) sections discuss in detail the differences among these surveys that affect the comparability of estimates, and how these data can be more fully adjusted to minimize comparability problems. The final section of the report uses the adjusted survey data to construct undergraduate enrollment estimates that are more comparable across surveys. That section focuses on undergraduate enrollments because these are typically the postsecondary enrollments of most policy interest, and thus the enrollments for which comparable estimates are most critical.

Figures 1, 2, 6, and 7 (discussed further below) present the results of the preliminary and final analyses. In the figures, the bars around the NPSAS, NHES, and CPS estimates indicate 95 percent confidence intervals.⁴ Because IPEDS is considered a survey of the

³ As discussed in the section “Denominator reference period,” the denominator of the percentage includes the military and institutionalized adults, which may result in an underestimate of enrollment rates for the two surveys (NHES and CPS) that exclude these groups.

⁴ Confidence intervals based on the standard errors provide a way to take into account the uncertainty associated with sample estimates and to make inferences about the population averages and percentages in a manner that reflects that uncertainty. A sample estimate plus or minus 1.96 standard errors provides a 95 percent confidence interval for the corresponding population quantity. This statement means that if an estimate was calculated from 100 samples taken from a population, then 95 of those sample estimates would fall between the upper and lower bounds of the confidence interval.

universe of postsecondary schools rather than a sample of schools, IPEDS estimates are not subject to sampling error and thus confidence intervals were not created for these data. Generally, if the confidence intervals of two sample-based estimates did not overlap, or if the confidence interval of a sample-based estimate did not include the IPEDS estimate, the difference between the two estimates was considered to be statistically significant.

Preliminary Estimates

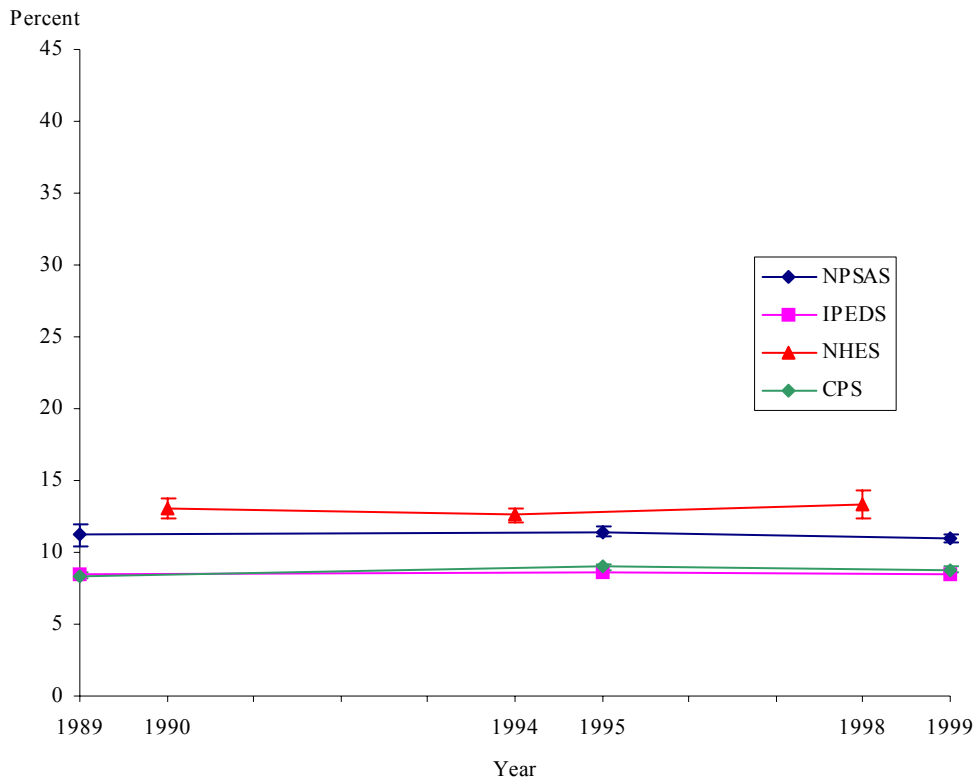
A set of preliminary estimates was derived from each survey. These estimates were derived for all postsecondary students (undergraduate and graduate) so that 1991 NHES estimates could be included in the comparisons. (That survey does not permit separate identification of graduate students.) For this preliminary analysis, enrollment estimates were obtained from published sources for IPEDS and CPS, and from analysis of NPSAS and NHES data files. The only modification to adjust for survey differences was to select students in 2- and 4-year or above institutions (IPEDS and NPSAS) or students in associate's degree or higher programs (CPS and NHES). As discussed below, this was done in part because IPEDS generally does not collect age data on students in less-than-2-year institutions. In addition, missing age data were imputed for some of the datasets (described later in this report).

Figures 1 and 2 show these preliminary estimates of combined undergraduate and graduate enrollment as a percentage of the population in each age category, and table 1 presents the enrollment and resident population estimates used to construct these figures. As one might expect, the two surveys that estimate enrollments over a year (NHES and NPSAS) consistently yield higher enrollment rates than the two surveys that estimate fall-only enrollments (CPS and IPEDS), with differences typically in the range of 2–5 percentage points for the 18- to 64-year-old cohort, and 3–12 percentage points for the 18- to 24-year-old cohort.⁵ Comparing surveys with similar enrollment reference periods provides estimates that are somewhat more consistent, but not entirely so. For 18- to 64-year-olds in each year, the full-year NHES yields estimates that are about 1 to 2 percentage points higher than estimates from the full-year NPSAS. However, for 18- to 24-year-olds in each year, the NHES and NPSAS yield enrollment rate estimates that are not significantly different from each other.⁶ For the two fall-only surveys (CPS and IPEDS), enrollment rate estimates are not significantly different for either age group in 1989, but in 1995 and 1999, the CPS estimates are higher than the IPEDS estimates for both age groups; the differences are relatively small among 18- to 64-year-olds (less than 1 percentage point), but are larger among the traditional 18- to 24-year-old cohort (almost 3 percentage points).

⁵ All statistical tests used in this report are *t*-tests (or their corresponding confidence intervals) conducted at the 0.05 significance level.

⁶ Relatively large standard errors for the NHES data may account for the 1989 and 1999 findings (figure 2).

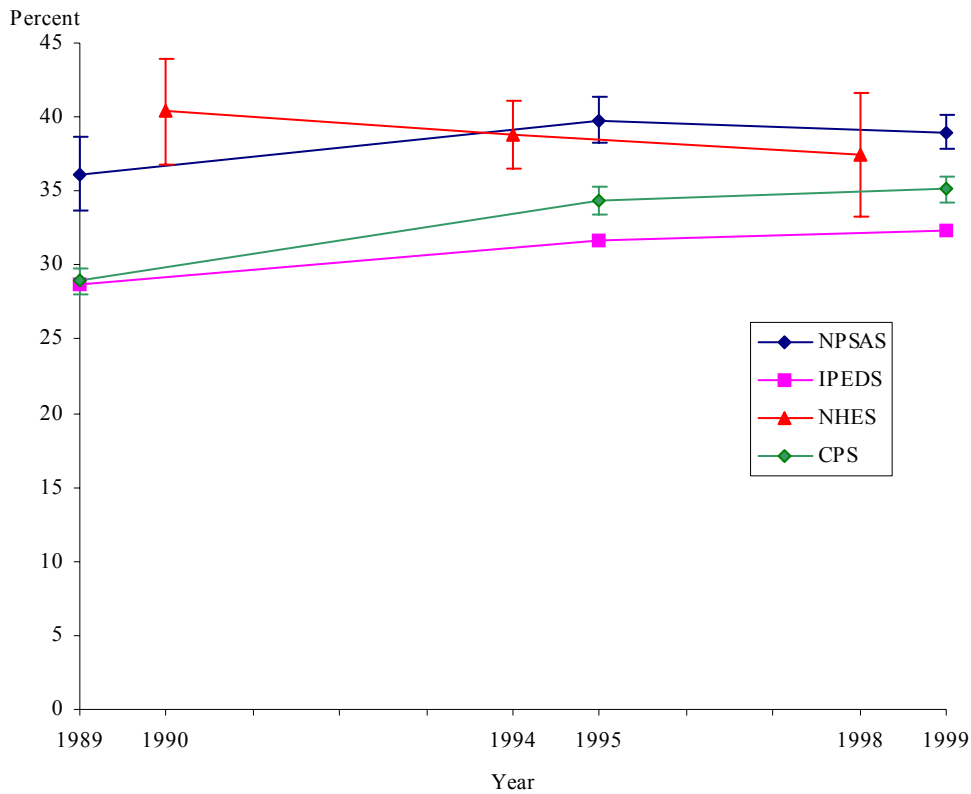
Figure 1. Enrollment of 18- to 64-year-olds in degree-granting postsecondary institutions as a percentage of the resident population: Selected years, 1989 to 2000



NOTE: The National Postsecondary Student Aid Study (NPSAS) includes enrollment for academic years 1989–90, 1995–96, and 1999–2000; Integrated Postsecondary Education Data System (IPEDS) for fall 1989, fall 1995, and fall 1999; National Household Education Survey (NHES) for spring 1990 to spring 1991, spring 1994 to spring 1995, and spring 1998 to spring 1999; and Current Population Survey (CPS) for October 1989, October 1995, and October 1999. Resident population figures are for April 1990, April 1996, and April 2000. NPSAS and IPEDS estimates include students in 2- and 4-year institutions only, and CPS and NHES estimates include students in associate’s degree or higher programs only. The bars around the NPSAS, NHES, and CPS estimates indicate 95 percent confidence intervals.

SOURCE: Amie, J., Curry, A., and Martinez, G. (2001). *School Enrollment—Social and Economic Characteristics of Students: October 1999* (Detailed tables; Series P20–533). U.S. Department of Commerce, Bureau of the Census, Washington, DC: U.S. Government Printing Office (for Current Population Survey [CPS] estimates); Bruno, R.R., and Curry, A. (1997). *School Enrollment—Social and Economic Characteristics of Students: October 1995* (Detailed tables; Series P20–492). U.S. Department of Commerce. Washington, DC: Bureau of the Census (for CPS estimates); Kominski, R., and Roodman, S. (1991). *School Enrollment—Social and Economic Characteristics of Students: October 1989* (Series P20–452). U.S. Department of Commerce. Washington, DC: Bureau of the Census (for CPS estimates); U.S. Department of Commerce, Bureau of the Census (2001), *National Monthly Population Estimates, 1990 to 2000*. Available: http://eire.census.gov/popest/archives/national/nat_90s_detail.php; Schantz, N.B., and Pluta, M.J. (1991). *Enrollment in Higher Education, Fall 1989* (NCES 91–217). U.S. Department of Education. Washington, DC: National Center for Education Statistics (for Integrated Postsecondary Education Data System [IPEDS] estimates); Snyder, T.D. (1999). *Digest of Education Statistics, 1998* (NCES 1999–036). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); Snyder, T.D. (2002). *Digest of Education Statistics, 2001* (NCES 2002–130). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office (for IPEDS estimates); U.S. Department of Education, National Center for Education Statistics, 1991, 1995, and 1999 Adult Education Surveys of the National Household Education Surveys Program (AE-NHES:1991, AE-NHES:1995, AE-NHES:1999); U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, NPSAS:2000).

Figure 2. Enrollment of 18- to 24-year-olds in degree-granting postsecondary institutions as a percentage of the resident population: Selected years, 1989 to 2000



NOTE: The National Postsecondary Student Aid Study (NPSAS) includes enrollment for academic years 1989–90, 1995–96, and 1999–2000; Integrated Postsecondary Education Data System (IPEDS) for fall 1989, fall 1995, and fall 1999; National Household Education Survey (NHES) for spring 1990 to spring 1991, spring 1994 to spring 1995, and spring 1998 to spring 1999; and Current Population Survey (CPS) for October 1989, October 1995, and October 1999. Resident population figures are for April 1990, April 1996, and April 2000. NPSAS and IPEDS estimates include students in 2- and 4-year institutions only, and CPS and NHES estimates include students in associate’s degree or higher programs only. The bars around the NPSAS, NHES, and CPS estimates indicate 95 percent confidence intervals.

SOURCE: Amie, J., Curry, A., and Martinez, G. (2001). *School Enrollment—Social and Economic Characteristics of Students: October 1999* (Detailed tables; Series P20–533). U.S. Department of Commerce, Bureau of the Census, Washington, DC: U.S. Government Printing Office (for Current Population Survey [CPS] estimates); Bruno, R.R., and Curry, A. (1997). *School Enrollment—Social and Economic Characteristics of Students: October 1995* (Detailed tables; Series P20–492). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); Kominski, R., and Roodman, S. (1991). *School Enrollment—Social and Economic Characteristics of Students: October 1989* (Series P20–452). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); U.S. Department of Commerce, Bureau of the Census (2001), *National Monthly Population Estimates, 1990 to 2000*. Available: http://eire.census.gov/popest/archives/national/nat_90s_detail.php; Schantz, N.B., and Pluta, M.J. (1991). *Enrollment in Higher Education, Fall 1989* (NCES 91–217). U.S. Department of Education, Washington, DC: National Center for Education Statistics (for Integrated Postsecondary Education Data System [IPEDS] estimates); Snyder, T.D. (1999). *Digest of Education Statistics, 1998* (NCES 1999–036). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); Snyder, T.D. (2002). *Digest of Education Statistics, 2001* (NCES 2002–130). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); U.S. Department of Education, National Center for Education Statistics, 1991, 1995, and 1999 Adult Education Surveys of the National Household Education Surveys Program (AE-NHES:1991, AE-NHES:1995, AE-NHES:1999); U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, NPSAS:2000).

Table 1. Number of students enrolled in degree-granting postsecondary institutions and percentage of resident population enrolled, by age: Selected years, 1989 to 2000

Survey and student age	Number enrolled			Percent of resident population		
	1989–90	1995–96	1999–2000	1989–90	1995–96	1999–2000
NPSAS						
Total ages 18 to 64	17,195,000	18,480,000	18,562,000	11.2	11.4	11.0
Ages 18 to 24	9,744,000	9,896,000	10,298,000	36.1	39.8	39.0
IPEDS	Fall 1989	Fall 1995	Fall 1999	Fall 1989	Fall 1995	Fall 1999
Total ages 18 to 64	13,128,541	13,891,676	14,322,481	8.5	8.6	8.5
Ages 18 to 24	7,724,784	7,850,268	8,523,610	28.7	31.6	32.3
NHES	1990	1994	1998	1990	1994	1998
Total ages 18 to 64	20,096,000	20,358,000	22,548,000	13.1	12.6	13.3
Ages 18 to 24	10,896,000	9,649,000	9,895,000	40.4	38.8	37.5
CPS	October 1989	October 1995	October 1999	October 1989	October 1995	October 1999
Total ages 18 to 64	12,960,000	14,512,000	14,978,000	8.4	9.0	8.8
Ages 18 to 24	7,804,000	8,539,000	9,259,000	28.9	34.3	35.1
	Resident population					
Age	April 1990	April 1996	April 2000			
Total ages 18 to 64	153,758,202	161,793,683	169,420,285			
Ages 18 to 24	26,960,710	24,869,238	26,399,159			

NOTE: National Postsecondary Student Aid Study (NPSAS), National Household Education Survey (NHES), and Current Population Survey (CPS) estimates have been rounded to the nearest thousand. NPSAS includes enrollment for academic years 1989–90, 1995–96, and 1999–2000; Integrated Postsecondary Education Data System (IPEDS) for fall 1989, fall 1995, and fall 1999; NHES for spring 1990 to spring 1991, spring 1994 to spring 1995, and spring 1998 to spring 1999; and CPS for October 1989, October 1995, and October 1999. NPSAS and IPEDS estimates include students in 2- and 4-year institutions only, and CPS and NHES estimates include students in associate’s degree or higher programs only.

SOURCE: Amie, J., Curry, A., and Martinez, G. (2001). *School Enrollment—Social and Economic Characteristics of Students: October 1999* (Detailed tables; Series P20–533). U.S. Department of Commerce, Bureau of the Census, Washington, DC: U.S. Government Printing Office (for Current Population Survey [CPS] estimates); Bruno, R.R., and Curry, A. (1997). *School Enrollment—Social and Economic Characteristics of Students: October 1995* (Detailed tables; Series P20–492). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); Kominski, R., and Roodman, S. (1991). *School Enrollment—Social and Economic Characteristics of Students: October 1989* (Series P20–452). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); U.S. Department of Commerce, Bureau of the Census (2001), *National Monthly Population Estimates, 1990 to 2000*. Available: http://eire.census.gov/popest/archives/national/nat_90s_detail.php; Schantz, N.B., and Pluta, M.J. (1991). *Enrollment in Higher Education, Fall 1989* (NCES 91–217). U.S. Department of Education, Washington, DC: National Center for Education Statistics (for Integrated Postsecondary Education Data System [IPEDS] estimates); Snyder, T.D. (1999). *Digest of Education Statistics, 1998* (NCES 1999–036). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); Snyder, T.D. (2002). *Digest of Education Statistics, 2001* (NCES 2002–130). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); U.S. Department of Education, National Center for Education Statistics, 1991, 1995, and 1999 Adult Education Surveys of the National Household Education Surveys Program (AE-NHES:1991, AE-NHES:1995, AE-NHES:1999); U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, NPSAS:2000).

In terms of changes in enrollment rates over time, all four surveys fail to find a significant change in enrollment rates between 1989 and 1999 for adults ages 18 to 64. For the traditional 18- to 24-year-old cohort, however, the surveys produce inconsistent findings, with the full-year NPSAS and NHES data failing to detect change between 1989 and 1999, while the fall-only CPS and IPEDS data indicate an increase in enrollment rates of about 4 to 6 percentage points.

Several obvious differences across surveys may account for these inconsistencies in findings (e.g., whether the estimates are for a full year or for fall only). Nonetheless, these preliminary findings suggest that it might be useful to take a closer look at the four surveys to see if they can generate estimates of both the level of enrollment and trends in enrollment that are at least conceptually more consistent. To focus on the enrollments that are most often of policy interest, the subsequent analyses in this report examine *undergraduate* enrollment rather than combined undergraduate and graduate enrollment. The remainder of the report discusses the relevant differences across these surveys, the impact these differences have on the estimates, and the resulting data considerations for those attempting to obtain comparable estimates of undergraduate enrollment across the surveys.

Differences Across Surveys

While there are numerous differences across these surveys as well as some differences in how specific surveys were administered from one year to the next, not all of the differences are likely to have an appreciable impact on enrollment estimates. The differences considered for this analysis can be grouped into the following categories, each of which is discussed below and summarized in table 2.

1. Source of information,
2. Reference period,
3. Definition of enrollment,
4. Definition of postsecondary institution, and
5. Survey administration procedures.

Source of information

One primary difference among these surveys is whether a student, a postsecondary institution, or a household member provides enrollment information. NPSAS is a survey of students enrolled in postsecondary education. In contrast, representatives of postsecondary institutions complete IPEDS forms, while NHES and CPS survey households and collect information from one or more household members. CPS and NHES differ in that CPS uses proxy respondents while NHES does not.

For NPSAS and IPEDS, NCES uses specific criteria to determine which institutions will be considered “postsecondary” for the purposes of the survey and then administers the survey only to students and institutions that meet those criteria. In contrast, because NHES and CPS are both household surveys, the definition of a “postsecondary institution” depends largely on the perceptions and experiences of the respondents. This differ-

Table 2. Major differences among the National Postsecondary Student Aid Study (NPSAS), Integrated Postsecondary Education Data System (IPEDS), National Household Education Survey (NHES), and Current Population Survey (CPS) related to obtaining enrollment estimates by age: 1999

Survey	Population surveyed	Reference period	Enrollment definition	Institution definition	Proxy data collection allowed
NPSAS	Post-secondary students	Academic year	For-credit courses and programs	Title IV institution	No
IPEDS	Post-secondary institutions	Fall only	For-credit courses and programs	Degree-granting Title IV institution	No
NHES	Civilian, non-institutionalized adults in households	12 months prior to date of survey administration (Jan–April administration)	Courses taken as part of degree program	All/ idiosyncratic	No
CPS	Civilian, non-institutionalized adults in households	Fall only	For-credit courses and programs	All/ idiosyncratic	Yes

SOURCE: Amie, J., Curry, A., and Martinez, G. (2001). *School Enrollment—Social and Economic Characteristics of Students: October 1999* (Detailed tables; Series P20–533). U.S. Department of Commerce, Bureau of the Census. Washington, DC: U.S. Government Printing Office; Broyles, S.G., Gallego, L.M., Kelly, J.E., Knapp, L.G., Whitmore, R.W., and Shiyng, W. (2002). *Enrollment in Postsecondary Institutions, Fall 2000 and Financial Statistics, Fiscal Year 2000* (NCES 2002–212). U.S. Department of Education. Washington, DC: National Center for Education Statistics; Nolin, M.J., Montaquila, J., Nic-chitta, P., Kim, K., Kleiner, B., Lennon, J., Chapman, C., Creighton, S., and Bielick, S. (2000). *National Household Education Survey of 1999: Methodology Report* (NCES 2000–078). U.S. Department of Education. Washington, DC: National Center for Education Statistics; Riccobono, J.A., Cominole, M.B., Siegel, P.H., Gabel, T.J., Link, M.W., and Berkner, L.K. (2002). *National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000) Methodology Report* (NCES 2002–152). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

ence in institution definition is discussed further below, in the section on “Definition of postsecondary institution.”

In addition, because NHES and CPS are surveys of the civilian, noninstitutionalized population, they exclude some groups of students enrolled in postsecondary institutions. In 1996, about 1 percent of undergraduates were on active duty military. (This figure excludes those enrolled in military academies.) In addition, a presumably small proportion of undergraduates were incarcerated. These military and incarcerated students are counted in NPSAS and IPEDS, but not in the household-based NHES and CPS.

Reference period

Another key difference across surveys is whether they ask about enrollment at one point in time or over an entire year.

The NPSAS surveys used in this analysis represent enrollment over an entire year.⁷ Specifically, for NPSAS:90, the students sampled were those enrolled on August 1, 1989; October 15, 1989; February 15, 1990; or June 15, 1990 (however, the June 15 enrollees were not sampled for 4-year institutions because of budgetary limitations). In NPSAS:96, the survey population was defined as those students who were enrolled in any term *beginning* between May 1, 1995 and April 30, 1996. In NPSAS:2000, with one exception, the survey population was defined as those students who were enrolled at any time between July 1, 1999, and June 30, 2000. The exception occurred if a term or course began after May 31, 2000, and ended after June 30, 2000; students enrolled only in that term or course were excluded from the survey population (Riccobono et al. 2002; pp.7–8). Thus, these three surveys differ in the likelihood of inclusion of summer school students, with NPSAS:89 least likely to include these students and NPSAS:95 most likely to include them. Although the effect of this variability is unknown, it is likely to be relatively small, since it would affect enrollment estimates only in situations where students attended summer sessions but not the preceding fall or spring sessions.

As its name indicates, the IPEDS Fall Enrollment surveys request information on enrollment in the fall. Specifically, the survey forms ask the institution representative to provide “Enrollment as of the institution’s official fall reporting date or as of October 15, [year].” Thus, a student who was enrolled in the spring but not the previous fall would not be counted in the IPEDS Fall Enrollment Survey.

The NHES surveys ask about enrollment over the 12 months preceding the interview. In the 1995 and 1999 NHES Adult Education surveys, respondents were asked, “During the past 12 months, did you take any courses that are part of a program leading toward...?” (figure 3). Because the Adult Education surveys were conducted from early January through early April of the survey year (i.e., 1995 and 1999), the enrollment period covers almost all of calendar years 1994 and 1998 (i.e., a respondent interviewed in January 1995 would report on enrollment from January 1994 to December 1994). Whether or not spring 1995 or spring 1999 enrollment was counted depends on the month in which a respondent was interviewed and when the spring term began. If interviewed before their spring enrollment started, that enrollment would not have been counted, but if interviewed after spring enrollment started, then that enrollment may have been counted. In terms of estimating enrollment, whether or not spring 1995 or spring 1999 enrollment was counted only affects those who were not otherwise enrolled in 1994 or 1998 and whose interview date came before the start of the spring term. Such occurrences are assumed to be fairly rare. It was not possible to estimate undergraduate enrollment using the 1991 NHES Adult Education Survey because the item asking about full-time

⁷Although the NPSAS surveys since 1989–90 are designed to provide estimates of enrollment over the year, and those are the estimates used in this report, a variable is provided on each NPSAS data file that allows the analyst to restrict the estimate to fall enrollment only.

Figure 3. Selected credential enrollment items from the National Household Education Survey (NHES) Program Adult Education Surveys: 1995 and 1999

1995 NHES Adult Education Survey

D1. During the past 12 months, did you take any courses that are part of a program, or a series of courses associated with a program leading toward...

- CRDEGREE** a. A college or university degree, such as an associate's, bachelor's, or graduate degree?
CRVOC DIP b. A diploma or certificate from a vocational or technical school after high school or a formal vocational training program?

D3. In what type of degree, diploma, or certificate program(s) were you working?
 [CODE UP TO 5. CATEGORIES CAN BE ENTERED MORE THAN ONCE FOR MULTIPLE PROGRAMS OF THE SAME PROGRAM TYPE.]

- CRDIPLO1–
CRDIPLO3** VOC/TECH DIPLOMA AFTER HIGH SCHOOL,
 BUT BELOW BACHELOR'S DEGREE
 ASSOCIATE'S DEGREE
 BACHELOR'S DEGREE
 MASTER'S DEGREE
 DOCTORATE (PHD, EDD)
 PROFESSIONAL DEGREE BEYOND BACHELOR'S DEGREE
 (MEDICINE/MD; DENTISTRY/DDS; LAW/JD/LLB; ETC.)
 ANOTHER DEGREE
**CRDIPOS1–
CRDIPOS3/R** SPECIFY

1999 NHES Adult Education Survey

AD1. During the past 12 months, did you take any courses that are part of a program leading toward...

- CRDEGREE** a. A college or university degree, such as an associate's, bachelor's, or graduate degree?
CRVOC DIP b. A diploma or certificate from a vocational or technical school after high school or a formal vocational training program

AD2. In what (type/types) of degree, diploma, or certificate program were you working?
 [CODE UP TO 5. CATEGORIES CAN BE ENTERED MORE THAN ONCE FOR MULTIPLE PROGRAMS OF THE SAME PROGRAM TYPE.]

- CRTYVOC** VOC/TECH DIPLOMA AFTER HIGH SCHOOL, BUT BELOW BACHELOR'S DEGREE
CRTYASC ASSOCIATE'S DEGREE (AA, AS)
CRTYBCH BACHELOR'S DEGREE (BA, BS)
CRTYMAS MASTER'S DEGREE (MA, MS)
CRTYDOC DOCTORATE (PHD, EDD)
CRTYPRF PROFESSIONAL DEGREE BEYOND BACHELOR'S DEGREE
 (MEDICINE/MD; DENTISTRY/DDS; LAW/JD/LLB; ETC.)
CRTYOTH ANOTHER DEGREE
CRTYOS1–5/R SPECIFY
-

NOTE: Bold type indicates variable names.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995 and 1999 Adult Education Surveys of the National Household Education Surveys Program (AE-NHES:1995 and AE-NHES:1999).

enrollment (A1A) asks about enrollment in “a program leading to a bachelor’s or more advanced degree,” making it difficult to separate full-time undergraduate from full-time graduate enrollment. (However, the question about part-time enrollment does separate bachelor’s from advanced degrees.)

The October CPS School Enrollment Supplement item used in this analysis asks, “Is [person] attending or enrolled in regular school?”⁸ (figure 4). Because the survey is administered in October, this question yields estimates of the number of individuals enrolled in October of the survey year. However, the technical notes on CPS enrollment reports (e.g., Kominski and Roodman 1991, p. B-3) state, “Interviewers were instructed to count as enrolled anyone who had been enrolled at any time during the current term or school year, except those who have left for the remainder of the term.” Therefore, individuals who were enrolled in the summer term but not in the fall term might have been considered to be enrolled during the “school year.” However, this scenario seems somewhat unlikely; thus, the CPS can be considered to provide primarily an estimate of the number of individuals enrolled in postsecondary education during the fall term of the survey year.

These differences in the enrollment reference period across surveys can be expected to affect the overall estimated level of enrollment. In particular, NPSAS and NHES, the two surveys that reference enrollment over an entire year, should (and do, as seen above) provide estimates somewhat higher than those of IPEDS and CPS, which generally reflect enrollment in the fall of the survey year. Thus, the degree to which NPSAS and NHES estimates are higher than IPEDS and CPS estimates depends in part on the likelihood of students in any given age group enrolling in the spring (or summer) and not in the previous fall term. If, for example, older students tend to be more likely than younger students to enroll in the spring and not the previous fall, then the difference between enrollment estimates (i.e., NPSAS/NHES vs. IPEDS/CPS) should be greater for older students than for younger students.

Denominator reference period. The enrollment counts discussed above provide the numerators for enrollment rate calculations. In this analysis, the denominators for enrollment rates consist of estimates of the resident population. Rather than picking a month and year of the resident population figures most closely aligned with each dataset, the same month (April of 1990, 1996, and 2000) was used for each dataset for a given time period. This was done primarily because the analysis focused on comparing enrollment estimates and, therefore, the population estimate needed to be constant (within a time period). The month of April was chosen because consistent intercensal estimates are readily available from April 1990 to April 1999. These resident population figures are based primarily on the 1990 Decennial Census enumeration, adjusted as necessary based on estimates of the population change from the census date to the reference dates of the estimates. As such, they are considered here as counts of the population rather than estimates based on a sample.

⁸ As defined in the CPS, “regular schools” include colleges, universities, and professional schools at the postsecondary level, while business, vocational, technical, secretarial, trade, or correspondence schools generally are not considered regular schools. The October Enrollment Supplement also includes a question that asks whether the individual was enrolled in October of the previous year, and if so, at what level; this latter question was not used in this analysis.

Figure 4. Selected items from the October Current Population Survey (CPS) School Supplement Survey: 1995

PESCHOOL [School enrollment—(adult) attend regular school]

Is ... attending or enrolled in regular school?

- 1 Yes
- 2 No

PETYPE [School enrollment—2- or 4-year college]

Is this a 2-year or a 4-year college or university?

- 1 Out of universe
- 1 2-year college (community or junior college)
- 2 4-year college or university

PEFULL [School enrollment—attendance full/part-time]

Is ... attending college full-time or part-time?

- 1 Out of universe
- 1 Full-time
- 2 Part-time

PEGRADE [School enrollment—grade or year attending]

What grade or year is ... attending?

- 1 Grade 1 Elementary
- 2 Grade 2 Elementary
- 3 Grade 3 Elementary
- 4 Grade 4 Elementary
- 5 Grade 5 Elementary
- 6 Grade 6 Elementary
- 7 Grade 7 Elementary
- 8 Grade 8 Elementary
- 9 Grade 9 High School
- 10 Grade 10 High School
- 11 Grade 11 High School
- 12 Grade 12 High School
- 13 1st year of college (freshman)
- 14 2nd year of college (sophomore)
- 15 3rd year of college (junior)
- 16 4th year of college (senior)
- 17 1st year of graduate school
- 18 2nd year or higher of graduate school

PEVOCA [School enrollment—had vocational/tech/secretarial courses]

Excluding (regular college courses and) on-the-job training, is ... taking any business, vocational, technical, secretarial, trade, or correspondence courses?

- 1 Out of universe
- 1 Yes
- 2 No

PEPUBLIC [School type—public or private school(adult)]

Is ... enrolled in public or private school?

- 1 Out of universe
 - 1 Public
 - 2 Private
-

NOTE: Bold type indicates variable names.

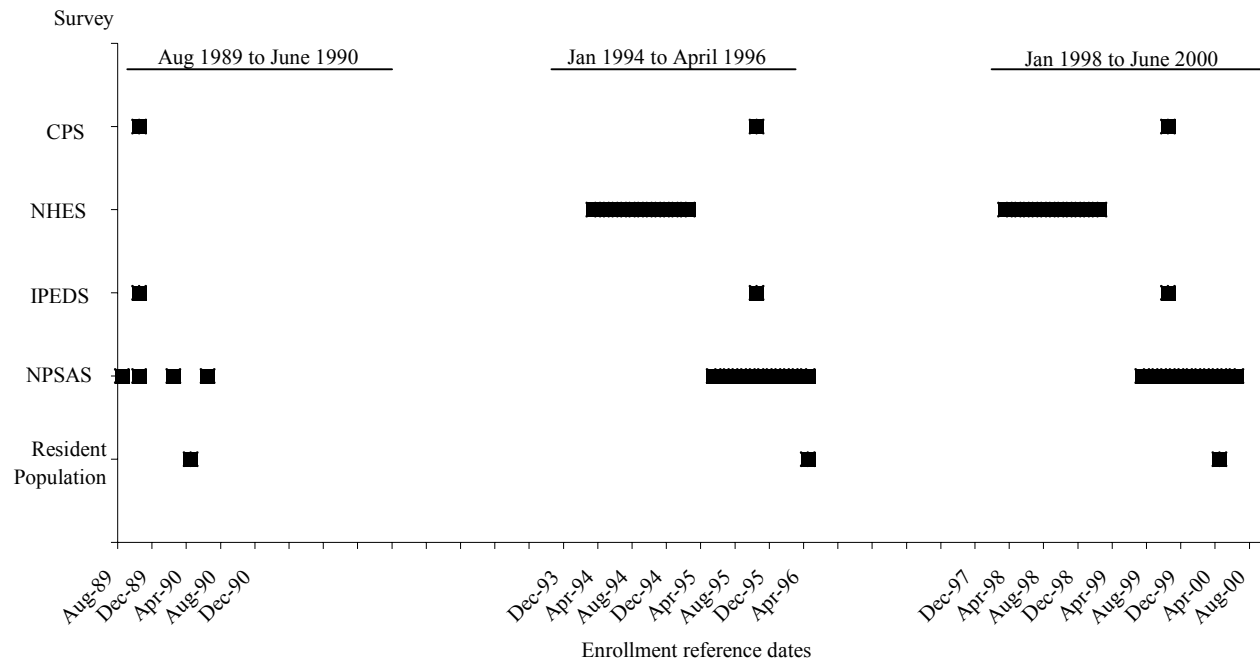
SOURCE: U.S. Department of Labor, Bureau of Labor Statistics and U.S. Department of Commerce, Bureau of the Census via the Federal Electronic Research and Review Extraction Tool (FERRET). Available: <http://ferret.bls.census.gov/cgi-bin/ferret>.

The choice of the resident population for the denominator also warrants discussion. The resident population is the most appropriate denominator for estimating enrollment rates from NPSAS and IPEDS, because individuals in the military or in prisons who are enrolled in a postsecondary institution would be counted in these datasets. In the case of NHES and CPS, which are both designed to be representative of the civilian, noninstitutionalized population, using the resident population as the base of the estimate might be somewhat problematic. Since the denominator includes institutionalized adults and those in the military but the numerator does not, the NHES and CPS enrollment rate estimates are slight underestimates of the enrollment rates for the total population. Conversely, using the civilian, noninstitutionalized population as a denominator would yield slight overestimates of enrollment rates based on NPSAS and IPEDS. Two different denominators could have been used; however, because the primary emphasis of this analysis was to compare enrollment estimates using different datasets, it was important that the population base remain constant across estimates, even if it is somewhat inconsistent with the target populations of NHES and CPS.⁹

Figure 5 shows the approximate undergraduate enrollment reference dates for the data collected in each survey, along with the date of the resident population estimate. As described above, while the surveys' time periods are roughly similar, they are not exactly the same, and thus some of the variation in estimates may be due to changes across time in the number of enrolled students. In addition, as the figure makes clear, the date of the resident population estimate (April of 1990, 1996, and 2000) does not align perfectly with each enrollment estimate. In particular, the NHES enrollment reference periods are about 1 to 2 years prior to the resident population estimates. The appendix of this report compares NHES enrollment rates using April 1996 and April 2000 resident population figures to those using April 1995 and April 1999 resident population estimates, which are more contemporaneous to the NHES enrollment reference periods. The difference ranges from .09 to .67 of a percentage point.

⁹ Population counts that are more proximate in time to the NHES reference period were also calculated (see table A-4 in the appendix).

Figure 5. Enrollment reference dates for the undergraduate National Postsecondary Student Aid Study (NPSAS), Integrated Postsecondary Education Data System (IPEDS), National Household Education Survey (NHES), and Current Population Survey (CPS), and resident population estimates: Selected years, 1989 to 2000



NOTE: Unable to estimate undergraduate-only enrollment using the 1991 NHES.

SOURCE: National Center for Education Statistics NHES website (<http://www.nces.ed.gov/nhes/Main/adult.asp>); Riccobono, J.A., Whitmore, R.W., Gabel, T.J., Traccarella, M.A., Pratt, D.J., and Berkner, L.K. (1997). *National Postsecondary Student Aid Study, 1995–96 (NPSAS:96) Methodology Report* (NCES 98–073). U.S. Department of Education. Washington, DC: National Center for Education Statistics; Riccobono, J.A., Cominole, M.B., Siegel, P.H., Gabel, T.J., Link, M.W., and Berkner, L.K. (2002). *National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000) Methodology Report*, (NCES 2002–152). U.S. Department of Education. Washington, DC: National Center for Education Statistics; Shepherd, J. (1992). *Methodology Report for the 1990 National Postsecondary Student Aid Study* (NCES 92–080). U.S. Department of Education. Washington, DC: National Center for Education Statistics; National Center for Education Statistics IPEDS website (<http://nces.ed.gov/ipeds/>); U.S. Department of Commerce, Bureau of the Census, and U.S. Department of Labor, Bureau of Labor Statistics, CPS School Supplement web page (<http://www.bls.census.gov/cps/school/scenmain.htm>).

Definition of enrollment

Students enroll in postsecondary institutions in a variety of ways. Some take credit courses leading to a degree, others take credit courses that do not lead to a degree, while others enroll in noncredit courses only. The four surveys examined differ in which of these types of enrollment they include.

The postsecondary students eligible for NPSAS:90 were those who attended an NPSAS-eligible institution (described below) between July 1, 1989, and June 30, 1990, and who met the following criteria:

- taking one or more courses for credit; or
- in a degree or formal award program of at least 3 months' duration; or
- in an occupationally or vocationally specific program of at least 3 months' duration; and
- not concurrently enrolled in high school (Shepherd 1992, p. 27).

The postsecondary students eligible for NPSAS:96 or NPSAS:2000 were those who attended an NPSAS-eligible institution during the respective survey year who were

- enrolled in *either* (a) an academic program, (b) at least one course for credit that could be applied toward fulfilling the requirements for an academic degree, *or* (c) an occupational or vocational program that required at least 3 months or 300 clock hours of instruction to receive a degree, certificate, or other formal award;
- not concurrently enrolled in high school; and
- not enrolled solely in a GED or other high school completion program. (Riccobono et al. 1997, pp. 2–10; Riccobono et al. 2002, p. 13).

The 1989 and 1995 IPEDS Fall Enrollment Surveys specify that the following students should be included in the Fall Enrollment Survey:

- students enrolled in courses creditable toward a degree or other formal award;
- students enrolled in courses that are part of a vocational or occupational program, including those enrolled in off-campus centers; and
- high school students taking regular college courses for credit.

The following students were excluded from the Fall Enrollment Surveys:

- students enrolled exclusively in courses not creditable toward a formal award and who are not in a postsecondary vocational program;
- students enrolled exclusively in remedial courses;
- students exclusively auditing classes;
- students studying abroad (e.g., at a foreign university) if their enrollment at the domestic institution is only an administrative record and the fee is only nominal;
- students in any branch campus located in a foreign country; and
- students earning continuing education units (CEUs) only (Barbett and Korb 1997).

The 1999 IPEDS criteria are similar, except that they explicitly indicate that institutions should include full-time students taking remedial courses if the student is considered degree seeking for the purpose of student financial aid determination (1999 IPEDS Fall Enrollment Survey form instructions).

The emphasis in the 1995 and 1999 NHES Adult Education Surveys is on enrollment for the purpose of earning a degree or other formal award. In 1995, the survey asks, “During the past 12 months, did you take any courses that are part of a program, or a series of courses associated with a program leading toward...?,” while the 1999 survey asks, “During the past 12 months, did you take any courses that are part of a program leading toward...?” (figure 3). Thus, students taking one or two classes for personal or professional reasons who did not consider themselves enrolled in a specific program leading toward a credential may not have indicated that they were enrolled in postsecondary education.¹⁰ Although the 1991 NHES Adult Education Survey also focuses on enrollment in a degree program, as noted above, it was not possible to estimate undergraduate enrollment using the 1991 NHES Adult Education survey.

The primary CPS October School Enrollment Supplement questions are as follows: “Is [person] attending or enrolled in a regular school?” and “What grade or year is [person] attending?” (figure 4). The “Definitions and Explanations” section of the October 1989 School Enrollment report states that: “The college student need not be working toward a degree, but he/she must be enrolled in a class for which credit would be applied toward a degree” (Kominski and Roodman 1991, p. B-3).

NPSAS, IPEDS, and CPS are similar in that a student taking a class that *could be* counted toward a degree or formal award is considered to be enrolled in postsecondary education, regardless of whether the student is actually seeking a degree. NHES is somewhat different in that the survey questions emphasize classes taken as part of a degree program, although respondents may differ in how they interpret the questions. Generally, students enrolled exclusively in continuing education classes, remedial classes, or non-credit classes are excluded from all of these estimates.

Definition of postsecondary institution

“Postsecondary institution” is a broad term, encompassing a diverse group of organizations offering postsecondary education. Any survey of postsecondary education must determine which types of institutions or programs will be considered postsecondary for the purposes of the survey. One common distinction is between a) institutions that offer certificates or other credentials generally requiring less than 2 years of full-time study to complete; and b) those that offer an associate’s degree or higher, which typically require 2 or more years to complete. Each of the four surveys differs somewhat in how it defines postsecondary institutions, particularly at the less-than-2-year level.

¹⁰ These non-degree-seeking postsecondary students may be captured in the later coursetaking sections of the survey, but could not be clearly identified in every NHES survey.

A broad range of institutions is eligible to participate in NPSAS, including public and private less-than-2-year, 2-year, and 4-year institutions. Specifically, to be eligible to participate in NPSAS:90, an institution must have

- offered an education program designed for persons who have completed secondary education;
- offered an academically, occupationally, or vocationally oriented program of study;
- offered access to persons other than those employed by the institution;
- offered more than just correspondence courses;
- offered at least one program lasting 3 months or longer; and
- been located in the 50 states, Puerto Rico, or the District of Columbia (Shepherd 1992, p. 11).

In addition, U.S. service academies were not eligible to participate because of their unique funding/tuition base (Shepherd 1992, p. 10). While the criteria for NPSAS:96 were similar to these, NPSAS:2000 added a new criterion: The institution must have a signed Title IV participation agreement with the U.S. Department of Education.¹¹ Because nearly all institutions eligible to participate in previous NPSAS administrations had a Title IV participation agreement, the impact of this additional criterion is not large. A recent NCES report indicates that in NPSAS:96, only about 1 percent of the sampled undergraduates were attending an institution not eligible to participate in the Department's Title IV aid programs (Malizio 2001, p. 25). To facilitate comparison with NPSAS:2000, however, NCES has added a variable to the Data Analysis System (DAS) for previous NPSAS studies that allows the analyst to select only those institutions with Title IV agreements.

IPEDS defines a postsecondary institution as “an institution which has as its sole purpose, or one of its primary missions, the provision of postsecondary education. Postsecondary education is the provision of a formal instructional program whose curriculum is designed primarily for students beyond the compulsory age for high school. This includes programs whose purpose is academic, vocational, and continuing professional education, and excludes avocational and adult basic education programs” (Broyles 1995). The IPEDS Fall Enrollment Survey was mailed to nearly all 2- and 4-year postsecondary institutions in 1989, 1995, and 1999. Whether or not less-than-2-year institutions were asked to report enrollment-by-age data varied across those years. The 1989 Fall Enrollment Survey included public less-than-2-year institutions and a sample of all private less-than-2-year institutions, while the 1995 Fall Enrollment Survey was sent to the universe of institutions accredited at the college level, which excludes most less-than-2-year institutions (Barbett and Korb 1997, p. 167). In 1999, the Fall Enrollment Survey collected information on institutions that were eligible to participate in the Title IV federal financial aid program (i.e., degree-granting institutions) and therefore excluded most less-than-

¹¹ A Title IV participation agreement allows eligible students at an institution to receive Pell Grants and other federal student financial aid (e.g., direct loans). For an institution to be eligible to participate in Title IV financial aid programs, it must offer a program of at least 300 clock hours in length, have accreditation recognized by the U.S. Department of Education, and have been in business for at least 2 years (IPEDS COOL website: <http://www.nces.ed.gov/ipeds/cool/Search.asp>).

2-year institutions (Barbett 1999, p. 13). Because the inclusion of less-than-2-year institutions varied over the decade, the analysis in this report includes only enrollment in 2- and 4-year institutions. Limiting the estimates to 2- and 4-year institutions also is consistent with how NCES currently publishes enrollment-by-age data.

The IPEDS estimates presented in this paper are based on published NCES reports. For 1989 and 1995, published NCES tables generally include data for “higher education” institutions only, defined as those institutions that were accredited at the college level¹² by an agency recognized by the U.S. Department of Education (Schantz and Pluta 1991, appendix B), while tables based on 1999 data are limited to degree-granting Title IV institutions. Barbett (1999) reports that the change from classifying institutions as whether or not they are accredited at the collegiate level to whether or not they are degree-granting Title-IV eligible had a comparatively small effect on the estimated number of students enrolled in institutions offering college and university education. In 1995, total enrollment in degree-granting Title-IV eligible institutions was about 0.1 percent higher than total enrollment in institutions accredited at the collegiate level (Barbett 1999, p. 2).

Because NHES is a household survey, the definition of what constitutes a postsecondary institution depends in part on the perceptions and experiences of the respondent, particularly with regard to the distinction between enrollment for an associate’s or higher degree versus enrollment in a vocational program of less than 2 years. As shown in figure 3, in both 1995 and 1999,¹³ respondents were first asked broad questions about their participation in credential programs and then asked in which particular credential program(s) they were enrolled. It is possible that some respondents do not perceive their degree program and institution type in the same way that the survey item is structured. For example, although a respondent may be in an institution that does not offer associate’s degrees or higher, the respondent may nevertheless consider him- or herself to be in an associate’s degree program. As described in greater detail below, there appeared to be a few inconsistencies between responses to the broad questions and to the specific credential program question, particularly among respondents who indicated that they were enrolled in “another degree.” Although not used in this analysis, NHES also asks questions about the type of “school, organization, or business” that provided the instruction for the degree, which also can be useful in determining the level and type of enrollment.

Like NHES, estimates based on CPS depend in part on the respondent’s perception or understanding of what constitutes a “college or professional degree.” As figure 4 indicates, in the CPS a respondent (or proxy) is first asked about attendance at a “regular” school, which is defined for the respondent as including elementary school, high school, and schooling that leads to a college or professional degree. The respondent then provides some details about the grade and level of enrollment at the institution. A separate question asks whether he or she is taking any business, vocational, technical, secretarial, trade, or correspondence courses.

¹² Includes those institutions that had courses that led to an associate’s degree or higher, or were accepted for credit towards those degrees.

¹³ As noted above, the 1991 NHES Adult Education Survey is not included here because it was not possible to estimate the number of adults enrolled in *undergraduate* education using that survey.

The various ways in which “postsecondary” is defined across surveys makes it somewhat difficult to obtain consistent estimates of the number of postsecondary education students. Although the preliminary estimates in figures 1 and 2 include undergraduate and graduate enrollment, it was decided to limit the main analysis for this report to undergraduate students. Having made that restriction, a second issue raised by the inconsistencies in data sources was whether comparable estimates could be derived if students in vocational programs and/or less-than-2-year institutions are included. Because the survey questions and definitions vary considerably for vocational and less-than-2-year students and because IPEDS does not ask most less-than-2-year institutions to report enrollment-by-age categories, it was decided that estimates would be more comparable without these students than with them. Thus, as in the preliminary analysis, only students who indicated that they were enrolled in courses that could lead to an associate’s or a bachelor’s degree were included in the NHES and CPS estimates, and only students enrolled in 2-year or 4-year institutions were included in the NPSAS and IPEDS estimates. Although these restrictions improve comparability across surveys, there are remaining inconsistencies. Under these restrictions, a student pursuing a vocational certificate in a 2-year institution, for example, would be counted in the NPSAS and IPEDS estimates because he or she is enrolled in a 2-year college, but may not be counted in NHES or CPS because the respondent might have indicated enrollment in a vocational diploma program, which was excluded from the estimates. In addition, a student enrolled in a non-Title IV postsecondary institution in 1999 would be counted in CPS and NHES but not in NPSAS and IPEDS because the latter two surveys are restricted to Title IV institutions. This difference is not expected to have a large impact on the estimates because enrollment in degree-granting institutions that are not Title IV eligible is comparatively small (less than 1 percent of total degree-granting enrollment; Barbett 1999, table J).

Survey administration procedures

The preceding discussion focused primarily on fairly broad differences across the four surveys, such as whether the survey included enrollment at one point in time or over an entire year. Another set of differences encompasses the specific way in which the surveys were administered. Because previous NCES reports have addressed some of these details, particularly between NHES and CPS (e.g., Nolin et al. 2000; Collins, Brick, and Kim 1997; Nolin et al. 1997; Kim, Loomis, and Collins 1996) and because some of these differences are difficult to adjust for beyond what is accomplished by the sample weights, these issues are only mentioned here. These include whether only households with telephones are sampled (NHES) or if nontelephone households are also sampled (CPS); whether only telephone interviews are conducted (NHES) or if some respondents are interviewed in person (CPS); the time of year in which the survey is administered; differences in minimum survey-eligible age cutoffs, and differences in response rates between NHES and CPS (Nolin et al. 2000). It seems unlikely, however, that any bias due to these issues has a substantial impact on the enrollment estimates. In an analysis comparing NHES and CPS estimates of adult education enrollment, for example, Collins, Brick, and Kim (1997) indicated that “the empirical evidence clearly indicates that the undercoverage bias [due to sampling only households with telephones] in the NHES estimates is very small” (p. 24). Regarding nonresponse bias, the authors suggest that “the actual bias

due to nonresponse is probably less than 5 percent” (p. 24) compared to CPS estimates.¹⁴ For purposes of this analysis, it was assumed that the sample weights for each sample-based survey adjust for factors such as undercoverage due to sampling only households with telephones and that sources of bias that cannot be adjusted for with sample weights do not have a substantial impact on enrollment estimates.

Analysis of Undergraduate Enrollment Rates

After examining the differences across surveys discussed above, a number of adjustments were made to some of the datasets to obtain estimates that were as comparable as possible. The types of adjustments made are described below.

National Postsecondary Student Aid Study

All NPSAS estimates were made using restricted-use data files. Although NPSAS data are available from NCES through the public-use Data Analysis System (DAS), the DAS does not provide standard errors for the estimated number of students enrolled. To obtain these standard errors, it is necessary to apply to NCES for a license to obtain NPSAS restricted-use data, which can then be used with statistical programs such as STATA, SUDAAN, or AM to obtain standard errors that take into account the complex design of the NPSAS surveys.

As noted above, NPSAS:2000 was the first NPSAS study to include only those postsecondary institutions that had a signed Title IV agreement with the U.S. Department of Education. To make NPSAS:90 and NPSAS:96 consistent with NPSAS:2000, the variable T4ELIG was used to select those schools that were Title IV eligible or assumed eligible in NPSAS:90 and NPSAS:96. Because not all of the other surveys under consideration collect information from Puerto Rico, OBEREG (region of NPSAS institution) was used to exclude those students enrolled in schools located in Puerto Rico. In addition, LEVEL (level of NPSAS institution) was used to exclude those students enrolled in less-than-2-year institutions (this restriction was made for the preliminary estimates as well). Finally, about 1 percent (395 cases) of the final NPSAS:90 sample was missing a value for age. Because the analysis focused in part on estimating totals, it was important to include these cases in the analysis. For these cases with missing data, age was imputed by first sorting the dataset by level and control of the institution. Then the median age of the five cases before and the five cases after the missing-data cases in this sorted file was applied to the case with missing data (i.e., the case with missing data was assigned the median age of its nearest neighbors in the sorted file). Because the total number with missing age data is relatively small and the age categories are large, any impact of the imputations on the estimates by age is likely to be small.

¹⁴ Additional information on differences between NHES and CPS can be found in Collins, Brick, and Kim (1997) and Nolin et al. (1997).

Integrated Postsecondary Education Data System

IPEDS enrollment data for higher education (1989 and 1995) and Title IV degree-granting institutions (1999) were drawn from three NCES publications.¹⁵ The age categories used in these publications reflect the categories used on the enrollment survey: under 18, 18–19, 20–21, 22–24, 25–29, 30–34, 35–39, 40–49, 50–64, and 65 and over (i.e., this is the finest level of disaggregation available). A number of students were classified as “age unknown” in these reports, with fall 1989 having a particularly high number (about 12 percent compared to less than 2 percent for the other years). This issue is addressed in appendix A of *Enrollment in Higher Education, Fall 1989* (Schantz and Pluta 1991), which recommends applying the distribution of those with known ages to those with unknown ages. This recommendation was followed for each year used in the analysis. Although IPEDS collects information from institutions in outlying areas (such as Puerto Rico), in this analysis the IPEDS enrollment figures are limited to institutions located in the 50 states and the District of Columbia, and only include students enrolled in 2-year or 4-year institutions.

National Household Education Survey

As noted above, it was not possible to estimate the total number of individuals enrolled in *undergraduate* postsecondary education using the NHES:1991 Adult Education Survey. This section, therefore, concerns NHES:1995 and NHES:1999. Analysis was done using restricted-use data files in order to examine some of the write-in responses for certain items. When conducting the preliminary analysis (which included undergraduate and graduate enrollment) with NHES:1995, there appeared to be some inconsistencies between question D1 (CRDEGREE/CRVOC DIP), which asks the general questions about credential programs, and question D3 (CRDIPLO1–CRDIPLO3), which asks which specific type of program the respondent was pursuing (see figure 3). Some respondents, for example, answered “no” to CRDEGREE (whether seeking a college degree) and “yes” to CRVOC DIP (whether seeking a vocational diploma), but reported that they were working toward an associate’s degree. In addition, as noted in the *NHES 95: Adult Education Data File User’s Manual* (Collins et al. 1996), a number of respondents who indicated on the general question (CRDEGREE) that they were in a program leading toward a college or university degree, such as an associate’s, bachelor’s, or graduate degree, reported working on “another degree” type (CRDIPLO1–CRDIPLO3=91) and were given the opportunity to specify that program.

After deciding to focus on undergraduate enrollment only, question D3 was used to estimate the number of individuals working on an associate’s or a bachelor’s degree (CRDIPLO1–CRDIPLO3=2 or 3). One question concerned what to do with the 360 respondents (weighted n=2,293,000) who indicated they were working on “another degree.” Because the goal of the analysis was to estimate the total number of individuals enrolled in an associate’s or a bachelor’s degree program, these unknowns could have an appreciable impact on the estimates.

¹⁵ Undergraduate enrollment data for fall 1989 are presented in table A-3 of *Enrollment in Higher Education, Fall 1989* (Schantz and Pluta 1991). Fall 1995 data are reported in table 175 of the *Digest of Education Statistics 1998* (Snyder 1999) and fall 1999 data are presented in table 175 of the *Digest of Education Statistics 2001* (Snyder 2002).

Although the 1995 NHES user's manual (Collins et al. 1996) indicates that responses in the "another degree" category had already been reviewed and partially recoded to existing credential categories, the restricted-use files were used to see if any additional "another degree" responses might be recoded as indicating participation in associate's or bachelor's programs for the purposes of this analysis. First, respondents who did not otherwise indicate that they were working on an associate's or a bachelor's degree but who indicated that they were working on "another degree" were selected (unweighted n=290; weighted n=1,958,000). For each of these respondents, their type of credential program (CRDIPOS1–CRDIPOS3), the name of their major (CRMAJOR1–CRMAJOR3), and the type of instructional provider (CR1PRTYP–CR3PRTYP) were examined, along with CRDEGREE and CRVOC DIP. Based on this review, 73 (weighted n=456,000) respondents were recoded as having taken courses toward an associate's or a bachelor's degree.

In NHES:1999, 179 respondents (4,122,000 weighted) indicated in response to question AD2 that they were working on "another degree" type. Following the same basic procedure for these data, CRTYASC and CRTYBCH were used to identify those who indicated that they were enrolled in an associate's or a bachelor's degree program. Among respondents who did not indicate an associate or a bachelor's program, those who indicated that they were working on another degree (CRTYOTH; n=174 or 4,011,000 weighted) were selected and their responses to the "specify" item (CRTYOS1–5) were reviewed. Based on this review, eight respondents (weighted n=129,000) were recoded as having taken courses toward an associate's or a bachelor's degree.¹⁶

Current Population Survey

The CPS estimates reported here were obtained from three U.S. Census Bureau publications. The estimates came from table 9 in *School Enrollment—Social and Economic Characteristics of Students* for 1989, 1995, and 1999 (Kominski and Roodman 1991; Bruno and Curry 1997; Amie, Curry, and Martinez 2001). No adjustments were made to the CPS estimated enrollment levels published in these reports. With the enrollment data from these CPS reports, only consistently defined population counts were needed in order to construct and compare enrollment rates.

Enrollment rate denominators: The resident population

As mentioned above, resident population counts from the U.S. Census Bureau were used as the denominator for enrollment rate calculations. The size of the resident population for April of 1990, 1996, and 2000 by age was obtained from the U.S. Census Bureau's website.¹⁷ Estimates of the U.S. resident population include people who reside in the 50 States and the District of Columbia. They exclude residents of Puerto Rico and other outlying areas under United States sovereignty or jurisdiction. Estimates of resident population include persons residing in institutions and exclude the U.S. Armed Forces overseas, as well as civilian U.S. citizens whose usual place of residence is outside the

¹⁶ The list of respondent IDs that were coded as having enrolled in an associate's or a bachelor's degree program is available upon request for both NHES:1995 and NHES:1999.

¹⁷ *National Estimates Monthly Population Estimates, 1990 to 2000* obtained from http://eire.census.gov/popest/archives/national/nat_90s_detail.php.

United States. To create the resident population estimates, the Census Bureau begins with an estimate based primarily on the 1990 census enumeration and then updates it using administrative records and estimates of the components of population change. Specifically, the following formula is used to update the 1990 census: 1990 enumeration of resident population + births to U.S. resident women - deaths to U.S. residents + net international migration + net movement of U.S. Armed Forces and civilian citizens to the United States. A detailed description of the methodology used to produce these post-census estimates is available from the Census Bureau's website (U.S. Department of Commerce 2001).

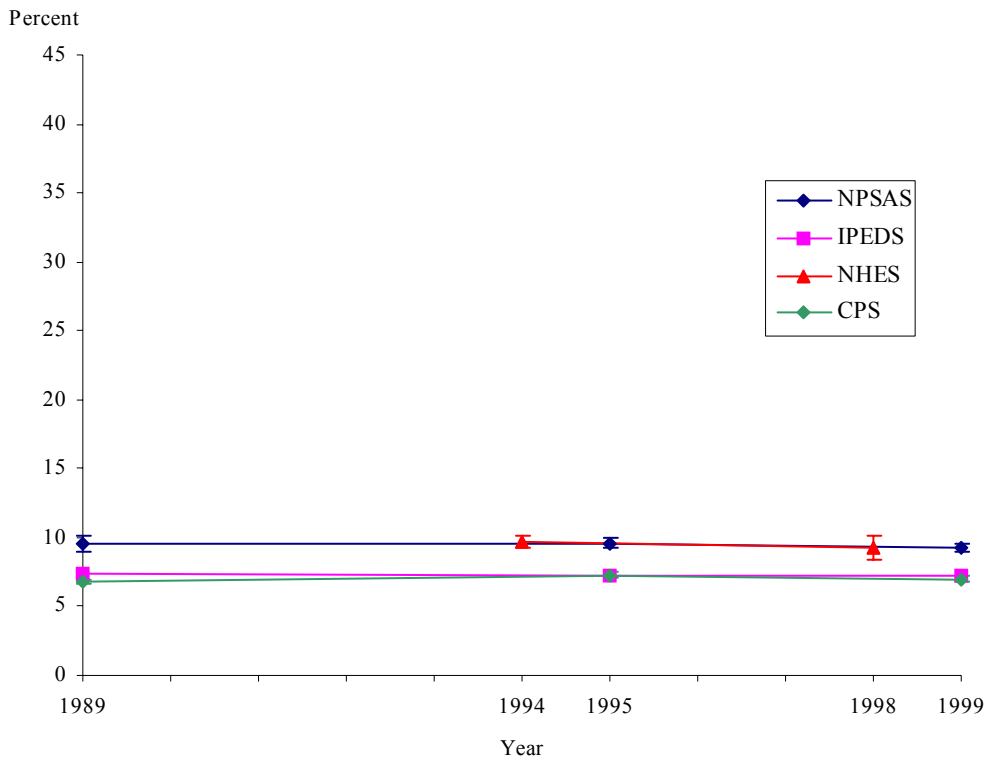
Estimated Undergraduate Enrollment

Figures 6 and 7 present estimates of undergraduate enrollment after making the adjustments discussed above. Table 3 presents the enrollment and resident population estimates used to construct these figures, and table 4 presents the enrollment estimates from each survey and year. As discussed previously, these figures and tables exclude graduate enrollment as well as enrollment in less-than-2-year institutions (for NPSAS and IPEDS) and enrollment in programs below the associate's degree level (for NHES and CPS). To review the effects of these adjustments on enrollments, the following discussion includes (1) a general comparison of the percentage of the resident population enrolled in each year and trends in the percentage enrolled across years, (2) a comparison of the enrollment estimates (i.e., number enrolled rather than percent of population) of those surveys covering similar enrollment reference periods, and (3) a discussion of differences between estimates of fall enrollment (IPEDS and CPS) with those of full-year enrollment (NPSAS and NHES).

First, figures 6 and 7 show that the (adjusted) estimates for NHES and NPSAS, the two surveys that include full-year enrollments, do not differ significantly from each other for any year or any age group.¹⁸ The two fall-only surveys, CPS and IPEDS, result in estimates that are sometimes significantly different, but never by more than 2.2 percentage points, and typically by less than 1.0 percentage points. These data suggest that the adjustments made to the survey data can in fact lead to estimates that produce reasonably consistent findings (i.e., test results) across surveys with similar enrollment reference periods.

¹⁸ The NHES estimate for 18- to 24-year-olds in 1998 has a relatively large standard error, which makes it difficult to detect differences between this estimate and other estimates.

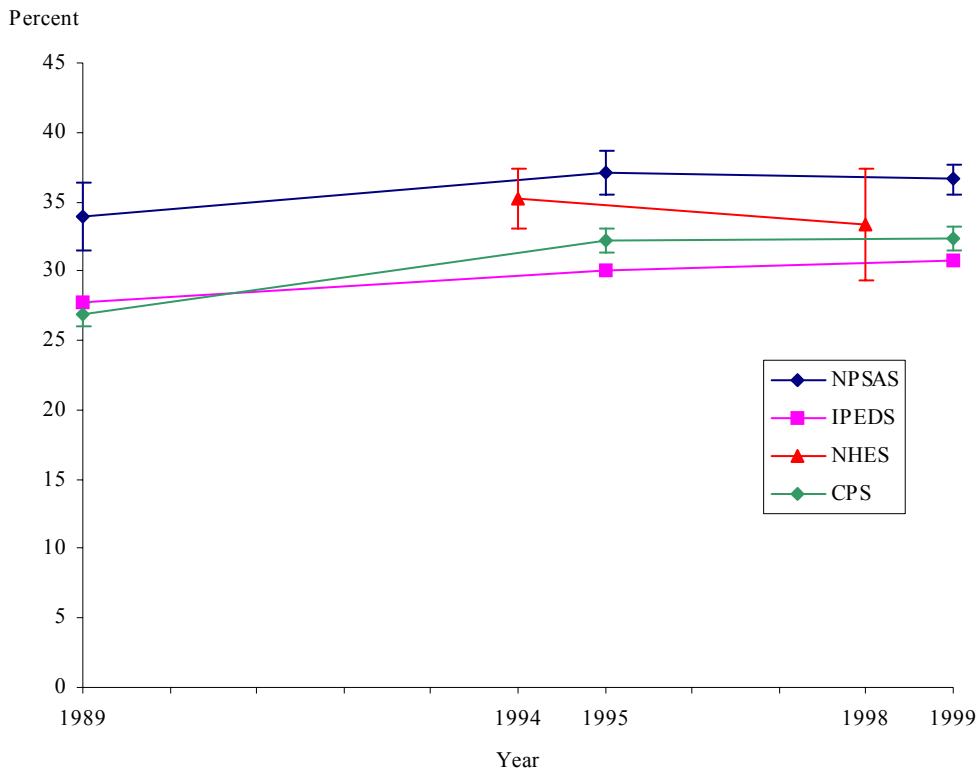
Figure 6. Undergraduate enrollment of 18- to 64-year-olds in degree-granting postsecondary institutions as a percentage of the resident population: Selected years, 1989 to 2000



NOTE: The National Postsecondary Student Aid Study (NPSAS) includes enrollment for academic years 1989–90, 1995–96, and 1999–2000; Integrated Postsecondary Education Data System (IPEDS) for fall 1989, fall 1995, and fall 1999; National Household Education Survey (NHES) for spring 1994 to spring 1995 and spring 1998 to spring 1999 (unable to estimate undergraduate-only enrollment using 1991 NHES); and Current Population Survey (CPS) for October 1989, October 1995, and October 1999. Resident population figures are for April 1990, April 1996, and April 2000. NPSAS and IPEDS estimates include students in 2- and 4-year institutions only, and CPS and NHES estimates include students in associate’s degree or higher programs only. Other adjustments made as described in the text on pages 21–24. The bars around the NPSAS, NHES, and CPS estimates indicate 95 percent confidence intervals.

SOURCE: Amie, J., Curry, A., and Martinez, G. (2001). *School Enrollment—Social and Economic Characteristics of Students: October 1999* (Detailed tables; Series P20–533). U.S. Department of Commerce, Bureau of the Census, Washington, DC: U.S. Government Printing Office (for Current Population Survey [CPS] estimates); Bruno, R.R., and Curry, A. (1997). *School Enrollment—Social and Economic Characteristics of Students: October 1995* (Detailed tables; Series P20–492). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); Kominski, R., and Roodman, S. (1991). *School Enrollment—Social and Economic Characteristics of Students: October 1989* (Series P20–452). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); U.S. Department of Commerce, Bureau of the Census (2001), *National Monthly Population Estimates, 1990 to 2000*. Available: http://eire.census.gov/popest/archives/national/nat_90s_detail.php; Schantz, N.B., and Pluta, M.J. (1991). *Enrollment in Higher Education, Fall 1989* (NCES 91–217). U.S. Department of Education, Washington, DC: National Center for Education Statistics (for Integrated Postsecondary Education Data System [IPEDS] estimates); Snyder, T.D. (1999). *Digest of Education Statistics, 1998* (NCES 1999–036). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); Snyder, T.D. (2002). *Digest of Education Statistics, 2001* (NCES 2002–130). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); U.S. Department of Education, National Center for Education Statistics, 1991, 1995, and 1999 Adult Education Surveys of the National Household Education Surveys Program (AE-NHES:1991, AE-NHES:1995, AE-NHES:1999); U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, NPSAS:2000).

Figure 7. Undergraduate enrollment of 18- to 24-year-olds in degree-granting postsecondary institutions as a percentage of the resident population: Selected years, 1989 to 2000



NOTE: The National Postsecondary Student Aid Study (NPSAS) includes enrollment for academic years 1989–90, 1995–96, and 1999–2000; Integrated Postsecondary Education Data System (IPEDS) for fall 1989, fall 1995, and fall 1999; National Household Education Survey (NHES) for spring 1994 to spring 1995 and spring 1998 to spring 1999 (unable to estimate undergraduate-only enrollment using 1991 NHES); and Current Population Survey (CPS) for October 1989, October 1995, and October 1999. Resident population figures are for April 1990, April 1996, and April 2000. NPSAS and IPEDS estimates include students in 2- and 4-year institutions only, and CPS and NHES estimates include students in associate’s degree or higher programs only. Other adjustments made as described in the text on pages 21–24. The bars around the NPSAS, NHES, and CPS estimates indicate 95 percent confidence intervals.

SOURCE: Amie, J., Curry, A., and Martinez, G. (2001). *School Enrollment—Social and Economic Characteristics of Students: October 1999* (Detailed tables; Series P20–533). U.S. Department of Commerce, Bureau of the Census, Washington, DC: U.S. Government Printing Office (for Current Population Survey [CPS] estimates); Bruno, R.R., and Curry, A. (1997). *School Enrollment—Social and Economic Characteristics of Students: October 1995* (Detailed tables; Series P20–492). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); Kominski, R., and Roodman, S. (1991). *School Enrollment—Social and Economic Characteristics of Students: October 1989* (Series P20–452). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); U.S. Department of Commerce, Bureau of the Census (2001), *National Monthly Population Estimates, 1990 to 2000*. Available: http://eire.census.gov/popest/archives/national/nat_90s_detail.php; Schantz, N.B., and Pluta, M.J. (1991). *Enrollment in Higher Education, Fall 1989* (NCES 91–217). U.S. Department of Education, Washington, DC: National Center for Education Statistics (for Integrated Postsecondary Education Data System [IPEDS] estimates); Snyder, T.D. (1999). *Digest of Education Statistics, 1998* (NCES 1999–036). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); Snyder, T.D. (2002). *Digest of Education Statistics, 2001* (NCES 2002–130). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); U.S. Department of Education, National Center for Education Statistics, 1991, 1995, and 1999 Adult Education Surveys of the National Household Education Surveys Program (AE-NHES:1991, AE-NHES:1995, AE-NHES:1999); U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, NPSAS:2000).

Table 3. Number of undergraduates enrolled in degree-granting postsecondary institutions and percentage of resident population enrolled, by age: Selected years, 1989 to 2000

Survey and student age	Number enrolled			Percent of resident population		
	1989–90	1995–96	1999–2000	1989–90	1995–96	1999–2000
NPSAS						
Total ages 18 to 64	14,675,000	15,512,000	15,690,000	9.5	9.6	9.3
Ages 18 to 24	9,148,000	9,223,000	9,664,000	33.9	37.1	36.6
IPEDS	Fall 1989	Fall 1995	Fall 1999	Fall 1989	Fall 1995	Fall 1999
Total ages 18 to 64	11,339,558	11,868,526	12,220,815	7.4	7.3	7.2
Ages 18 to 24	7,466,695	7,451,422	8,108,853	27.7	30.0	30.7
NHES	1990	1994	1998	1990	1994	1998
Total ages 18 to 64	—	15,621,000	15,689,000	—	9.7	9.3
Ages 18 to 24	—	8,761,000	8,790,000	—	35.2	33.3
CPS	October 1989	October 1995	October 1999	October 1989	October 1995	October 1999
Total ages 18 to 64	10,459,000	11,783,000	11,853,000	6.8	7.3	7.0
Ages 18 to 24	7,253,000	8,010,000	8,521,000	26.9	32.2	32.3
	Resident population					
	April 1990	April 1996	April 2000			
Total ages 18 to 64	153,758,202	161,793,683	169,420,285			
Ages 18 to 24	26,960,710	24,869,238	26,399,159			

— Not available. Unable to estimate undergraduate-only enrollment using 1991 NHES.

NOTE: National Postsecondary Student Aid Study (NPSAS), National Household Education Survey (NHES), and Current Population Survey (CPS) estimates have been rounded to the nearest thousand. NPSAS includes enrollment for academic years 1989–90, 1995–96, and 1999–2000; Integrated Postsecondary Education Data System (IPEDS) for fall 1989, fall 1995, and fall 1999; NHES for spring 1994 to spring 1995 and spring 1998 to spring 1999 (unable to estimate undergraduate-only enrollment using 1991 NHES); and CPS for October 1989, October 1995, and October 1999. NPSAS and IPEDS estimates include students in 2- and 4-year institutions only, and CPS and NHES estimates include students in associate’s degree or higher programs only. Other adjustments made as described in the text on pages 21–24.

SOURCE: Amie, J., Curry, A., and Martinez, G. (2001). *School Enrollment—Social and Economic Characteristics of Students: October 1999* (Detailed tables; Series P20–533). U.S. Department of Commerce, Bureau of the Census, Washington, DC: U.S. Government Printing Office (for Current Population Survey [CPS] estimates); Bruno, R.R., and Curry, A. (1997). *School Enrollment—Social and Economic Characteristics of Students: October 1995* (Detailed tables; Series P20–492). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); Kominski, R., and Roodman, S. (1991). *School Enrollment—Social and Economic Characteristics of Students: October 1989* (Series P20–452). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); U.S. Department of Commerce, Bureau of the Census (2001), *National Monthly Population Estimates, 1990 to 2000*. Available: http://eire.census.gov/popest/archives/national/nat_90s_detail.php; Schantz, N.B., and Pluta, M.J. (1991). *Enrollment in Higher Education, Fall 1989* (NCES 91–217). U.S. Department of Education, Washington, DC: National Center for Education Statistics (for Integrated Postsecondary Education Data System [IPEDS] estimates); Snyder, T.D. (1999). *Digest of Education Statistics, 1998* (NCES 1999–036). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); Snyder, T.D. (2002). *Digest of Education Statistics, 2001* (NCES 2002–130). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); U.S. Department of Education, National Center for Education Statistics, 1991, 1995, and 1999 Adult Education Surveys of the National Household Education Surveys Program (AE-NHES:1991, AE-NHES:1995, AE-NHES:1999); U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, NPSAS:2000).

Table 4. National Household Education Survey (NHES), Integrated Postsecondary Education Data System (IPEDS), and Current Population Survey (CPS) undergraduate enrollment estimates in degree-granting postsecondary institutions as a percentage of National Postsecondary Student Aid Study (NPSAS), NHES, and IPEDS enrollment estimates, by age: Selected years, 1989 to 2000

Survey and student age	Percent of NPSAS estimate			Percent of NHES estimate			Percent of IPEDS estimate		
	1989–90	1995–96	1999–2000	1990	1994	1998	Fall 1989	Fall 1995	Fall 1999
NHES									
Total ages 18 to 64	—	101	100	†	†	†	†	†	†
Ages 18 to 24	—	95	91	†	†	†	†	†	†
IPEDS									
Total ages 18 to 64	77	77	78	—	76	78	†	†	†
Ages 18 to 24	82	81	84	—	85	92	†	†	†
CPS									
Total ages 18 to 64	71	76	76	—	75	76	92	99	97
Ages 18 to 24	79	87	88	—	91	97	97	107	105

— Not available. Unable to estimate undergraduate-only enrollment using 1991 NHES.

† Not applicable or comparable data shown elsewhere in table.

NOTE: NPSAS includes enrollment for academic years 1989–90, 1995–96, and 1999–2000; IPEDS for fall 1989, fall 1995, and fall 1999; NHES for spring 1994 to spring 1995 and spring 1998 to spring 1999; and CPS for October 1989, October 1995, and October 1999. NPSAS and IPEDS estimates include students in 2- and 4-year institutions only, and CPS and NHES estimates include students in associate's or bachelor's degree programs only. Other adjustments made as described in the text on pages 21–24.

SOURCE: Amie, J., Curry, A., and Martinez, G. (2001). *School Enrollment—Social and Economic Characteristics of Students: October 1999* (Detailed tables; Series P20–533). U.S. Department of Commerce, Bureau of the Census, Washington, DC: U.S. Government Printing Office (for Current Population Survey [CPS] estimates); Bruno, R.R., and Curry, A. (1997). *School Enrollment—Social and Economic Characteristics of Students: October 1995* (Detailed tables; Series P20–492). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); Kominski, R., and Roodman, S. (1991). *School Enrollment—Social and Economic Characteristics of Students: October 1989* (Series P20–452). U.S. Department of Commerce, Washington, DC: Bureau of the Census (for CPS estimates); U.S. Department of Commerce, Bureau of the Census (2001), *National Monthly Population Estimates, 1990 to 2000*. Available: http://eire.census.gov/popest/archives/national/nat_90s_detail.php; Schantz, N.B., and Pluta, M.J. (1991). *Enrollment in Higher Education, Fall 1989* (NCES 91–217). U.S. Department of Education, Washington, DC: National Center for Education Statistics (for Integrated Postsecondary Education Data System [IPEDS] estimates); Snyder, T.D. (1999). *Digest of Education Statistics, 1998* (NCES 1999–036). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); Snyder, T.D. (2002). *Digest of Education Statistics, 2001* (NCES 2002–130). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office (for IPEDS estimates); U.S. Department of Education, National Center for Education Statistics, 1991, 1995, and 1999 Adult Education Surveys of the National Household Education Surveys Program (AE-NHES:1991, AE-NHES:1995, AE-NHES:1999); U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, NPSAS:2000).

The effect of the survey reference period on enrollment rates is clearly indicated in these figures. With few exceptions,¹⁹ the full-year NHES and NPSAS estimates are higher than the fall-only CPS and IPEDS estimates. Further, in most instances the difference in fall versus full-year enrollment rates is larger for the broader, older age group than for younger age group²⁰—perhaps reflecting the greater likelihood of older students rather than younger students to enroll at later points in the school year. (The Data Analysis System [DAS] for NPSAS:96 indicates that of undergraduate students enrolled in 2- and 4-year institutions at some point during the 1995–96 school year, 14 percent of students ages 18 to 24 were not enrolled in fall 1995, compared to 27 percent of students over age 24. [$t=12.83$; estimates from Web DAS].) Among 18- to 24-year-olds, the fall enrollment estimates of IPEDS and CPS are between 79 and 97 percent of the full-year NPSAS and NHES estimates (i.e., fall enrollments appear to capture 80 percent or more of full-year enrollments; table 4). However, among 18- to 64-year-olds, the fall-only IPEDS and CPS estimates are 71 to 78 percent of the full-year NPSAS and NHES estimates.

The findings for enrollment trends across the years are also fairly consistent. As discussed above, NHES data for 1991 could not be included in this analysis, so only three datasets can be compared between 1991 and 1999; however, all four can be compared over the shorter time period between 1995 and 1999. Over the longer period, for the broad 18- to 64-year-old cohort, no change in enrollment rates was detected in the NPSAS and CPS, and the IPEDS indicated a change of less than 1 percentage point.²¹ For the younger age cohort, both the CPS and IPEDS (the two fall-only surveys) suggest an increase in enrollment rates of at least 3 percentage points, but the NPSAS fails to detect any change. Over the shorter time period between 1995 and 1999, for both cohorts, no change was detected in enrollment rates in the NHES, NPSAS, and CPS, and the IPEDS indicated a change of less than 1 percent (a slight decrease for the 18- to 64-year-old cohort, a slight increase for the 18- to 24-year-old cohort).

Taken together, figures 6–7 and tables 3–4 lead to at least two general observations about these estimates. First, because the resident population base is so large relative to the enrollment estimates, the enrollment estimates can vary considerably without having an appreciable effect on the estimated rate of enrollment. For example, given the April 2000 resident population of 169 million for ages 18 to 64, enrollment estimates could vary between 14.5 and 16.0 million (i.e., differ by 1.5 million) and still round to an enrollment rate of 9 percent. Apparently small differences in enrollment rates either across surveys or over time may translate into relatively large differences in terms of the estimated number enrolled. Thus, it is useful to carry the rates out to at least one decimal place and to look at the estimated number enrolled as well.

¹⁹ No difference was detected in the NHES and CPS estimates for 18- to 24-year-olds in 1995, or in the NHES and CPS estimates and the NHES and IPEDS estimates for 18- to 24-year-olds in 1999. Relatively large NHES standard errors for 18- to 24-year-olds may account for these NHES and IPEDS findings and for the NHES and CPS 1995 findings (figure 7).

²⁰ The only exceptions were for the three NHES comparisons discussed in footnote 19.

²¹ Given the changes in included students and institutions in IPEDS over the years, a change of less than 1 percentage point is probably within the margin of nonsampling error for this survey.

Second, this report highlighted several differences across surveys that result in observed differences in enrollment estimates. Some of these differences can be at least partially eliminated (e.g., by restricting analyses to students in certain degree programs or types of institutions), while others are less amenable to correction (e.g., the survey reference period, the source of the data, and other methodological differences). Thus, it is important that the analyst examining participation in postsecondary education note the reference period, levels of degrees, and institution type covered by the analysis, and the effects of this coverage relative to other possible analyses and/or data sources.

Summary

This report described a number of differences across four NCES surveys with data on postsecondary enrollments—NPSAS, IPEDS, NHES, and CPS—and compared estimates of enrollment rates using these four datasets. Table 2 (on page 9) summarizes major differences across these surveys in terms of population, reference period, and the definitions of enrollment and postsecondary institution. After making several adjustments to minimize the effects of these differences on enrollment estimates, (including limiting the focus to undergraduate enrollment), enrollment rates typically are not found to be significantly different for those surveys with similar reference periods (i.e., full year or fall only). Remaining differences across surveys can reasonably be attributed to factors such as the size and nature of the population surveyed, the survey methodology, and the time of year in which the survey is administered.

It is important to note that the estimates presented in this report generally exclude students enrolled in less-than-2-year institutions (for NPSAS and IPEDS) and those enrolled in programs leading to a vocational certificate or other credential below the associate's degree level (for NHES and CPS). While this excluded population of postsecondary institutions and students is not particularly large,²² it presents additional challenges in terms of deriving consistent estimates. CPS, for example, includes correspondence courses in the survey item related to vocational training (figure 4), whereas enrollment in correspondence courses may not be included in the NPSAS and NHES estimates.

Also, comparing graduate enrollment rates raises additional issues that were beyond the scope of this report. It is difficult, for example, to obtain graduate enrollment estimates using NHES:1991, and it is not clear how enrollment in postbaccalaureate certificate programs would be counted across the surveys. To more fully measure postsecondary enrollments, enrollment in less-than-2-year programs and graduate enrollment require additional attention.

This analysis also highlighted the discrepancy between the NHES item that asks about enrollment in any college degree program and the question about the specific degree program in which a respondent was enrolled. Some students indicated that they were not in a degree program on the general question but indicated that they were enrolled in an associate's degree program on the specific degree type item. In addition, a number of

²² For example, the NPSAS:2000 DAS indicates that about 3 percent of students were enrolled in less-than-2-year institutions in 1999–2000.

respondents who indicated enrollment in a degree program indicated that they were in an “other” type of degree program. While some of these other degree programs might plausibly be considered an associate’s or a bachelor’s degree, many were not. Although these issues are noted in the 1995 NHES user’s manual (Collins et al. 1996), comparing the NHES estimates to those based on other surveys highlights the need to carefully consider how the question was asked.²³

As with most data sources, the most appropriate choice depends on the questions being asked. Certain questions, for example, exclude some of these databases. If interest lies in examining enrollment estimates prior to the late 1980s, then IPEDS (and its predecessor, the Higher Education General Information Survey [HEGIS]) and CPS are the only databases discussed here that extend back to that time. Although each survey includes a broad range of information, each focuses on a particular area. For example, NPSAS includes extensive data on how students finance postsecondary education, while NHES can be used to examine postsecondary education relative to other types of education, such as that provided by employers. One significant decision is whether to use a dataset that focuses on enrollment at one point in time or that includes enrollment over an entire year. This may be particularly important when examining enrollment among older students. In sum, the variety of NCES postsecondary surveys provide flexibility for the analyst, but with the caveat that analyses across surveys require careful consideration of a number of issues in order to provide comparable data.

²³ Similar issues of question interpretation may apply to the CPS data as well.

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Appendix: Data Sources and Limitations

Survey descriptions in this section were taken primarily from the *NCES Handbook of Survey Methods* (Thurgood et al. 2003), supplemented with information from survey technical reports. This section focuses on survey components most relevant to the postsecondary enrollment estimates used in this report. Each survey includes additional components not described in this appendix (e.g., in certain years, NHES has included an Early Childhood Education component, and NPSAS includes information on students' work experiences).

National Postsecondary Student Aid Study

The National Postsecondary Student Aid Study (NPSAS) is a comprehensive nationwide study conducted by NCES to determine how students and their families pay for postsecondary education. The first NPSAS was conducted during the 1986–87 academic year. The fifth in the series was administered during the 1999–2000 academic year. NPSAS is based on a nationally representative sample of all students in postsecondary education institutions in the 50 states, the District of Columbia, and Puerto Rico. Institutions may be public or private, and they include less-than-2-year schools, community colleges, 4-year colleges, and major universities with graduate-level programs. Study participants include students who receive financial aid as well as those who do not. Information has been gathered on more than 55,000 students in each study cycle.

There are four components to NPSAS. The Student Record Abstract collects information on major field of study, tuition and fees, date first enrolled, and other information from institution records. Beginning in 1995–96, NPSAS used U.S. Department of Education administrative records to obtain information on financial aid applications and loans. Student interviews, conducted by telephone, provide information on student level, major field of study, other sources of financial support, and age, among other information. In addition, NPSAS has included telephone interviews with a limited sample of students' parents (through 1995–96) to collect supplemental data.

The target population is defined as those students who are enrolled in any term that begins between May 1 of one year and April 30 of the next year, thus allowing the student lists needed for sample selection to be obtained in January or February for most institutions. This definition was used starting with the 1992–93 NPSAS, and provides substantial comparability with the survey populations for the 1986–87¹ and 1989–90 NPSAS studies. Nearly all members of the target population are also members of the survey population; the survey population excludes students who are enrolled solely in a GED program or are concurrently enrolled in high school.

The sample design for the NPSAS sample involves the selection of a nationally representative sample of postsecondary education institutions and students within those institutions. Prior to the 1995–96 study, NPSAS used a geographic-area-clustered, three-stage

¹ The 1986–87 NPSAS sampled students enrolled in the fall (October) and did not include students enrolled in institutions located in Puerto Rico.

sampling design: (1) constructing geographic areas from three-digit postal zip code areas; (2) sampling institutions within the geographic sample areas; and (3) sampling students within sample institutions. The 1995–96 sample design eliminated the first stage of sampling (geographic area), thereby increasing the precision of the estimates.

The institution-level sampling frame is constructed from the Integrated Postsecondary Education Data System (IPEDS) Institutional Characteristics file. Although the institutional sampling strata have varied across NPSAS administrations, in all years the strata have been formed by classifying institutions according to control (public or private) and level (length of program and highest degree offering). A stratified sample of institutions is then selected with probabilities proportional to size (pps). In the 1999–2000 NPSAS, to be eligible for participation, an institution must have had a signed Title IV participation agreement² with the U.S. Department of Education. A stratified sample of 1,083 postsecondary institutions was selected from all Title IV participating institutions listed in the 1998–99 IPEDS Institutional Characteristics database for NPSAS:2000.

The sampled institutions are requested to provide student enrollment lists with the following information on each student: full name, identification number, social security number, and educational level. Of the nearly 1,100 NPSAS:2000-eligible institutions, 1,000 provided a student enrollment list or data file that could be used for sample selection, for an overall weighted institutional participation rate of 95 percent.

Students are sampled on a flow basis from the lists provided by the institutions. Steps are taken to eliminate both within-institution and cross-institution duplication of students. NPSAS classifies students by educational level as undergraduate, graduate, or first-professional students. The student sample is allocated to the combined institutional and student strata (e.g., graduate students in public, 4-year, doctorate institutions). Initial student sampling rates are calculated for each sample institution using refined overall rates to approximate equal probabilities of selection within the institution-by-student sampling strata. These rates are sometimes modified to ensure that the desired student sample sizes are achieved. Prior to collection of data from the students themselves, information is abstracted from institutional records for the sampled students. Students for whom no record abstracts are available or who are found to be ineligible during record abstraction are excluded from the interview data collection.

Records for about 59,300 students (92 percent of the eligible students) were abstracted for NPSAS:2000. Of the eligible sample members located, about 44,500 (87 percent) were interviewed. Adjusting for institution nonresponse, the overall weighted computer-assisted telephone interview (CATI) response rate was 66 percent. Ninety-one percent of those interviewed completed the full interview (Riccobono et al. 2002).

² A Title IV participation agreement allows eligible students at an institution to receive Pell Grants and other federal student financial aid (e.g., direct loans). For an institution to be eligible to participate in Title IV financial aid programs, it must offer a program of at least 300 clock hours in length, have accreditation recognized by the U.S. Department of Education, and have been in business for at least 2 years (IPEDS COOL website: <http://www.nces.ed.gov/ipeds/cool/Search.asp>).

For NPSAS:96, a stratified sample of 973 postsecondary institutions was selected from all institutions listed in the 1993–94 IPEDS Institutional Characteristics database. Of these, 131 institutions had such large enrollments that they were selected with certainty, and the remaining 842 sample institutions were selected with probabilities proportional to size from 9 institutional sampling strata. Approximately 93 percent of eligible sample institutions provided student enrollment lists for student sampling. Of this group, 96 percent also provided full or partial data from administrative records for at least one student. The overall sample yield in the 1995–96 NPSAS was about 63,600 students. For the subsample of students who were interviewed by telephone, the overall weighted CATI response rate was 76 percent.

In NPSAS:90, 1,533 institutions were sampled. About 80 percent of the sampled schools were eligible and, of these, 1,130 participated. More than 70,000 students were sampled from the participating schools, of whom approximately 66,700 were eligible for the CATI interview. About 51,400 completed interviews were obtained, for an overall weighted CATI response rate of 76 percent.

Integrated Postsecondary Education Data System

The Integrated Postsecondary Education Data System (IPEDS) is the core NCES postsecondary education data collection program, designed to help NCES meet its mandate to report full and complete statistics on the condition of postsecondary education in the United States. IPEDS is a single, comprehensive system that collects institutional data about all primary providers of postsecondary education. It is built around a series of inter-related surveys designed to collect institution-level data in such areas as enrollments, program completions, faculty, staff, and finances. This report used the Fall Enrollment (EF) component, which collects data annually on the number of full- and part-time students enrolled in postsecondary institutions in the United States and its outlying areas, by level (undergraduate, graduate, first-professional), race/ethnicity, and sex of student.

The target population is institutions in the 50 states, the District of Columbia, and outlying areas whose primary purpose is the provision of postsecondary education. The IPEDS universe includes all institutions and branches that offer a full program of study (not just courses); freestanding medical schools, as well as schools of nursing, radiology, etc., within hospitals; and schools offering occupational and vocational training with the intent of preparing students for work.

Eligibility for Title IV federal financial aid, while not a requirement for inclusion in the IPEDS universe, defines a major subset of all postsecondary institutions. Prior to 1996, aid-eligible institutions were self-identified as Institutions of Higher Education (IHEs) or were identified as aid-eligible from responses to items on the Institutional Characteristics survey. Beginning in 1996, the subset of aid-eligible institutions is validated by matching the IPEDS universe with the Postsecondary Education Participants System (PEPS) file maintained by the Office of Postsecondary Education (OPE) at the U.S. Department of Education. OPE grants eligibility to institutions to participate in Title IV federal financial aid programs.

Since 1993, all institutions entering into Title IV Program Participation Agreements with the U.S. Department of Education are required by law to complete the IPEDS package of surveys. Therefore, overall unit and item response rates are quite high for all surveys for these institutions. For example, the unit response rate for the fall enrollment survey was 97 percent among higher education institutions (Barbett and Korb 1997, p. 170). By sector, the response rates are highest for public 4-year or higher institutions and lowest for private for-profit institutions, especially the less-than-2-year institutions. Student age, the primary variable of interest in this report, had a relatively high percentage missing in 1989 (about 12 percent), compared to less than 2 percent in 1995 and 1999. To impute these missing data, the analysis in this report followed Schantz and Pluta's (1991) recommendation in appendix A of *Enrollment in Higher Education, Fall 1989*, which suggests applying the distribution of those with known ages to those with unknown ages.

National Household Education Survey

The National Household Education Surveys (NHES) Program conducts telephone surveys of the noninstitutionalized, civilian population of the United States. These surveys are designed to provide information on educational issues that are best addressed by contacting households rather than schools or other educational institutions. They offer policymakers, researchers, and educators a variety of statistics on the condition of education in the United States.

This report used the NHES Adult Education Surveys administered in 1991, 1995, and 1999.³ The information collected on programs and up to four classes included the subject matter, duration, sponsorship, purpose, and cost. The 1995 and 1999 surveys included questions concerning respondents' participation in basic skills courses, English as a Second Language (ESL) courses, credential (degree or diploma) programs, apprenticeships, work-related courses, and personal development/interest courses. Eligible respondents included civilians age 16 and older not currently enrolled in secondary school. The Adult Education Surveys included questions on educational background and work experience; participation in adult education, including educational activities through distance learning (1999 only); adult demographic characteristics; and household characteristics. Eligible respondents were 16 years of age or older (age 17 or older in NHES:1991) who were not currently enrolled in 12th grade or below and not institutionalized or on active duty in the U.S. Armed Forces.

The NHES samples are selected using random-digit-dialing (RDD) methods. Telephone numbers are randomly sampled, and a screener is administered to sampled households. About 45,000 to 64,000 households are screened for each administration. Individuals within households who meet predetermined criteria are then sampled for more detailed or extended interviews.

Two general sampling approaches have been taken: list assisted and a modified Mitofsky-Waksberg method. The list-assisted method has been used since the 1995 admini-

³ Although not analyzed for this report, the Adult Education and Lifelong Learning Survey was administered as part of NHES in 2001.

stration. This approach involves selecting a simple random sample of telephone numbers from all telephone numbers in 100 banks (i.e., sets of numbers with the same first 8 digits of the 10-digit telephone number) that have at least one telephone number listed in the white pages (called the listed stratum). The NHES survey fielded in 1991 used a modified version of the Mitofsky-Waksberg method of RDD, in which a fixed number of telephone numbers is sampled from 100 banks (Brick et al. 1992).

Data collection for the NHES surveys takes place over a 3-month period beginning in January of each survey year. The data are collected using computer-assisted telephone interviewing (CATI). The NHES screeners are completed with an adult household member in households selected using RDD techniques.

Household members are identified for extended interviews in a two-stage process. First, screener interviews are conducted to enumerate and sample households for the extended interviews. The failure to complete the first-stage screener means that it is not possible to enumerate and interview members of the household. The response rate for the first stage is the percentage of screeners completed by households. The response rate for the second stage is the percentage of sampled and eligible persons with completed interviews. The overall unit response rate is the product of the first- and second-stage response rates (screener response rate x interview response rate = overall unit response rate). In 1991, the overall unit response rate for the Adult Education Survey was 68.6 percent; in 1995, it was 58.6 percent; and in 1999, it was 62.3 percent. These rates are weighted by the inverse of the probability of selecting the units. The sample size of the Adult Enrollment Survey was approximately 12,600 in 1991, 19,700 in 1995, and 6,700 in 1999.

For most of the items collected in the NHES surveys, the item response rate is high. The median item response rate for items with any missing values for the surveys administered in 1995 and 1999 was approximately 95 percent, and most of the NHES:1991 items had response rates of more than 99 percent. Although item response rates for most data items collected in NHES surveys are very high, virtually all items with missing data (including “don’t know” and “refused” responses) are imputed in NHES surveys. A standard (random within class) hot-deck procedure has been used to impute missing responses in every NHES collection. More information on the imputation procedures and other NHES technical issues are available in Brick et al. (1992), Collins et al. (1996), and Nolin et al. (2000).

Current Population Survey

The Current Population Survey (CPS) is a monthly survey of about 50,000 households conducted by the Bureau of the Census, part of the U.S. Department of Commerce, for the Bureau of Labor Statistics (BLS), U.S. Department of Labor. The “Basic CPS” collects data about the employment, unemployment, and other characteristics of the civilian noninstitutional population in the 50 states and the District of Columbia; it excludes military personnel and their families living on post, inmates of institutions, and homes for the aged.

Since the mid-1960s, NCES has sponsored the CPS October Supplement to collect information on the school enrollment of household members in any type of public, parochial, or other private school in the regular school system. Such schools include nursery schools, kindergartens, elementary schools, high schools, colleges, universities, and professional schools. The October Supplement collects information on school enrollment status and educational attainment of household members 3 years old and over, including highest grade completed, level and grade of current enrollment, attendance status, number and type of courses being taken, degree or certificate objective, and type of organization offering instruction for each member of the household. A dozen core questions on the interview instrument for the October Supplement have remained unchanged since 1967. Since 1987, additional questions have been included on business, vocational, technical, secretarial, trade, and correspondence courses; the grade the student was attending last year; the calendar year that the student received his/her most recent degree; and whether the student completed high school by means of an equivalency test (such as the GED).

The CPS is based upon a probability sample of about 50,000 housing units. Each month, interviewers contact the sampled units to obtain basic demographic information on all persons residing at the address and detailed labor force information on all persons age 15 or over. To improve the reliability of estimates of month-to-month and year-to-year change, eight panels are used to rotate the sample each month. A sample unit is interviewed for 4 consecutive months, and then, after an 8-month rest period, for the same 4 months a year later. Every month, a new panel of addresses, or one-eighth of the total sample, is introduced. Thus, in a particular month, one panel is being interviewed for the first time, one panel for the second time, etc., up to one panel for the eighth and final time.

The first stage sample selection is carried out in three major steps: definition of the primary sampling units (PSUs), stratification of the PSUs within each state, and selection of the sample PSUs in each state. The CPS national design as of January 1996 contained 754 stratification PSUs. The second stage of the CPS sample design is the selection of sample housing units within PSUs. These ultimate sampling unit clusters consist of a geographically compact cluster of approximately four addresses, corresponding to four housing units at the time of the census. Each month, about 59,000 housing units are assigned for data collection, of which about 50,000 are occupied and thus eligible for interview. Of the 50,000 housing units, about 6.5 percent are not interviewed in a given month due to temporary absence (e.g., vacation), other failures to make contact after repeated attempts, inability of persons contacted to respond, unavailability for other reasons, and refusals to cooperate (about half of the noninterviews). For the October 2000 basic CPS, the nonresponse rate was 6.8 percent, and for the school enrollment supplement the nonresponse rate was an additional 3.1 percent, for a total supplement nonresponse rate of 9.7 percent (or a response rate of 90.3 percent).

Each month, Bureau of the Census field representatives attempt to collect data from the sample units during the week containing the 19th of the month. For the first month-in-sample interview, the interviewer visits the sample address to determine if the sample unit exists, if it is occupied, and if some responsible adult will provide the necessary information. This person serves as the proxy respondent for the household, providing in-

formation for all members of the unit. The interviewer uses a laptop computer to administer the first interview. In most cases, the interviewer conducts subsequent interviews by telephone (use of telephone interviewing must be approved by the respondent) and does not actually visit the sample unit again until the fifth month-in-sample interview, the first interview after the 8-month resting period.

Starting with the data collected in the October 1994 CPS, independent estimates are based on civilian noninstitutional population controls for age, race, and sex established by the 1990 Decennial Census and adjusted for an undercount of about 1.6 percent. These independent estimates are based on statistics from decennial censuses; statistics on births, deaths, immigration, and emigration; and statistics on the size of the Armed Forces.

When a response is not obtained for a particular data item, or an inconsistency in reported items is detected, an imputed response is entered in the field. CPS edits use three imputation methods: relational imputation, longitudinal edits, and hot-deck imputation. The imputation procedure is performed one item at a time. In a typical month, the imputation rate for demographic items is less than 1 percent. In October 1998, the imputation rate for the basic school enrollment items ranged from 4–7 percent per item.

Undercoverage in the CPS results from missed housing units and missed persons within sample households. The CPS covers about 92 percent of the decennial census population (adjusted for the undercount). The CPS undercoverage varies with age, sex, race, and Hispanic origin. Generally, undercoverage is larger for men than for women and larger for Blacks, Hispanics, and other races than for Whites.

Data limitations and accuracy of the estimates

The NPSAS, NHES, and CPS estimates presented in this report are subject to non-sampling and sampling errors. Nonsampling errors are due to a number of sources, including but not limited to nonresponse, inaccurate coding, misspecification of composite variables, and inaccurate imputations. Sampling errors exist in all sample-based datasets. As a result of sampling error, estimates calculated from one sample may differ from estimates calculated from other samples, even if all the samples used the same sample design and methods and had no nonsampling error. Because IPEDS is a census of postsecondary institutions rather than a sample, the IPEDS estimates are not subject to sampling errors, although they are subject to nonsampling errors. Likewise, the resident population estimates are based on the decennial census and updated with administrative records, and thus are not subject to sampling error.

Table A-1. Standard errors for Table 1—Number of students enrolled in degree-granting postsecondary institutions and percentage of resident population enrolled, by age: Selected years, 1989 to 2000

Survey and student age	Number enrolled		
	1989–90	1995–96	1999–2000
NPSAS			
Total ages 18 to 64	583,493	299,217	230,790
Ages 18 to 24	345,028	200,108	150,541
IPEDS	Fall 1989	Fall 1995	Fall 1999
Total ages 18 to 64	†	†	†
Ages 18 to 24	†	†	†
NHES	1990	1994	1998
Total ages 18 to 64	545,312	387,333	814,743
Ages 18 to 24	489,829	290,746	563,843
CPS	October 1989	October 1995	October 1999
Total ages 18 to 64	182,580	183,697	179,764
Ages 18 to 24	123,191	119,777	118,895
	Resident population		
Age	April 1990	April 1996	April 2000
Total ages 18 to 64	†	†	†
Ages 18 to 24	†	†	†

† Not applicable. The Integrated Postsecondary Education Data System (IPEDS) enrollment and the resident population estimates are not based on a sample and thus have no associated standard errors.

NOTE: NPSAS (National Postsecondary Student Aid Study); IPEDS (Integrated Postsecondary Education Data System); NHES (National Household Education Surveys Program); CPS (Current Population Survey).

SOURCE: Amie, J., Curry, A., and Martinez, G. (2001). *School Enrollment—Social and Economic Characteristics of Students: October 1999* (Detailed tables; Series P20–533). U.S. Department of Commerce, Bureau of the Census. Washington, DC: U.S. Government Printing Office (for Current Population Survey [CPS] estimates); Bruno, R. R. and Curry, A. (1997). *School Enrollment—Social and Economic Characteristics of Students: October 1995* (Detailed tables; Series P20–492). U.S. Department of Commerce, Bureau of the Census. Washington, DC: U.S. Government Printing Office (for CPS estimates); Kominski, R., and Roodman, S. (1991). *School Enrollment—Social and Economic Characteristics of Students: October 1989* (Series P20–452). U.S. Department of Commerce. Washington, DC: Bureau of the Census (for CPS estimates); U.S. Department of Education, National Center for Education Statistics, 1991, 1995, and 1999 Adult Education Surveys of the National Household Education Surveys Program (AE-NHES:1991, AE-NHES:1995, AE-NHES:1999); U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, NPSAS:2000).

The CPS standard errors were calculated using formulas provided in the CPS publications containing the enrollment estimates. Standard errors were not calculated for the IPEDS and resident population estimates because they are considered to be censuses. Therefore, the denominator of the enrollment rate estimates—the size of the resident population—did not have an associated standard error. However, for the NPSAS, NHES, and CPS estimates, the numerator had an associated standard error, while it did not for the IPEDS estimates. Standard errors for the NPSAS, NHES, and CPS estimates used in this report are presented in tables A–1 and A–2.

Table A–2. Standard errors for Table 3—Number of undergraduates enrolled in degree-granting postsecondary institutions and percentage of resident population enrolled, by age: Selected years, 1989 to 2000

Survey and student age	Number enrolled		
NPSAS	1989–90	1995–96	1999–2000
Total ages 18 to 64	503,453	286,600	225,463
Ages 18 to 24	329,512	194,835	148,079
IPEDS	Fall 1989	Fall 1995	Fall 1999
Total ages 18 to 64	†	†	†
Ages 18 to 24	†	†	†
NHES	1990	1994	1998
Total ages 18 to 64	—	348,683	698,151
Ages 18 to 24	—	277,991	543,994
CPS	October 1989	October 1995	October 1999
Total ages 18 to 64	165,501	167,070	161,543
Ages 18 to 24	120,623	117,868	116,539
	Resident population		
Age	April 1990	April 1996	April 2000
Total ages 18 to 64	†	†	†
Ages 18 to 24	†	†	†

— Not available. Unable to estimate undergraduate-only enrollment using 1991 NHES.

† Not applicable. The Integrated Postsecondary Education Data System (IPEDS) enrollment and the resident population estimates are not based on a sample and thus have no associated standard errors.

NOTE: NPSAS (National Postsecondary Student Aid Study); IPEDS (Integrated Postsecondary Education Data System); NHES (National Household Education Surveys Program); CPS (Current Population Survey).

SOURCE: Amie, J., Curry, A., and Martinez, G. (2001). *School Enrollment—Social and Economic Characteristics of Students: October 1999* (Detailed tables; Series P20–533). U.S. Department of Commerce, Bureau of the Census. Washington, DC: U.S. Government Printing Office (for Current Population Survey [CPS] estimates); Bruno, R. R. and Curry, A. (1997). *School Enrollment—Social and Economic Characteristics of Students: October 1995* (Detailed tables; Series P20–492). U.S. Department of Commerce. Washington, DC: Bureau of the Census (for CPS estimates); Kominski, R., and Roodman, S. (1991). *School Enrollment—Social and Economic Characteristics of Students: October 1989* (Series P20–452). U.S. Department of Commerce. Washington, DC: Bureau of the Census (for CPS estimates); U.S. Department of Education, National Center for Education Statistics, 1991, 1995, and 1999 Adult Education Surveys of the National Household Education Surveys Program (AE-NHES:1991, AE-NHES:1995, AE-NHES:1999); U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, NPSAS:2000).

Statistical procedures

The sample estimate and an estimate of its standard error permit statistical testing of whether the population values estimated by the samples differ across time or across surveys. If all possible samples were selected, each was surveyed under the same conditions, and an estimate and its standard error were calculated from each sample, then approximately 95 percent of the intervals from 1.96 standard errors below the estimate to 1.96 standard errors above the estimate would include the actual value. This interval is called the 95 percent confidence interval. The upper and lower bounds of the confidence intervals (i.e., the estimate plus and minus 1.96 standard errors) were calculated and then divided by the resident population estimate for that year. This provided a confidence interval derived from the sample estimate (i.e., the numerator) but expressed as a percentage of the population rather than the estimated number enrolled. As noted above, the resident population denominator is considered a census and thus is not subject to sampling error. These confidence intervals are depicted graphically in figures 1, 2, 6, and 7. Estimates were considered statistically different if their confidence intervals did not overlap. Because IPEDS is considered a census of postsecondary institutions and thus not subject to sampling errors, confidence intervals were not constructed around the IPEDS estimates.

To illustrate this approach further, consider the NPSAS estimates, standard errors, and resident populations for 25- through 34-year-olds presented in table A-3. Because the confidence interval of the 1989–90 estimate (6.76 to 7.96 percent) does not overlap the confidence interval around the 1995–96 estimate (8.09 to 9.10 percent), the difference between these two estimates was considered statistically significant.

Table A-3. Selected National Postsecondary Student Aid Study (NPSAS) degree-granting enrollment estimates and census resident population estimates for 25- through 34-year-olds: 1989–90, 1995–96, and 1999–2000

Statistic	Year		
	1989–90	1995–96	1999–2000
NPSAS undergraduate enrollment in degree-granting institutions	3,177,000	3,469,000	3,209,000
Standard error of NPSAS enrollment estimate	132,200	104,300	77,900
Census-based resident population count	43,174,991	40,371,491	37,474,145
Enrollment to resident population ratio	7.36	8.56	8.59
Lower bound (estimate – 1.96 standard error)/resident population	6.76	8.09	8.16
Upper bound (estimate + 1.96 standard error)/resident population	7.96	9.10	8.97

NOTE: The NPSAS estimates have been rounded to the nearest thousand and standard errors to the nearest hundred. NPSAS includes enrollment for academic years 1989–90, 1995–96, and 1999–2000 and excludes students enrolled in less-than-2-year institutions.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90, 1995–96, and 1999–2000 National Postsecondary Student Aid Studies (NPSAS:90, NPSAS:96, NPSAS:2000); U.S. Department of Commerce, Bureau of the Census (2001). *National Monthly Population Estimates, 1990 to 2000*. Available: http://eire.census.gov/popest/archives/national/nat_90s_detail.php.

The statements made in footnotes 5 and 19 were supported by equivalency tests. These tests showed that, using a delta of 5 percentage points, the comparisons discussed in these footnotes as possibly resulting from large standard errors were not statistically

equivalent. Equivalency tests compare an observed difference to a predetermined difference of substantive interest (delta) using a null hypothesis of a difference at least as large as delta. For more information on equivalency tests, the reader is referred to Rogers, Howard, and Vessey (1993).

NHES enrollment dates and resident population date

As noted previously, the enrollment reference dates for NHES do not overlap the references periods used in this report for the other three surveys. This creates an inconsistency between the NHES enrollment reference date and the resident population date. The resident population date is the spring following the fall enrollment period for NPSAS, IPEDS, and CPS. For example, April 2000 resident population figures were used with the fall 1999 IPEDS estimates (and with the October 1999 CPS estimate and academic year 1999–2000 NPSAS estimate). However, because the 1995 and 1999 NHES enrollment reference period covers the calendar year prior to the other surveys and because it was important to use the same month/year resident population date for each survey, the resident population figures are 1 to 2 years after the NHES estimates. To be consistent with the other surveys, April 1995 and April 1999 resident population figures should be used with the 1994 and 1998 NHES estimates, thereby using the resident population estimate of the spring following the fall enrollment period. Table A-4 presents the comparison of NHES estimates based on April 1996 and April 2000 resident population estimates (i.e., the estimates used in the report) with those based on April 1995 and April 1999 resident population figures. Although the differences are all less than 1 percentage point, the date of the resident population may account for some of the differences shown in this report between NHES and the other surveys.

Table A-4. Comparison of National Household Education Survey (NHES) undergraduate enrollments as a percentage of resident population, by age: Selected years, 1994 to 2000

Age	1994 NHES enrollment estimate			1998 NHES enrollment estimate		
	1994 NHES enrollment as a percent of April 1996 resident population	1994 NHES enrollment as a percent of April 1995 resident population	Difference in percent-age points	1998 NHES enrollment as a percent of April 2000 resident population	1998 NHES enrollment as a percent of April 1999 resident population	Difference in percentage points
Total ages 18 to 64	9.65	9.75	-0.09	9.26	9.37	-0.11
Ages 18 to 24	35.23	34.81	0.42	33.30	33.96	-0.67

NOTE: NHES enrollment estimates include students who reported having been enrolled in courses leading toward a college or university degree.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995 and 1999 Adult Education Surveys of the National Household Education Surveys Program (NHES:1995, NHES:1999); Amie, J., Curry, A., and Martinez, G. (2001). *School Enrollment—Social and Economic Characteristics of Students: October 1999* (Detailed tables; Series P20–533). U.S. Department of Commerce, Bureau of the Census. Washington, DC: U.S. Government Printing Office; Bruno, R. R., and Curry, A. (1997). *School Enrollment—Social and Economic Characteristics of Students: October 1995* (Detailed tables; Series P20–492). U.S. Department of Commerce. Washington, DC: Bureau of the Census.