

Chapter 12: Integrated Postsecondary Education Data System (IPEDS)

1. OVERVIEW

The Integrated Postsecondary Education Data System (IPEDS) is NCES's core 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. The IPEDS collects institution-level data from providers of postsecondary education in the United States (the 50 states and the District of Columbia) and other jurisdictions, such as the U.S. Virgin Islands. The IPEDS is a single, comprehensive system that is built around a series of interrelated surveys designed to collect institution-level data in such areas as enrollment, program completions, graduation rates, student financial aid, tuition and fees, faculty, staff, and finances.

Beginning in 1993, the IPEDS survey completion became mandatory for all postsecondary institutions with a Program Participation Agreement (PPA) with the Office of Postsecondary Education (OPE), U.S. Department of Education—that is, institutions that participate in or are eligible to participate in any federal student financial assistance program authorized by Title IV of the Higher Education Act of 1965, as amended (20 USC 1094[a] [17]). For institutions not eligible to participate in Title IV programs, participation in the IPEDS is voluntary. Prior to 1993, only national-level estimates from a sample of institutions are available for private less-than-2-year institutions.

In 1998, due to several externally mandated changes and additions to the IPEDS, changes in technology for data collection and dissemination, changes in postsecondary education issues, and new expectations for the IPEDS, a redesign task force was charged with recommending changes for the system. The primary recommendation was that the IPEDS switch from paper forms to a solely web-based reporting system. The IPEDS program was completely redesigned for the 2000–01 survey year, and the data collection was converted from a paper-based to a fully web-based system. The web-based survey instruments offered many features to improve the quality and timeliness of the data. Currently, the IPEDS remains an annual survey, with data collection occurring three times per year: in fall, winter, and spring. The next data collection is scheduled for the fall of 2010.

It was in 1986 that the IPEDS replaced the Higher Education General Information Survey (HEGIS). HEGIS collected data from 1966 to 1986 from a more limited universe of approximately 3,400 institutions accredited at the college level by an association recognized by the Secretary of the U.S. Department of Education. The transition to the IPEDS program expanded the universe to include *all* institution whose primary purpose is the provision of postsecondary education. The system currently includes about 7,000 Title IV institutions and 200 non-Title IV institutions—including many schools not accredited at the college level but with vocational/occupational accreditation. Note that the U.S. Department of Education's Office for Civil Rights (OCR) has collaborated with NCES since 1976 on the collection of data from postsecondary institutions through compliance reports

SURVEY OF THE UNIVERSE OF POSTSECONDARY INSTITUTIONS

IPEDS collects data annually or biennially through these major components:

- Institutional Characteristics
- Completions
 - 12-Month Enrollment
 - Fall Enrollment
 - Graduation Rates
 - Student Financial Aid
- Human Resources
- Finance

mandated pursuant to Title VI of the Civil Rights Act of 1964, first through HEGIS and then through the IPEDS.

Purpose

To collect institution-level data from all Title IV providers of postsecondary education—universities and colleges, as well as institutions offering technical and vocational education beyond the high school level.

Components

The IPEDS program consists of several components that obtain information on who provides postsecondary education (institutions), who participates in it and completes it (students), what programs are offered, what programs are completed, and the human and financial resources involved in the provision of institution-based postsecondary education. To avoid duplicative reporting and thus enhance the analytic potential of the database, the various IPEDS data elements and component surveys are interrelated. Survey components are tailored to the institution using institutional characteristics. In general, the most extensive data are collected from postsecondary institutions granting baccalaureate and higher degrees; less extensive data are requested from other types of institutions. This feature accommodates the varied operating characteristics, program offerings, and reporting capabilities of postsecondary institutions while yielding comparable statistics for all institutions.

The IPEDS program currently collects information from approximately 7,200 postsecondary institutions using a combination of survey components. Participation in the IPEDS is a requirement for institutions that participate in Title IV federal student financial aid programs, such as Pell Grants or Stafford loans. Title IV institutions include traditional colleges and universities, 2-year institutions, and for-profit degree- and non-degree-granting institutions (such as schools of cosmetology), among others. Because of the requirements for participation in Title IV federal financial aid programs, the IPEDS focuses on the institutions designated as Title IV participants (about 7,200 institutions). Institutions that do not participate in Title IV programs may participate in the IPEDS data collection on a voluntary basis.

The IPEDS collects data three times per year—in fall, winter, and spring—using the following instruments. The Institutional Characteristics, Completions, and 12-month Enrollment surveys are administered in the fall. The Human Resources component (consisting of the Employees by Assigned Position, Salaries, and Fall Staff sections), is collected in the winter, and the Fall Enrollment and Finance surveys, are administered in

the winter. (Institutions can also elect to submit fall enrollment and finance data in the spring.) The Student Financial Aid and Finance components are administered in the spring.

Each of these instruments (or components) is described below; the abbreviation for the survey component is provided after the component name.

Institutional Characteristics (IC). The core of the IPEDS program is the annual Institutional Characteristics component collected each fall—intended for completion by all currently operating postsecondary institutions in the United States and its other jurisdictions. As the control file for the entire IPEDS program, IC constitutes the sampling frame for all other NCES surveys of postsecondary institutions. It also helps determine the specific IPEDS screens that are shown to each institution (as it used to determine the specific survey forms that were mailed to each institution). This component collects basic data on each institution, such as identification; educational offerings; control or affiliation; tuition; room and board charges; admission requirements; levels of degrees and awards; estimated fall enrollment; and student services. These data are necessary to sort and analyze not only the IC data file, but also all the other IPEDS component data files. The IC Survey incorporates many data elements required by state career information delivery systems, thereby reducing or eliminating the need for these organizations to conduct their own surveys.

IC data are collected for the academic year, which generally extends from September of one calendar year to June of the following year. Specific data elements currently collected for each institution include the institution name, address, telephone number, web address, control or affiliation, calendar system, levels of degrees and awards offered, types of programs, application and admissions information, and student services offered. The IC component also collects information on tuition and required fees, room and board charges, books and supplies, and other expenses for release on NCES's College Navigator website (<http://nces.ed.gov/collegenavigator/>). The College Navigator is designed to help college students, prospective students, and their parents understand the differences among colleges and how much it costs to attend college, as well as offer information on student financial aid, programs and services offered, enrollments and graduation rates, and accreditation, among other things.

Completions (C). The Completions component collects data annually each fall on recognized degree completions in postsecondary education programs by

level (associate's, bachelor's, master's, doctor's, and professional) and on other formal awards by length of program. These data are collected by race/ethnicity and gender of recipient and by fields of study, which are identified by 6-digit Classification of Instructional Programs (CIP) codes from the NCES publication *Classification of Instructional Programs* (<http://nces.ed.gov/ipeds/cipcode/>). Completions data on multiple majors are collected by 6-digit CIP code, award level, race/ethnicity, and gender from those schools that award degrees with multiple majors.

OCR has provided support to collect Completions data since 1976.

12-Month Enrollment (E12). This annual component in the fall collection collects 12-month enrollment data for award levels ranging from postsecondary certificates of less than 1 year to doctoral degrees. The component collects data on unduplicated headcounts and instructional activity (contact or credit hours). A standardized, 12-month full-time equivalent (FTE) enrollment is computed based on instructional activity, and institutions may report an alternate FTE as well. The headcount data collected include demographic information on race/ethnicity and sex. Data are collected for a 12-month reporting period in the previous year; institutions must indicate the 12-month period for which they are reporting—either July 1 through June 30, or September 1 through August 31.

Fall Enrollment (EF). This spring collection component collects data annually on the number of full- and part-time students enrolled in postsecondary institutions in the United States and its other jurisdictions, by level (undergraduate, graduate) and by race/ethnicity and gender of student.

Institutions report on 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. An item that asks for the total number of undergraduates in the entering class (including first-time, transfer, and nondegree students) was added in 2001. Full- and part-time fall-to-fall retention rates for first-time, degree/certificate-seeking students are also collected.

Age distributions are collected in odd-numbered years by student level. Data on the state of residence of first-time freshmen (first-time, first-year students) and the number of students who graduated from high school in the past 12 months are collected in even-numbered years (replacing an earlier survey on Residence of

First-Time Students). Four-year institutions are also required, in even-numbered years, to complete enrollment data by level, race/ethnicity, and gender for nine selected fields of study—Education, Engineering, Law, Biological Sciences/Life Sciences, Mathematics, Physical Sciences, Dentistry, Medicine, and Business Management and Administrative Services. The specified fields and their codes are taken directly from *Classification of Instructional Programs*.

OCR has supported the collection of these data since 1976.

Fall Enrollment in Occupationally Specific Programs (EP). This component was incorporated into the IPEDS program in response to the Carl Perkins vocational education legislation. Conducted biennially in odd-numbered years, this survey collected fall enrollment data on students enrolled in occupationally specific programs at the subbaccalaureate level, by race/ethnicity and gender of student and by fields of study (identified by 6-digit CIP codes). Starting in 1995, total unduplicated counts of students enrolled in these programs were also requested. This survey was discontinued as of the 1999–2000 data collection.

Graduation Rate Survey (GRS). This annual spring collection component was added in 1997 to help institutions satisfy the requirements of the Student Right-to-Know Act of 1990. For the 1997–98 GRS, 4-year institutions reported on a 1991 cohort, and less than 4-year institutions reported on a 1994 cohort.

Institutions provide data on their initial cohort of full-time, first-time, degree/certificate-seeking undergraduate students; on the number of those students completing within 150 percent of the normal time; and on the number of students who transferred to other institutions. Four-year institutions report separately on their bachelor's degree-seeking students. Data are reported by race/ethnicity and gender. These data allow institutions to disclose and/or report information on the completion or graduation rates and transfer-out rates of their students. Worksheets automatically calculate rates within the web system.

A supplemental form is used to collect data on students who completed a long program within 150% of normal time, e.g., a 5-year bachelor's degree program or 3-year associate's degree program.

One hundred percent graduation rates data are also collected. Four-year bachelor's rates have been reported by 4-year institutions since 1997, and 100% rates have been reported by less than 4-year institutions since 2008-09.

200% Graduation Rates (GR200). This survey component was added to the spring collection in 2009–10. It is separate from the regular GRS component so not to confuse the two different cohorts that are being reported on. The *GR200* asks institutions to report additional data on cohort students so that 200% graduation rates can be calculated. Graduation rates at 200 percent of normal time are calculated for full-time, first-time bachelor degree-seeking students at 4-year institutions, and for all full-time, first-time degree/certificate-seeking undergraduate students at less than 4-year institutions.

Student Financial Aid (SFA). This spring collection component collects student financial aid data on several different student populations: undergraduate students; a cohort of full-time, first-time, degree/certificate-seeking undergraduate students; and two subpopulations of that cohort. The financial aid data collected on the subpopulations is used to calculate the institution's average net price of attendance, and average net price of attendance by income category. Data are collected for the previous aid year. Number of students receiving aid and total amount of aid received are collected for different aid types; average amount of aid received by type of aid and percent of students receiving aid by type of aid are calculated. For undergraduates, total grant or scholarship aid, Pell grants, and federal loans are the aid types. For the cohort, aid types are federal grants (Pell grants and other federal grants), state/local government grants or scholarships, institutional grants or scholarships, and loans to students (total loans, Federal loans, other loans).

This component began with a pilot test in 1999 and collected both pricing and student financial aid data. The pricing items are now part of the Institutional Characteristics Survey, conducted annually in the fall; the SFA component is part of the annual spring data collection.

Human Resources (HR). The Human Resources component, collected in the winter consists of three sections: Employees by Assigned Position, Fall Staff, and Salaries. These three sections (see below) were previously separate components, but were merged into the single HR component beginning with the 2005–06 survey year in order to simplify reporting and ensure data consistency and accuracy.

Employees by Assigned Position (EAP). Beginning with the winter 2001–02 collection, a new annual survey, Employees by Assigned Position, proposed by the National Postsecondary Education Cooperative focus group on faculty and staff, was instituted. This survey was optional in the first year, but became

mandatory in 2002–03. The EAP section categorizes all staff on the institution's payroll as of November 1 of the collection year by full- and part-time status; by function or occupational category; and by faculty status and tenure status (if applicable). Institutions with medical schools are required to report their medical school data separately. The medical school pages of EAP are applicable to institutions with M.D. and/or D.O. programs only. Employees who are in health disciplines that are not considered part of the medical school are reported in the nonmedical school part of EAP.

Fall Staff (S). This survey is conducted biennially in odd-numbered years and collects data on the numbers of full- and part-time institutional staff and includes demographic information on race/ethnicity and gender. (During even-numbered years, reporting Fall Staff data is optional.) Specific data elements include number of full-time staff by contract length and salary class intervals; number of other persons employed full time by primary occupational activity and salary class intervals; part-time employees by primary occupational activity; tenure of full-time faculty by academic rank; and new hires by primary occupational activity.

Between 1987 and 1991, the Fall Staff data were collected in cooperation with the U.S. Equal Employment Opportunity Commission (EEOC). From 1976 through 1991, EEOC collected data on staff through its biennial Higher Education Staff Information (EEO-6) report from all postsecondary institutions within its mandate—that is, institutions that had 15 or more full-time employees. Through the IPEDS program, NCES collected data from all other postsecondary institutions, including all 2- and 4-year higher education institutions with fewer than 15 full-time employees and a sample of less-than-2-year schools. The 1987–91 IPEDS Fall Staff data files contain combined data from the EEO-6 and the IPEDS staff surveys. Beginning in 1993, all schools formerly surveyed by EEOC were surveyed through the IPEDS Fall Staff Survey.

OCR began supporting the collection of these data in 1993.

Salaries (SA) (formerly Salaries, Tenure, and Fringe Benefits of Full-Time Instructional Faculty). The primary purpose of this section is to collect data on the salaries, tenure, and fringe benefits of full-time instructional staff (referred to as instructional faculty prior to the 2005–06 survey year) by contract length, gender, and academic rank. Institutions are excluded from completing the Salaries section if all of their instructional staff (1) are employed on a part-time

basis, (2) were military personnel, (3) contributed their services (e.g., members of a religious order), or (4) teach preclinical or clinical medicine.

Data are collected on total salary outlays; total number of full-time instructional staff paid these outlays; and number of staff members with tenure, on tenure track, and not on tenure track. These data are collected by rank (professor, associate professor, assistant professor, instructor, lecturer, no academic rank) for men and women on 9- or 10-month and 11- or 12-month contracts or teaching periods. Fringe benefits are collected for instructional staff on 9/10-month and 11/12-month contracts or teaching periods. Specific data elements are included for retirement, tuition, housing, medical/dental plans, group life insurance, unemployment and worker's compensation, social security taxes, fringe benefit expenditures (in whole dollars), and the number of full-time staff covered, by length of contract or teaching period.

This Salaries data collection was changed from a biennial to an annual collection in 1990, and data were not collected in 2000.

Finance (F). This component, collected in the spring, collects summary data on each institution's financial status in the applicable fiscal year. The Finance component has different versions of the form based mainly on control of the institution: public, private not-for-profit, and private for-profit. The primary purpose of this annual component is to collect data to describe the financial condition of postsecondary education in the nation; to enable changes in postsecondary education finance to be monitored; and to promote research involving institutional financial resources and expenditures.

For public institutions that use Governmental Accounting Standards Board (GASB) reporting standards to prepare their financial statements, data are collected on statement of net assets, plant, property, and equipment, revenues and other additions, expenses and other deductions, summary of changes in net assets, scholarships and fellowships, and endowment assets. Additionally, certain data are collected for the U.S. Bureau of the Census, including revenue data, expenditure data, and debts and assets

Private not-for-profit institutions and public institutions that use Financial Accounting Standards Board (FASB) reporting standards to prepare their financial statements report data on their statement of financial position, summary of changes in net assets, student grants, revenues and investment return, expenses by functional and natural classification, and endowment assets. A

shortened version of the not-for-profit form has been developed for private for-profit institutions, and data are collected on balance sheet information, summary of changes in equity, student grants, revenues and investment return, and expenses by function.

A 2-year phase-in period began with FY 2008 reporting to implement additional changes to better align the finance reporting of public and private institutions. For FY 2010 reporting, all public and not-for-profit institutions used the new aligned form.

Academic Libraries. First administered in 1966, the Academic Libraries Survey was designed to provide concise information on library resources, services, and expenditures for the entire population of academic libraries in the United States. In 1988, the Academic Libraries Survey became a part of the IPEDS program and was conducted biennially in even-numbered years. From 1966 to 1988, the Academic Libraries Survey was conducted on a 3-year cycle. As of September 2000, this survey ceased to be a part of the IPEDS. (See chapter 11 for a full description of the Academic Libraries Survey.)

Consolidated Form (CN and CN-F). When paper survey forms were used, a Consolidated Form was used to collect the IPEDS data from the institutions that did not complete the full package of the IPEDS components described above—that is, accredited institutions granting only certificates at the subbaccalaureate level. The Consolidated Form consisted of four or five parts designed to collect, on the same schedule as the regular IPEDS components, minimal data on enrollment (including occupationally specific programs) and completions by race/ethnicity and gender, as well as data on finance, fall staff, and academic libraries. As of 1996, the Finance part of the Consolidated Form was moved to a separate form (CN-F). The purpose and use of the Consolidated Form was the same as for the full package of surveys: to allow national data on all accredited institutions to be presented and analyzed. The Consolidated Form is no longer needed, since the web-based data collection system, implemented in the 2000–01 survey year, automatically tailors data items for institutions based on selected characteristics and screening questions.

Periodicity

The IPEDS program replaced the HEGIS program in 1986. The IPEDS data were collected on paper forms between 1986 and 1999. Since the implementation of the web-based collection of the IPEDS data in 2000, most components are completed by institutions on an annual basis. However, the components schedules vary slightly. The Institutional Characteristics, Fall

Enrollment, 12-month Enrollment, Completions, Graduation Rate, Student Financial Aid, and Finance components are conducted annually. The Salaries Survey is also annual, except for the 2000–01 collection. Within the Fall Enrollment component, the Age and Residence sections alternate, but are available in the off years for those institutions wishing to submit the data; the collection of enrollment by program is done only in even-numbered years. The Human Resources component is also annual; the Employees by Assigned Position section and Salaries section are collected yearly (Salaries was not collected in 2000–01), and the Fall Staff section continues to be conducted on a biennial basis in odd-numbered years (but is available in even-numbered years if institutions wish to submit those data).

2. USES OF DATA

The IPEDS surveys provide a wealth of national-, state-, and institution-level data for analyzing the condition of postsecondary education institutions. For example, the data can be used (with the earlier HEGIS data) to describe long-term trends in higher education. NCES uses the IPEDS data in annual reports to Congress on the condition of postsecondary education, statistical digests, profiles of higher education in the states, and other publications. In addition, many requests for information based on the IPEDS surveys are received each year from Congress, federal agencies and officials, state agencies and officials, education associations, individual institutions, the media, and the general public. Federal program staff use the IPEDS data to address various policy issues. State policymakers use the IPEDS data for planning purposes and comparative analysis. Institutional staff use the data for peer analysis.

The IPEDS data respond to a wide range of specific educational issues and public concerns. Policymakers and researchers can analyze the types and numbers of postsecondary institutions; the number of students, graduates, first-time freshmen, and graduate and professional students by race/ethnicity and gender; the status of postsecondary vocational education programs; the number of individuals trained in certain occupational and vocational fields by race/ethnicity, gender, and level; the resources generated by postsecondary institutions; patterns of expenditures and revenues of institutions; changes in tuition and fees charged and student financial aid received; completions by type of program, level of award, race/ethnicity, and gender; faculty composition and salaries; and many other topics of interest.

The IPEDS universe also provides the institutional sampling frame used in all NCES postsecondary surveys, such as the National Postsecondary Student Aid Study and the National Study of Postsecondary Faculty. Each of these surveys uses the IPEDS institutional universe for its first-stage sample and relies on the IPEDS results on enrollment, completions, or staff to weight its second-stage sample.

OCR supports the collection of the IPEDS enrollment, completions, and fall staff data, and uses these data to produce reports.

3. KEY CONCEPTS

Key Terms

Described below are several key concepts relevant to the IPEDS program. For additional terms, refer to the *IPEDS Glossary* at <http://nces.ed.gov/ipeds/glossary>.

Postsecondary Education. The provision of a formal instructional program whose curriculum is designed primarily for students who are beyond the compulsory age for high school. This includes programs whose purpose is academic, vocational, or continuing professional education, and excludes avocational and adult basic education programs.

Postsecondary Education Institution. An institution which has as its sole purpose or one of its primary missions, the provision of postsecondary education.

Institution of Higher Education (IHE). Prior to 1996, an IHE was defined as an institution accredited at the *college* level by an accrediting agency or association recognized by the Secretary of the U.S. Department of Education—and indicated as such in the database by the presence of a Federal Interagency Committee on Education (FICE) code. IHEs were legally authorized to offer at least a 1-year program of study creditable toward a degree.

Degree-Granting Institution. Any institution offering an associate's, bachelor's, master's, doctor's, or first-professional degree. Institutions that grant only certificates or awards of any length (less than 2 years, or 2 years or more) are categorized as nondegree-granting institutions.

Branch Institution. A campus or site of an educational institution that is not temporary, that is located in a community beyond a reasonable commuting distance from its parent institution, and that offers full programs of study (not just courses). This last criterion is the

most important. It means that at least one degree or award program can be completed entirely at the site without requiring any attendance at the main campus or any other institution within the system.

OPEID Code. An 8-digit identification code developed by the U.S. Department of Education's Office of Postsecondary Education (OPE) for the Postsecondary Education Participants System (PEPS). The presence of a valid OPEID in the database indicates that the school has a PPA with the Department of Education and is currently eligible to participate in Title IV federal financial aid programs (e.g., Pell grants, Stafford loans, college work-study). The first 6 digits of the OPEID are the old FICE code and identify the institution. The last 2 digits identify the various campuses or additional locations. For the main campus, the last 2 digits will always be "00." If the last 2 digits are numeric (e.g., 01, 02, 03), the institution is a branch campus or other location of an eligible main campus and is listed separately in PEPS. If the last 2 digits of the OPEID are of the form A1, A2, etc., the entity is separately identified in the IPEDS for reporting purposes.

Occupationally Specific Program. An instructional program below the bachelor's level that is designed to prepare individuals with the entry-level skills and training required for employment in a specific trade, occupation, or profession related to the field of study.

CIP Code. A 6-digit code, in the form xx.xxxx, that identifies instructional program specialties within educational institutions. The codes are from the NCES publication *Classification of Instructional Programs* (<http://nces.ed.gov/ipeds/cipcode/>).

4. SURVEY DESIGN

Target Population

All institutions (in the 50 states, the District of Columbia, and other jurisdictions) whose purpose is the provision of postsecondary education may participate in IPEDS, but the majority of institutions represented are those that are eligible to participate in Title IV federal student financial aid programs. The IPEDS universe includes institutions and branch campuses that offer a full program of study (not just courses); freestanding medical schools, as well as schools of nursing, schools of radiology, etc., within hospitals; and schools offering occupational and vocational training with the intent of preparing students for work (e.g., a modeling school that trains for professional modeling, but not a charm school).

The IPEDS universe of postsecondary institutions does *not* include institutions that are not open to the general public (training sites at prisons, military installations, corporations); hospitals that offer only internships or residency programs or that offer only training as part of a medical school program at an institution of higher education; organizational entities providing only noncredit continuing education; schools whose only purpose is to prepare students to take a particular test, such as the CPA or bar exams; and branch campuses of U.S. institutions in foreign countries. Relevant data from such locations or training sites are to be incorporated into the data reported by the main campus or any other institution or branch campus in the system that is most appropriate. Prior to 2010-11, Title IV institutions that are not primarily postsecondary (e.g., secondary technical schools with a small postsecondary component) reported to IPEDS voluntarily; starting in 2010-11 their participation is required.

Eligibility for Title IV federal financial aid, while not a requirement for inclusion in the universe, defines a major subset of all postsecondary institutions. Prior to 1996, aid-eligible institutions were self-identified as IHEs or were identified as aid-eligible from responses to items in the Institutional Characteristics Survey. Since 1996, the subset of aid-eligible institutions has been validated by matching the IPEDS universe with the PEPS file maintained by OPE. OPE grants eligibility to institutions to participate in Title IV federal financial aid programs.

In establishing the PEPS file, the U.S. Department of Education discontinued its tradition of distinguishing institutions accredited at the college level from institutions accredited at the occupational/vocational level. Therefore, it is no longer possible for NCES to maintain a subset of accredited institutions at the college level (IHEs). Beginning with the 1997 IPEDS mailout and in the 1996 and subsequent data files, institutions have been classified by whether or not they are eligible to participate in Title IV financial aid programs and whether or not they grant degrees (as opposed to awarding only certificates).

Sample Design

Prior to 1993, data were collected from a representative sample of about 15 percent of the universe of private, for-profit, less-than-2-year institutions. However, the Higher Education Act of 1992 mandated the completion of the IPEDS surveys for all institutions that participate in or are applicants for participation in any federal student financial assistance program authorized by Title IV of the Higher Education Act of 1965, as amended. Thus, beginning with the 1993

IPEDS mailout, NCES surveys in detail *all* postsecondary institutions meeting this mandate.

Data Collection and Processing

The U.S. Bureau of the Census served as the data collection agent for the IPEDS surveys from 1990 through the 1999–2000 survey. Survey forms were either submitted directly to the Census Bureau by the institutions or through a central or state coordinating office. The web-based data collection system was implemented with the 2000–01 survey, with different contractors developing the website and managing the collection process.

The IPEDS institution-level data collection allows for aggregation of results at various levels and permits significant controls on data quality through editing. Attempts are made to minimize institutional respondent burden by coordinating data collection with the states and with other offices and agencies that regularly collect data from institutions.

Reference dates. Data for the IPEDS component surveys are collected for a particular academic year, 12-month period, or fiscal year, as follows:

- The Institutional Characteristics component collects data for the entire current academic year, generally starting in September, or with the fall term, if there is one. In the case of schools operating on a 12-month calendar, the reference period runs from the current September through August.
- The Completions component collects data for an entire 12-month period, which is defined as July 1 through June 30; in some instances, start dates may vary slightly by institution.
- The 12-month Enrollment component collects data for a 12-month reporting period in the previous year; institutions must indicate the 12-month period for which they are reporting—either July 1 through June 30, or September 1 through August 31.
- The Fall Enrollment component (and previously the Fall Enrollment in Occupationally Specific Programs component) collects data for a single point in time during the fall term, usually recorded as of the institution’s official fall reporting date or October 15. Institutions that operate on a continuous basis report their fall enrollment based on the time period between August 1 and October 31. If there is no fall term

or class activity, institutions are asked to report zero enrollment.

- For the Graduation Rate component, institutions report on the status of students in their cohort (either a fall cohort or a full-year cohort) as of August 31.
- The Student Financial Aid component collects data for the prior aid year. Institutions reporting on a fall cohort report aid for the prior academic year; institutions reporting on a full-year cohort report aid for the prior 12-month period.
- The Employees by Assigned Position and Fall Staff sections of the Human Resources component collects data on staff on the institution’s payroll as of November 1 of the current academic year. Additionally, the Fall Staff section collects data on new hires from July 1 through October 31 of the survey year. Prior to the 2001 collection, institutions reported as of October 1. Salaries and fringe benefits data collected in the Salaries section reflect the full academic year.
- The Finance component collects data for the institution’s most recent fiscal year ending before October 1. Thus, data collected in spring 2010 (part of the 2009-10 data collection cycle) pertain to the fiscal year just ended, FY 2009.

Data collection. Since institutions are the primary unit of data collection, institutional units must be defined as consistently as possible. The IPEDS program does not request separate reports from more than one component within an individual institution; however, separate branch campuses are asked to report as individual units. Following the HEGIS model, the IPEDS program is intended to collect data from each institution in a multi-institutional system and each separate branch in a multi-campus system.

Schools targeted as “possible adds” are identified from many sources, including a review of the PEPS data file from OPE, and information received from the institutions themselves. Institutions are added to the universe if they respond that they provide postsecondary education as defined in the survey. Unlike in past years (prior to 2000), these institutions submit all survey components in their first year in IPEDS.

Institutions found to be closed or out-of-scope during data collection are deleted from the IPEDS universe. These deletions result from formal notification from

the Postsecondary Education Participation System, the institution, or the IPEDS state coordinators. Included in the deletions are (1) duplicates of other institutions on the file; (2) institutions that closed or merged with another institution and, thus, are no longer legitimate institutions or branches; (3) institutions that no longer offer postsecondary programs; and (4) schools that do not conform to the IPEDS definition of an institution or branch. The final IPEDS universe is also adjusted to reflect institutions that have changed from one sector to another.

Institutions receive letters or emails in August containing UserIDs and passwords for the web-based data collection system, and instructions for registering their keyholder. The keyholder is responsible for entering and locking the institution's data by each collection close date. Follow-up is done by email and telephone, and is conducted either directly with the keyholder or with the institution's chief executive officer (if there is no registered keyholder). State IPEDS coordinators also conduct follow-up.

To ease respondent burden, the Institutional Characteristics web screens include previously reported data, and survey respondents are instructed to update the previous data, if necessary, and to provide current information for items such as tuition and required fees, and room and board charges. (In earlier years, IC forms were preprinted with prior-year survey responses for those items that generally were not expected to change from year to year.) Screens for other IPEDS components contain selected information from previous reporting (such as CIP codes and program titles in the screens for the Completions and Enrollment components, and cohort for Graduation Rates). Prior year values are preloaded on screens for reference and to edit against, and values are brought forward from one section to another where they must match. Totals, differences, and rates are calculated by the data collection system. Institutions may choose to key enter their data into the system, or to upload a file in a fixed, key value, or, more recently, XML format.

State and system IPEDS coordinators play a large role in the submission and review of IPEDS data. In many states, the IPEDS institutional data are provided by the state higher education agency from data collected in state surveys. Coordinators may choose the sectors and institutions they wish to monitor (e.g., they can identify just 4-year schools or specify particular institutions); they can also choose to view the data only, or actually review, approve, and "lock" the data. Alternatively, state agencies may extract data from the IPEDS rather than conduct their own surveys.

Prior to web-based data collection, mailouts of survey forms generally took place in July of the survey year. Due dates varied by component. Extensive follow-up for survey nonresponse was conducted during the 6 months following each component's due date. Initially, reminder letters were mailed, encouraging nonresponding institutions to complete and return their forms. Subsequently, the Postsecondary Education Telephone System (PETS) was used to collect critical data by telephone from representatives of institutions for which the IPEDS state coordinators were not responsible for follow-up.

Institutions reported the IPEDS data by mail (on paper forms or diskettes), by fax, or electronically through the Internet. Two methods were available: the first method involved a predetermined ASCII record layout, available for all surveys, except Institutional Characteristics. For the Fall Enrollment and Graduation Rate surveys, a second method was available that used downloadable software for data entry as well as preliminary editing of the data before transmission to the Census Bureau.

The current IPEDS universe includes approximately 7,200 postsecondary institutions and 84 administrative units (central and system offices).

Editing. Edit checks are built into the web-based data collection instrument to detect major reporting errors. The system automatically generates percentages for many data elements, and totals for each survey page. Based on these calculations, edit checks compare current responses to previously reported data. The percent variance necessary to trigger an edit check varies depending on the data element being compared, but typically are considered out of the expected range if the variance is greater than 25 percent. Edit checks can be run by the keyholder at any time during the collection, and all edit failures are required to be resolved before the keyholder can lock the data. As edit checks are executed, survey respondents are allowed to correct any errors detected by the system. If data are entered correctly but fail the edit checks, the survey respondents are asked either to confirm that the data are correct as entered or to key in a text message explaining why the data appear to be out of the expected data range. Additionally, some edit failures are "fatal"; in these cases, the data must be corrected by the keyholder rather than confirmed or explained, or an edit override must be performed. Survey respondents are also provided with a context box for each survey component and are encouraged to use this area to explain any special circumstances that might not be evident in their reported data.

Final quality control procedures are performed when all institutions have responded or data for them have been imputed.

Before the conversion to a web-based reporting system, all data, whether received on paper forms, diskettes, electronically through the Internet, or through PETS, went through the same editing process to verify internal and inter-year consistency. Addition checks were performed by adding down or across columns and comparing generated totals with reported totals. If the reported total differed from the generated total but was within a designated range, the reported total was replaced by the generated total and the cell was flagged with the proper imputation code. Otherwise, institutions were contacted to resolve the discrepancies.

Estimation Methods

Imputation is done to compensate for nonresponding institutions—both those with total nonresponse and those with partial nonresponse to specific data items.

Prior to 1993, all sectors were surveyed and a sample of private less-than-2-year institutions was conducted to obtain national estimates for fall enrollment, completions, finance, and fall staff; these data were weighted and subject to sampling error. Starting in 1993, the IPEDS eliminated the sample of private less-than-2-year institutions and surveyed the entire universe of postsecondary institutions; therefore, no weighting is conducted.

Imputation. Imputation is performed after all editing has been completed. Several methods of imputation are used, depending on the availability of prior-year data, including a “carry forward” method, group means, and “nearest neighbor.” All the IPEDS components use the same imputation flags. Institutions whose data are entirely imputed may be identified in the file by their response status and imputation type codes. For responding institutions whose data are partially imputed, the affected items may be identified by the associated item imputation flags.

In the past, the IPEDS used cold-deck (updated by ratio methods to reflect the change) and hot-deck imputation procedures to adjust for partial or total nonresponse to a specific survey instrument.

Recent Changes

Key changes to the IPEDS program since 1995 are summarized below:

- The primary focus of the IPEDS data collections is to collect data from Title IV institutions. These institutions have Program Participation

Agreements (PPAs) with the Office of Postsecondary Education (OPE) within the U.S. Department of Education and thus are eligible to participate in Title IV student financial aid programs. The IPEDS program no longer differentiates between accredited college-level institutions and postsecondary institutions with occupational or vocational accreditation. Beginning with the 1996 data files, institutions have been classified by whether or not they are eligible to participate in Title IV financial aid programs and whether or not they grant degrees, not by highest level of offering.

- Between 1993 and 1996, NCES began to examine the universe of accredited institutions in order to form a crosswalk between the IPEDS data files and those maintained by OPE for student financial aid purposes. During this period, OPE discontinued its policy of differentiating institutions by level of accreditation—that is, those accredited at the college level (formerly the HEGIS universe) versus those with occupational/vocational accreditation. Since the IPEDS could no longer identify institutions with college-level accreditation, a new approach was developed to categorize institutions for mailout and analysis purposes. Beginning with the 1997 mailout, the IPEDS universe was subdivided according to (1) accreditation status, (2) level of institution, and (3) degree-granting status.
- Prior to the development of the web-based data collection system, the IPEDS survey forms were mailed to institutions based upon the information provided in the prior year’s Institutional Characteristics Survey—control and highest level of offering (which determined an institution’s sector) combined with accreditation status. Institutions that were not accredited, and thus not eligible for federal student financial aid, were asked to complete only the Institutional Characteristics survey form. All accredited institutions that either (1) grant an associate’s or higher degree or (2) offer a certificate program above the baccalaureate level received a full packet of components—Institutional Characteristics, Completions, Fall Enrollment, Fall Enrollment in Occupationally Specific Programs, Fall Staff, Finance, Graduation Rates, Salaries of Full-Time Instructional Faculty, and Academic Libraries. All other accredited institutions (i.e., those granting only certificates at the subbaccalaureate level) were required to complete Institutional Characteristics,

Graduation Rates, and a Consolidated Form. In 2000, the IPEDS was redesigned, and postsecondary institutions that had Title IV Program Participation Agreements with OPE became the primary focus for the full set of data collected by the IPEDS. Thus, the current web-based system considers Title IV status rather than accreditation.

- In 1997, the Graduation Rate component was added to the IPEDS program to help institutions satisfy the requirements of the Student Right-to-Know Act of 1990.
- In 1999, NCES collected selected data items in a pilot test of a web-based survey. These items—tuition and fees for entering students, room and board, books and supplies, and information on students receiving financial aid—have been incorporated in the redesigned IPEDS data collection, implemented in 2000–01.
- In 2000–01, NCES converted the IPEDS to a web-based data collection system. The content of the survey “forms” was revised and reduced in scope, and the procedures for collecting data vary considerably from those used in prior years. In the first year, two collection cycles were implemented: the fall 2000 cycle collected Institutional Characteristics and Completions data, and the spring 2001 cycle collected Enrollment, Student Financial Aid, Finance, and Graduation Rate data. In subsequent years, a winter cycle has been included to collect Human Resources data.
- In 2005–06, three survey components—Employees by Assigned Position, Salaries, and Fall Staff—were merged into the single Human Resources component to simplify reporting and ensure data consistency and accuracy. The IPEDS glossary and instructions were also restructured, based on the new design, to improve the consistency of reporting between surveys. A few survey items were also reorganized to be more logical in flow.
- Beginning with the 2009–10 IPEDS, a new component was added to the spring collection, called 200% Graduation Rates (GR200). This component collects data on the number of students in the cohort who completed their program within 200 percent of normal time. It is separate from the regular Graduation Rates (GRS) component.

- In 2009-10, numerous changes were made to reduce reporting burden for nondegree-granting institutions. These changes include elimination of items on IC; combining data collection on HR into a single section with consolidation of 4 primary occupational categories (instruction, research, public service, and combined); elimination of transfers-in and noncertificate-seeking student columns on EF; and vastly simplifying the finance reporting required of these institutions.

Future Plans

The IPEDS plans to continue with three separate data collections (fall, winter, and spring) in future years. Data items may be modified to better reflect current issues in postsecondary education as recommended by the IPEDS Technical Review Panel. The next data collection is scheduled for the fall of 2010.

5. DATA QUALITY AND COMPARABILITY

Data element definitions have been formulated and tested to be relevant to all providers of postsecondary education and consistent among components of the system. A set of data elements has been established to identify characteristics common to all providers of postsecondary education, and specific data elements have been established to define unique characteristics of different types of providers. Interrelationships among various components of the IPEDS have been formed to avoid duplicative reporting and to enhance the policy relevance and analytic potential of the data. Through the use of “clarifying” questions that ask what was or was not included in a reported count or total or the use of context notes that supplement the web collection, it is possible to address problems in making interstate and interinstitutional comparisons. Finally, specialized, but compatible, reporting formats have been developed for the different sectors of postsecondary education providers. This design feature accommodates the varied operating characteristics, program offerings, and reporting capabilities that differentiate postsecondary institutional sectors, while yielding comparable statistics for some common parameters of all sectors.

Sampling Error

Only the data collected prior to 1993 from a sample of private less-than-2-year institutions are subject to sampling error. With this one exception, the HEGIS and the IPEDS programs include the universe of applicable postsecondary institutions.

Nonsampling Error

The IPEDS data are subject to such nonsampling errors as errors of design, reporting, processing, nonresponse, and imputation. To the extent possible, these errors are kept to a minimum by methods built into the survey procedures.

The sources of nonsampling error in the IPEDS data vary with the survey instrument. In the Fall Enrollment component, the major sources of nonsampling error are classification problems, the unavailability of needed data, misinterpretation of definitions, and operational errors. Possible sources of nonsampling error in the Finance component include nonresponse, imputation, and misclassification. The primary sources of nonsampling error in the Completions component are differences between the NCES program taxonomy and taxonomies used by colleges, classification of double majors and double degrees, operational problems, and survey timing. A major source of nonsampling error in the Graduation Rates components is the correct identification of cohort students (full-time, first-time, degree/certificate-seeking undergraduates); for Human Resources, difficulties in classifying employees by primary occupation; for 12-month Enrollment, definitional difficulties with calculating instructional activity. For Student Financial Aid, institutions often must merge enrollment and financial aid databases, and face difficulties in placing students in the various groups for which data are collected.

Coverage error. Coverage error in the IPEDS is believed to be minimal. For institutions that are eligible for Title IV federal financial aid programs, coverage is almost 100 percent. Schools targeted as “possible adds” are identified from many sources, including a review of the PEPS file from OPE, a universe review done by state coordinators, and the institutions themselves.

Nonresponse error. Since 1993, all institutions entering into PPAs with the U.S. Department of Education are required by law to complete the IPEDS package of components. Therefore, overall unit and item response rates are quite high for all components for these institutions. Data collection procedures, including extensive email and telephone follow-up, also contribute to the high response rates. Imputation is performed to adjust for both partial and total nonresponse to a survey. Because response rates are so high, error due to imputation is considered small.

Unit nonresponse. Because Title IV institutions are the primary focus of the IPEDS and they are required to respond, overall response rates for Title IV institutions and administrative units are high. For example, the

overall response rate in winter 2007-08 was 99.9 percent for the HR component. The response rates were also 99.9 percent for the individual required HR sections: Employees by Assigned Position, Fall Staff, and Salaries. Since the implementation of the web collection, Title IV institutional response rates for the various IPEDS surveys have ranged from about 89 percent to over 99 percent. (See chapter 11 for response rates for the Academic Libraries Survey.)

By sector, the response rates are highest for public 4-year or higher institutions and lowest for private for-profit institutions, especially less-than-2-year institutions. The 1994 Academic Libraries and the FY 95 Finance public-use data files are limited to IHEs because the response rate for postsecondary institutions not accredited at the collegiate level was quite low (74 percent in the Finance Survey and less than 50 percent in the Academic Libraries Survey).

Item nonresponse. Most participating institutions provide complete responses for all items. Telephone and email follow-up are used to obtain critical missing items.

Measurement error. NCES strives to minimize measurement error in the IPEDS data by using various quality control and editing procedures. New questionnaire forms or items are field tested and/or reviewed by experts prior to use. To minimize reporting errors in the Finance component, NCES uses national standards for reporting finance statistics. Wherever possible, definitions and formats in the Finance component are consistent with those in the following publications: *College and University Business Administration*; *Administrative Services, Financial Accounting and Reporting Manual for Higher Education*; *Audits of Colleges and Universities*; and *HEGIS Financial Reporting Guide*.

The classification of students appears to be the main source of error in the Enrollment component. Institutions have had problems in correctly classifying first-time freshmen, other first-time students, and unclassified students for both full-time and part-time categories. These problems occur most often at 2-year institutions (both public and private) and private 4-year institutions. In the 1977–78 HEGIS validation studies, misclassification led to an estimated overcount of 11,000 full-time students and an undercount of 19,000 part-time students. Although the ratio of error to the grand total was quite small (less than 1 percent), the percentage of errors was as high as 5 percent at student detail levels and even higher at certain aggregation levels. (See also “Data Comparability” below.)

Data Comparability

The definitions and instructions for compiling the IPEDS data have been designed to minimize comparability problems. However, survey changes necessarily occur over the years, resulting in some issues of comparability. Also, postsecondary education institutions vary widely, and hence, comparisons of data provided by individual institutions may be misleading. Specific issues related to the comparability of the IPEDS data are described below.

Imputation. Imputed data are on file for institutions with partial or total nonresponse. *Caution should be exercised when comparing institutions for which data have been imputed, since these data are intended for computing national totals and not intended to be an accurate portrayal of an institution's data. Users should also be cautious when making year-to-year enrollment comparisons by state.* In some cases, state enrollment counts vary between years as a result of imputation rather than actual changes in the reported enrollment data. To avoid misinterpretation, users should always check the response status codes of individual institutions to determine if a large proportion of data was imputed.

Classification of institutions. Beginning in 1996, the subset of the IPEDS institutions eligible to participate in Title IV federal financial student aid has been validated by matching the IPEDS universe with the PEPS file maintained by OPE. Previously, institutions were self-identified as aid-eligible from the list of IHEs and responses to the Institutional Characteristics component.

Fields of study. In analyzing Completions data by field of study, users must remember that the data are reported at the institution level, and represent programs, not schools, colleges, or divisions within institutions. For example, some institutions might have a few computer and information science programs organized and taught within a business school. However, for the IPEDS reporting purposes, the degrees are classified and counted within the computer and information science discipline.

Reporting periods. The data collected through the IPEDS components for any one year represent two distinct time periods. The Institutional Characteristics, Enrollment and Human Resources data represent an institution at one point in time, the fall of the school year. 12-month Enrollment, Student Financial Aid, Finance, and Completions data cover an entire 12-month period or fiscal year. Some indicators in NCES reports use fall data in conjunction with 12-month data,

and readers should be cognizant of the differences in time periods represented.

Questionnaire changes. Over the years, the IPEDS survey forms have undergone revisions that may have an impact on data comparability. Users should consider the following:

- The 2008-09 data collection was the start of a 3-year phase-in to the reporting of the new, 1997 federal race and ethnicity categories. The new categories allow students and staff to identify themselves using two or more race categories. The transition to the new race and ethnicity categories will be complete for the 2011-12 data collection.
- The 2008-09 data collection was the start of a 2-year phase-in of the restructuring of the postbaccalaureate degree categories. As of the 2010-11 data collection, the first-professional degree and certificate categories were eliminated, and the doctor's degree category was expanded to three categories: research/scholarship, professional practice, and other. These changes reflect changes in graduate education over the years, and make it easier to distinguish research-focused doctor's degrees from professionally focused doctor's degrees.
- Accreditation information was collected on the IC until 2006-07, when the Office of Postsecondary Education opened its database and searchable web tool of accredited institutions, collecting data from the accreditation agencies (<http://ope.ed.gov/accreditation/>).
- From 1990 to 1994, racial/ethnic data (by gender and degree/award level) were collected at the 2-digit CIP level on the Completions component. In 1995, there was a major restructuring of the component to collect race/ethnicity at the 6-digit CIP level and to add additional questions to collect numbers of completers with double majors and numbers of degrees granted at branch campuses in foreign countries. The additional questions were dropped in 2000-01, but a matrix to collect completions data on multiple majors was instituted for optional use in 2001-02 and became mandatory in 2002-03.
- Revisions to the CIP were made in 1970, 1980, 1985, 1990, 2000, and 2010. For a complete

- history, please see **History of the Classification of Instructional Programs** later in this chapter.
- Racial/ethnic data for Fall Enrollment have been collected annually since 1990 (biennially, in even-numbered years, before then). Additional items were included on students enrolled in branch campuses in foreign countries, students enrolled exclusively in remedial courses, and students enrolled exclusively at extension divisions; however, these items were discontinued in 2000. Prior to 1996, data were also collected in even-numbered years from 4-year institutions for the fields of Veterinary Medicine and Architecture and Related Programs.
 - Prior to 2000-01, the GRS collected additional data on students' length of time to complete; the number of students still persisting; and the number of students receiving athletically related student aid and their length of time to complete. The sections of the component collecting data on students receiving athletically related student aid were discontinued with the 2007-08 data collection.
 - In 2009-10, forms used to collect Graduation Rates (GRS) data for less than 4-year institutions were modified to include reporting of completers within 100 percent of normal time in addition to 150 percent of normal time. This change aligned forms for the less than 4-year institutions with the 4-year institutions' forms.
 - For the 2009–10 data collection, additional changes to the SFA component were implemented due to the Higher Education Opportunity Act (HEOA) and for clarification, including the collection of average aid amounts for sub-groups of the full-time, first-time degree/certificate-seeking undergraduate population, to be used in the calculation of average institutional net price and average institutional net price by income category information for display on the College Navigator website (<http://nces.ed.gov/collegenavigator/>).
 - In fall 1995, the salary class intervals were revised for the Fall Staff component. Salary class intervals were revised again in 2001.
 - Salary outlays, total number of instructional staff, and tenure status were collected for full-time staff on less than 9-month contract schedules through 1999-2000; currently only academic rank and gender are collected for these other contract schedules. Faculty status was not collected between 2001-02 and 2004-05, and was reinstated for degree-granting institutions in 2005-06. The reporting of data by faculty status was optional for 2005–06, but was required beginning in 2006–07. Beginning with the 2004-05 data collection, only degree-granting institutions have been required to complete the SA section of the HR component.
 - As of the 2004-05 collection, the IPEDS has limited the collection of data on employees in medical schools to institutions with an M.D. or D.O. program. In previous collections, all 4-year institutions were given the opportunity to report employees in medical schools. However, some institutions that did not have a medical school erroneously reported employees in this section of the Employees by Assigned Position section. This change may cause some discrepancies in comparisons of the IPEDS medical school data.
 - Prior to 2001, the Fall Staff component requested the number of persons donating (contributing) services or contracted for by the institution.
 - Over the years, the various versions of the Finance form have changed. Prior to 1997, the survey forms for public and private institutions were basically the same except that the public institution form contained three additional sections, with data from questions pertaining to state and local government financial entities used by the U.S. Bureau of the Census.
 - The Finance form for private institutions was revised in 1997 to make it easier for respondents to report their financial data according to new standards issued by the Financial Accounting Standards Board (FASB). In an attempt to address the reporting issues of proprietary institutions, the for-profit form was revised in 1999 to reflect the financial statements of these institutions. Due to new accounting standards issued by the Governmental Accounting Standards Board (GASB), beginning optionally in 2002, with a 2-year phase-in period, public GASB reporting

institutions moved from fund-based reporting to whole-entity reporting that is more similar to the private FASB-reporting institutions.

- With the web-based data collection, the number of data items requested from institutions was greatly reduced in FY 2000.
- A 2-year phase-in period began with FY 2008 reporting, to implement additional changes to better align the finance reporting of public and private institutions. For FY 2010 reporting, all public and not-for-profit institutions used the new aligned form.

History of Classification of Instructional Programs.

The purpose of the Classification of Instructional Programs (CIP) is to provide a taxonomic scheme that supports the accurate tracking, assessment, and reporting of fields of study and program completions activity. NCES has utilized a number of versions of CIP throughout the life of IPEDS, as well as its predecessor, the Higher Education General Information System (HEGIS).

In 1970 NCES published “A Taxonomy of Instructional Programs in Higher Education” which was to be used beginning with the HEGIS surveys of 1971-72. This taxonomy was divided into two main sections: one dealt with conventional academic subdivisions of knowledge and training; the other with technologies and occupational specialties related to curricula leading to associate’s degrees and other awards below the baccalaureate. Both sections used 4-digit numerical codes to represent the fields.

In 1981 NCES published “A Classification of Instructional Programs.” In addition to new programs that evolved or gained new significance since 1970, there were weaknesses in the way instructional programs were classified and disaggregated. The new CIP instituted the current 6-digit code, which allowed obtaining data by 2-digit or 4-digit groups of fields more easily than the older scheme. The new CIP also included program definitions or descriptions, which the 1970 version lacked, as well as other improvements.

In 1985 another revision to the CIP was released, although this was more of an update to the 1980 CIP than a radical change. There were 116 fields deleted, either due to duplication, or because programs no longer existed to the degree needed for national reporting. Forty fields were added based on write-in entries on surveys returned. In addition, there were a few revisions of codes or names of fields. This CIP was

used during the final years of HEGIS and continued into IPEDS.

A more extensive revision of CIP was released in 1990, which included programs at the secondary and adult education levels. Within the postsecondary level, there were several major restructures. Fields previously included in Business and Management (06) and Business (Administrative Support) (07) were integrated into a new Business Management and Administrative Support (52). Similarly, fields previously in Allied Health (17) and Health Sciences (18) were integrated into Health Professions and Related Sciences (51). Again there were deletions and additions, although many were actually combining two former fields into one, or vice versa. The 1990 CIP was first used in IPEDS 1991-92.

A further revision resulted in publishing “Classification of Instructional Programs: 2000 Edition” in 2002. This CIP was adopted as the standard field of study taxonomy by Statistics Canada, based on the comprehensiveness and detail of the CIP and the potential for enhanced comparability with U.S. education data. Again, there were several major reorganizations. Fields previously reported in Agricultural Sciences (02) were divided between Agriculture, Agriculture Operations and Related Sciences (01) and Biological and Biomedical Sciences (26). Fields previously reported in Sales and Marketing Operations/Marketing and Distribution (08) were incorporated into Business, Management, Marketing, and Related Services (52). History became a separate 2-digit CIP (54) moved from Social Sciences and History (45). In addition, there were a large number of new fields added. The CIP-2000 was first used in IPEDS in 2002-03.

The most recent revision to the CIP was developed during 2008-2009 and will be entirely on-line (<http://nces.ed.gov/ipeds/cipcode/>), with tools for browsing, searching, and crosswalking. There were fewer major shifts in coding; no new 2-digit series were added, and no large scale movement of codes from one series to another occurred. A large number of new fields were added: 50 new 4-digit codes and 300 new 6-digit codes. Several series were reorganized (English Language and Literature/Letters (23), Psychology (42), Nursing (51.16), and Residency Programs (60)), and one series was deleted (Technology Education/Industrial Arts (21)). Examples of instructional programs were added to assist users of CIP in selecting the appropriate field. This new version will be used in IPEDS for the 2010-11 collection.

Comparisons with HEGIS. *Caution must be exercised in making cross-year comparisons of institutional data collected in the IPEDS with data collected in HEGIS.* The IPEDS surveys request separate reporting by all institutions and their branches as long as each entity offers at least one complete program of study. Under HEGIS, only separately accredited branches of an institution were surveyed as separate entities; branches that were *not* separately accredited were combined with the appropriate entity for the purposes of data collection and reporting. Therefore, an institution may have several entities in the IPEDS, where only one existed in HEGIS.

Comparison with the Survey of Earned Doctorates.

Like the IPEDS Completions Survey, the Survey of Earned Doctorates (SED) (see chapter 17) also collects data on doctoral degrees, but the information is provided by doctorate recipients rather than by institutions. The number of doctorates reported in the Completions component is slightly higher than in SED. This difference is largely attributable to the inclusion of nonresearch doctorates (primarily in theology and education) in the Completions component. The discrepancies in counts have been generally consistent since 1960, with ratios of the IPEDS-to-SED counts ranging from 1.01 to 1.06. Differences in the number of doctorates within a given field may be greater than the overall difference, because a respondent to SED may classify his or her specialty differently than how the institution reports the field in the Completions survey.

6. CONTACT INFORMATION

For content information on the IPEDS, contact:

Elise Miller
Phone: (202) 502-7318
E-mail: elise.miller@ed.gov

Mailing Address:

National Center for Education Statistics
Institute of Education Sciences
U.S. Department of Education
1990 K Street NW
Washington, DC 20006-5651

7. METHODOLOGY AND EVALUATION REPORTS

General

Following each IPEDS collection cycle, three First Look publications are released. These publications present findings from the data collections, and include extensive survey methodology sections. They are available online. The latest three are listed below:

Knapp, L.G., Kelly-Reid, J.E., and Ginder, S.A. (2010). *Enrollment in Postsecondary Institutions, Fall 2008; Graduation Rates, 2002 and 2005 Cohorts; and Financial Statistics, Fiscal Year 2008* (NCES 2010-152REV). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Knapp, L.G., et al., Research Triangle Institute (2009). *Employees in Postsecondary Institutions, Fall 2008, and Salaries of Full-Time Instructional Staff, 2008-09* (NCES 2010-165). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Knapp, L.G. (2009). *Postsecondary Institutions and Price of Attendance in the United States: Fall 2008, Degrees and Other Awards Conferred: 2007-08, and 12-Month Enrollment: 2007-08* (NCES 2009-165). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Uses of Data

U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (2010). *Integrated Postsecondary Education Data System Glossary*. Retrieved from <http://nces.ed.gov/ipeds/glossary/>.

U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (2010). *Classification of Instructional Programs*. Retrieved from <http://nces.ed.gov/ipeds/cipcode/>.

Data Quality and Comparability

Clery, S., Arntz, M., and Miller, A. (2008). *Integrated Postsecondary Education Data System Human Resources Data Quality Study* (NCES 2008-150). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Jackson, K.W., Jang, D., Sukasih, A., and Peeckson, S. (2005). *Integrated Postsecondary Education Data System Data Quality Study* (NCES 2005-175). National Center for Education Statistics, Institute of

Education Sciences, U.S. Department of Education.
Washington, DC.

Chapter 13: National Study of Postsecondary Faculty (NSOPF)

1. OVERVIEW

The National Study of Postsecondary Faculty (NSOPF) is conducted to provide information on postsecondary faculty and instructional staff: their academic and professional background, sociodemographic characteristics, and employment characteristics, such as institutional responsibilities and workload, job satisfaction, and compensation. Thus far, there have been four NSOPF administrations—in the 1987–88 academic year (NSOPF:88), the 1992–93 academic year (NSOPF:93), the 1998–99 academic year (NSOPF:99), and the 2003–04 academic year (NSOPF:04). The first cycle was conducted with a sample of institutions, faculty, and department chairpersons. The second, third, and fourth cycles were limited to surveys of institutions and faculty, but with a substantially expanded sample of public and private, not-for-profit institutions and faculty. Furthermore, unlike any previous cycle of NSOPF, the fourth cycle was conducted in tandem with another study, the 2004 National Postsecondary Student Aid Study (NPSAS:04) (see chapter 14), as a component of a larger study, the 2004 National Study of Faculty and Students (NSoFaS:04).

Purpose

To provide a national profile of postsecondary faculty and instructional staff: their professional backgrounds, responsibilities, workloads, salaries, benefits, and attitudes.

Components

NSOPF consists of two questionnaires: one for institutions and one for faculty and instructional staff. Institutions receive both an *Institution Questionnaire* and a request to provide a faculty list. The *Faculty Questionnaire* is sent to faculty and instructional staff sampled from the lists provided by the institutions. The 1987–88 NSOPF also included a *Department Chairperson Questionnaire*.

Institution Questionnaire. The Institution Questionnaire obtains information on the number of full- and part-time instructional and noninstructional faculty (as well as instructional personnel without faculty status); the tenure status of faculty members (based on definitions provided by the institution); institution tenure policies (and changes in policies on granting tenure to faculty members); the impact of tenure policies on the influx of new faculty and on career development; the growth and promotion potential for existing nontenured junior faculty; the benefits and retirement plans available to faculty; and the turnover rate of faculty at the institution. The questionnaire is completed by an Institution Coordinator (IC) designated by the Chief Administrator (CA) at each sampled institution.

Faculty Questionnaire. This questionnaire addresses the following issues as they relate to postsecondary faculty and instructional staff: background characteristics

PERIODIC SURVEY OF A SAMPLE OF POSTSECONDARY INSTITUTIONS AND THEIR FACULTY

NSOPF includes:

- Institution Questionnaire
- Faculty Questionnaire
- Department Chairperson Questionnaire (1987–88 only)

and academic credentials; workloads and time allocation between classroom instruction and other activities such as research, course preparation, consulting, public service, doctoral or student advising, conferences, and curriculum development; compensation and the importance of other sources of income, such as consulting fees and royalties; the role of faculty in institutional policymaking and planning (and the differences, if any, between the role of part- and full-time faculty); faculty attitudes toward their jobs, their institutions, higher education, and student achievement in general; changes in teaching methods and the impact of new technologies on teaching techniques; career and retirement plans; differences between individuals who have instructional responsibilities and those who do not (e.g., those engaged only in research); and differences between those with teaching responsibilities but no faculty status and those with teaching responsibilities and faculty status. Eligible respondents for this questionnaire are faculty and instructional staff sampled from lists provided by institutions involved in the study. These lists are compiled by the IC at each sampled institution.

Department Chairperson Questionnaire.

Administered only in the 1987–88 academic year, this questionnaire collected information from over 3,000 department chairpersons on the faculty composition in departments, tenure status of faculty, faculty hires and departures, hiring practices, activities used to assess faculty performance, and professional and developmental activities.

Periodicity

The NSOPF was conducted in the 1987–88, 1992–93, 1998–99, and 2003–04 academic years. No specific administration date has been set for the next round of NSOPF.

2. USES OF DATA

NSOPF provides valuable data on postsecondary faculty that can be applied to policy and research issues of importance to federal policymakers, education researchers, and postsecondary institutions across the United States. For example, NSOPF data can be used to analyze whether the size of the postsecondary labor force is decreasing or increasing. NSOPF data can also be used to analyze faculty job satisfaction and how it correlates with an area of specialization as well as how background and specialization skills relate to present assignments. Comparisons can be made on academic rank and outside employment. Benefits and

compensation can be studied across institutions, and faculty can be aggregated by sociodemographic characteristics. Because NSOPF is conducted periodically, it also supports comparisons of data longitudinally.

The Institution Questionnaire includes items about

- the number of full- and part-time faculty (regardless of whether they had instructional responsibilities) and instructional personnel without faculty status;
- the distribution of faculty and instructional staff by employment (i.e., full-time, part-time) and tenure status (based on the definitions provided by the institution);
- institutional tenure policies and changes in policies on granting tenure to faculty members;
- the impact of tenure policies on the number of new faculty and on career development;
- the growth and promotion potential for existing nontenured junior faculty;
- the procedures used to assess the teaching performance of faculty and instructional staff;
- the benefits and retirement plans available to faculty; and
- the turnover rates of faculty at the institution.

The Faculty Questionnaire addresses such issues as respondents' employment, academic, and professional background; institutional responsibilities and workload; job satisfaction; compensation; sociodemographic characteristics; and opinions. The questionnaire is designed to emphasize behavioral rather than attitudinal questions in order to collect data on who the faculty are; what they do; and whether, how, and why the composition of the nation's faculty is changing.

The Faculty Questionnaire includes items about

- background characteristics and academic credentials;
- workloads and time allocation between classroom instruction and other activities (such as research, course preparation, consulting, work at other institutions, public service,

- doctoral or student advising, conferences, and curriculum development);
- compensation and the importance of other sources of income, such as consulting fees and royalties;
- the number of years spent in academia, and the number of years with instructional responsibilities;
- the role of faculty in institutional policymaking and planning (and the differences, if any, between the role of full- and part-time faculty);
- faculty attitudes toward their jobs, their institutions, higher education, and student achievement in general;
- changes in teaching methods, and the impact of new technologies on instructional techniques;
- career and retirement plans;
- differences between those who have instructional responsibilities and those who do not, such as those engaged only in research; and
- differences between those with teaching responsibilities but no faculty status and those with teaching responsibilities and faculty status.

3. KEY CONCEPTS

Some key concepts related to NSOPF are described below.

Faculty/Instructional Staff (NSOPF:04). Eligible individuals for NSOPF:04 included any faculty and instructional staff who

- were permanent, temporary, adjunct, visiting, acting, or postdoctoral appointees;
- were employed full- or part-time by the institution;
- taught credit or noncredit classes;
- were tenured, nontenured but on a tenure track, or nontenured and not on a tenure track;
- provided individual instruction, served on thesis or dissertation committees, or advised or otherwise interacted with first-professional, graduate, or undergraduate students;
- were in professional schools (e.g., medical, law, or dentistry); or
- were on paid sabbatical leave.

NSOPF:04 excluded staff who

- were graduate or undergraduate teaching or research assistants;
- had instructional duties outside of the United States, unless on sabbatical leave;
- were on leave without pay;
- were not paid by the institution (e.g., those in the military or part of a religious order);
- were supplied by independent contractors; or
- otherwise volunteered their services.

Faculty/Instructional Staff (NSOPF:99).

Faculty—All employees classified by the institution as faculty who were on the institution’s payroll as of November 1, 1998. Included as faculty were

- any individuals who would be reported as “Faculty (Instruction/Research/Public Service)” in the U.S. Department of Education’s 1997–98 Integrated Postsecondary Education Data System (IPEDS) Fall Staff Survey¹ (see chapter 12);
- any individuals with faculty status who would be reported as “Executive, Administrative, and Managerial” in the 1997–98 IPEDS Fall Staff Survey, whether or not they engaged in any instructional activities; and
- any individuals with faculty status who would be reported as “Other Professionals (Support/Service)” in the 1997–98 IPEDS Fall Staff Survey, whether or not they engaged in any instructional activities.

¹ When constructing the NSOPF:99 institution frame, faculty data from 1995–96 IPEDS were used if 1997–98 data were missing.

Individuals who would be reported as “Instruction/Research Assistants” in the 1997–98 IPEDS Fall Staff Survey were excluded.

Instructional Staff—All employees with instructional responsibilities—those teaching one or more courses, or advising or supervising students’ academic activities (e.g., by serving on undergraduate or graduate thesis or dissertation committees or supervising an independent study or one-on-one instructions)—who may or may not have had faculty status. Included as instructional staff were

- any individuals with instructional responsibilities during the 1998 fall term who would be reported as “Executive, Administrative, and Managerial” in the 1997–98 IPEDS Fall Staff Survey (e.g., a finance officer teaching a class in the business school); and
- any individuals with instructional responsibilities during the 1998 fall term who would be reported as “Other Professionals (Support/Service)” in the 1997–98 IPEDS Fall Staff Survey.

Individuals who would be reported as “Instruction/Research Assistants” in the 1997–98 IPEDS Fall Staff Survey were excluded.

Faculty/Instructional Staff (NSOPF:93). All institutional staff (faculty and nonfaculty) whose major regular assignment at the institution (more than 50 percent) was instruction. This corresponds to the definition used in IPEDS glossary (Broyles 1995), which defines faculty (instruction/research/public service) as “persons whose specific assignments customarily are made for the purpose of conducting instruction, research, or public service as a principal activity (or activities), and who hold academic-rank titles of professor, associate professor, assistant professor, instructor, lecturer, or the equivalent of any of these academic ranks. If their principal activity is instructional, this category includes deans, directors, or the equivalent, as well as associate deans, assistant deans, and executive officers of academic departments...”

A dedicated instructional assignment was not required for an individual to be designated as faculty/instructional staff in NSOPF:93. Included in the definition were: administrators whose major responsibility was instruction; individuals with major instructional assignments who had temporary, adjunct, acting, or visiting status; individuals whose major

regular assignment was instruction but who had been granted release time for other institutional activities; and individuals whose major regular assignment was instruction but who were on sabbatical leave from the institution. Excluded from this definition were graduate or undergraduate teaching assistants, postdoctoral appointees, temporary replacements for personnel on sabbatical leave, instructional personnel on leave without pay or teaching outside the United States, military personnel who taught only Reserve Officers Training Corps (ROTC) courses, and instructional personnel supplied by independent contractors.

Noninstructional Faculty (NSOPF:93). All institutional staff who had faculty status but were not counted as instructional faculty since their specific assignment was *not instruction* but rather conducting research, performing public service, or carrying out administrative functions.

Instructional Faculty (NSOPF:88). Those members of the institution’s instruction/research staff who were employed full- or part-time (as defined by the institution) and whose assignment included instruction. Included were administrators, such as department chairs or deans, who held full- or part-time faculty rank and whose assignment included instruction; regular full- and part-time instructional faculty; individuals who contributed their instructional services, such as members of religious orders; and instructional faculty on sabbatical leave. Excluded from this definition were teaching assistants; replacements for faculty on sabbatical leave; faculty on leave without pay; and others with adjunct, acting, or visiting appointments.

4. SURVEY DESIGN

Target Population

Since NSOPF:99, the target population has consisted of all public and private, not-for-profit Title IV-participating, 2- and 4-year degree-granting institutions in the 50 states and the District of Columbia that offer programs designed for high school graduates and are open to persons other than employees of the institution and faculty and instructional staff in these institutions. The NSOPF:93 and NSOPF:88 institution-level population included postsecondary institutions with accreditation at the college level recognized by the U.S. Department of Education. The NSOPF:88 faculty-level population included only instructional faculty, but it also targeted department chairpersons.

Sample Design

NSOPF:04 used a two-stage sample design, with a sample of 1,080 institutions selected for participation in the first stage, of which 1,070 were eligible and 890 provided a faculty list suitable for sampling. In the second stage, a total of 35,630 faculty were sampled from participating institutions. Of these, 34,330 were eligible.

The institution frame was constructed from the Winter 2001–02 IPEDS data file. Institutions were partitioned into institutional strata based on institutional control, highest level of offering, and Carnegie classification. The sample of institutions was selected with probability proportional to size (PPS) based on the number of faculty and students at each institution.

In the faculty-level stage of sampling, faculty were grouped into strata based on race/ethnicity, gender, and employment status. Furthermore, the faculty sample was implicitly stratified by academic field. Stratifying the faculty in this way allowed for the oversampling of relatively small subpopulations (such as members of Black, Hispanic, and other ethnic/racial groups) in order to increase the precision of the estimates for these groups. The selection procedure allowed the sample sizes to vary across institutions, but minimized the variation in the weights within the staff-level strata: the sampling fractions for each sample institution were made proportional to the institution weight.

The sample for NSOPF:99 was selected in three stages. Both the first-stage sample of institutions and the second-stage sample of faculty were stratified, systematic samples. In the initial stage, 960 postsecondary institutions were selected from the 1997–98 Integrated Postsecondary Education Data System (IPEDS) Institutional Characteristics (IC) data files and the 1997 and 1995 IPEDS Fall Staff files. Each sampled institution was asked to provide a list of all of the full- and part-time faculty that the institution employed during the 1998 fall term, and 819 institutions provided such a list. In the second stage of sampling, some 28,580 faculty were selected from the lists provided by the institutions. Over 1,500 of these sample members were determined to be ineligible for NSOPF:99, as they were not employed by the sampled institution during the 1998 fall term, resulting in a sample of 27,040 faculty. A third stage of sampling occurred in the final phases of data collection. In order to increase the response rate and complete data collection in a timely way, a subsample of the faculty who had not responded was selected for intensive follow-up efforts. Others who had not responded were eliminated from the sample, resulting in a final sample of 19,210 eligible faculty.

NSOPF:93 was conducted with a sample of 970 postsecondary institutions (public and private, not-for-profit 2- and 4-year institutions whose accreditation at the college level was recognized by the U.S. Department of Education) in the first stage and 31,350 faculty sampled from institution faculty lists in the second stage. Institutions were selected from IPEDS and then classified into 15 strata by school type, based on their Carnegie Classifications. The strata were (1) private, other Ph.D. institution (not defined in any other stratum); (2) public, comprehensive; (3) private, comprehensive; (4) public, liberal arts; (5) private, liberal arts; (6) public, medical; (7) private, medical; (8) private, religious; (9) public, 2-year; (10) private, 2-year; (11) public, other type (not defined in any other stratum); (12) private, other type (not defined in any other stratum); (13) public, unknown type; (14) private, unknown type; and (15) public, research; private, research; and public, other Ph.D. institution (not defined in any other stratum). Within each stratum, the institutions were further sorted by school size. Of the 960 eligible institutions, 820 (85 percent) provided lists of faculty. The selection of faculty within each institution was random except for the oversampling of the following groups: Blacks (both non-Hispanics and Hispanics); Asians/Pacific Islanders; faculty in disciplines specified by the National Endowment for the Humanities; and full-time female faculty.

NSOPF:88 was conducted with a sample of 480 institutions (including 2-year, 4-year, doctoral-granting, and other colleges and universities), some 11,010 faculty, and more than 3,000 department chairpersons. Institutions were sampled from the 1987 IPEDS universe and were stratified by modified Carnegie Classifications and size (faculty counts). These strata were (1) public, research; (2) private, research; (3) public, other Ph.D. institution (not defined in any other stratum); (4) private, other Ph.D. institution (not defined in any other stratum); (5) public, comprehensive; (6) private, comprehensive; (7) liberal arts; (8) public, 2-year; (9) private, 2-year; (10) religious; (11) medical; and (12) “other” schools (not defined in any other stratum). Within each stratum, institutions were randomly selected. Of the 480 institutions selected, 450 (94 percent) agreed to participate and provided lists of their faculty and department chairpersons. Within 4-year institutions, faculty and department chairpersons were stratified by program area and randomly sampled within each stratum; within 2-year institutions, simple random samples of faculty and department chairpersons were selected; and within specialized institutions (religious, medical, etc.), faculty samples were randomly selected (department chairpersons were not sampled). At all institutions, faculty were also stratified on the basis of

employment status—full-time and part-time. Note that teaching assistants and teaching fellows were excluded in NSOPF:88.

Data Collection and Processing

NSOPF:04 allowed ICs to upload lists of faculty and instructional staff and to complete the Institution Questionnaire online. Institutions were also given the option of responding by telephone, though a web response was preferred. Faculty and instructional staff were allowed to participate via a self-administered web-based questionnaire or an interviewer-administered telephone interview (CATI). Follow-up with ICs and with faculty was conducted by telephone, mail, and e-mail.

NSOPF:99 allowed sample members to complete a self-administered paper questionnaire and mail it back or to complete the questionnaire online. Follow-up activities included e-mails, telephone prompting, and, for nonresponding faculty, CATI. As part of the study, an experiment was conducted to determine if small financial incentives could increase use of the web-based version of the questionnaire. Previously, NSOPF was a mailout/mailback survey with telephone follow-up.

NSOPF:88 was conducted by SRI International; NSOPF:93 by the National Opinion Research Center (NORC) at the University of Chicago; NSOPF:99 by The Gallup Organization; and NSOPF:04 by RTI International.

Reference Dates. Most of the information collected in NSOPF pertains to the fall term of the academic year surveyed. For NSOPF:04, the fall term was defined as the academic term containing November 1, 2003. The Institution Questionnaire also asked about the number of full-time faculty/instructional staff considered for tenure in the 2003–04 academic year. The NSOPF:04 Faculty Questionnaire asked faculty and instructional staff about the year they began their first faculty or instructional staff position at a postsecondary institution; the number of presentations and publications during their entire career and, separately, the number during the last 2 years; and their gross compensation and household income in calendar year 2003. Similarly, NSOPF:99, NSOPF:93, and NSOPF:88 requested most information for the 1998, 1992, and 1987 fall term, respectively, but included some questions requiring retrospective or prospective responses.

Data Collection. The NSOPF:04 data collection offered both a CATI and a web-based version of the Institution and Faculty questionnaires, with mail,

telephone, and e-mail follow-up. Some 1,070 institutions in the eligible institution sample for the 2004 National Study of Faculty and Students (NSoFaS:04) were sampled and recruited to participate in both components of NSoFaS:04 (NSOPF:04 and NPSAS:04). The fielding of NSOPF:04 and NPSAS:04 together as NSoFaS:04 was one of three changes made in the institution contacting procedures for this cycle of NSOPF. The second change was to administer the Institution Questionnaire as a web or CATI instrument, with no hard-copy equivalent. The third change was to begin recruiting institutions and initiating coordinator contacts in March 2003—a full 8 months prior to the November reference date for the fall term and 5 to 6 months earlier than the September start dates of previous cycles. This change was prompted by the need to draw a faculty sample and subsequently contact sampled faculty for participation prior to the 2004 summer break.

The data collection procedure started in March 2003 with a cover letter and a set of pamphlets on NSoFaS, NSOPF, and NPSAS being sent to the institution's Chief Administrator (CA) as an introduction to the study. Study personnel then followed up with the CA by telephone, asking him or her to name an IC. An information packet was then sent to the IC. Each IC was then asked to complete a Coordinator Response Form to confirm that the institution could supply the faculty list within stated schedule constraints. ICs who indicated that a formal review process was needed before their institution would participate were forwarded additional project materials as appropriate.

A binder containing complete instructions for NSOPF:04, as well as a request for a faculty/instructional staff list, was sent to ICs in September 2003. ICs were asked to complete the Institution Questionnaire using the study's website. Data collection for the Institution Questionnaire ended in October 2004.

In NSOPF:04 full-scale study, the faculty data collection began with introductory materials being sent to sample members via first-class mail as well as e-mail. The letter included instructions for completing the self-administered questionnaire on the Internet or by calling a toll-free number to complete a telephone interview. After an initial 4-week period, telephone interviewers began calling sample members. An early-response incentive, designed to encourage sample members to complete the self-administered questionnaire prior to outgoing CATI calls, was offered to sample members who completed the questionnaire within 4 weeks of the initial mailing. Incentives were also offered to selected sample members as necessary

(i.e., those who refused to complete the questionnaire and other nonrespondents).

The NSOPF:99 data collection offered both a paper and a web version of the Institution and Faculty questionnaires, with telephone (including CATI) and e-mail follow-up. The data collection procedure started with a prenotification letter to the institution's CA to introduce him or her to the study and secure the name of an appropriate individual to serve as the IC. The data collection packet was then mailed directly to the IC. The packet contained both the Institution Questionnaire and the faculty list collection packet. The IC was asked to complete and return all materials at the same time. The mailing was timed to immediately precede the November 1, 1998, reference date for the fall term.

The field period for the NSOPF:99 faculty data collection extended from February 1999 through March 2000. Questionnaires were mailed to faculty in waves, as lists of faculty and instructional staff were received, processed, and sampled. Questionnaires were accompanied by a letter that provided the web address and a unique access code to be used to access the web questionnaire. The first wave of questionnaires was mailed on February 4, 1999; the seventh and final wave was mailed on December 1, 1999. Faculty sample members in each wave received a coordinated series of mail, e-mail, and telephone follow-ups. Mail follow-up for nonrespondents included a postcard and up to four questionnaire re-mailings; these were mailed to the home address of the faculty member if provided by the institution. E-mail prompts were sent to all faculty for whom an e-mail address was provided; faculty received as many as six e-mail prompts. Telephone follow-up consisted of initial prompts to complete the mail or web questionnaire. A CATI was scheduled for nonrespondents to the mail, e-mail, and telephone prompts.

The following efforts were made for the NSOPF:93 institution data collection: initial questionnaire mailing, postcard prompting, second questionnaire mailing, second postcard prompting, telephone prompting, third questionnaire mailing, and telephone interviewing. Similarly, the NSOPF:93 faculty data collection used an initial questionnaire mailing, postcard prompting, second questionnaire mailing, third questionnaire mailing, telephone prompting, and CATI. In both collections, institutions and faculty who missed critical items and/or had inconsistent or out-of-range responses were identified for data retrieval. Extra telephone calls were made to retrieve these data.

Data collection procedures for NSOPF:88 involved three mailouts for both the Institution Questionnaire

and the Department Chairperson Questionnaire, and two mailouts and one CATI interview for the Faculty Questionnaire.

Data Processing. The NSoFaS:04 website was used for both NSOPF:04 and NPSAS:04. For institutions, it was a central repository for all study documents and instructions. It allowed for the uploading of electronic lists of faculty and instructional staff. In addition, it housed the Institution Questionnaire for the IC to complete online.

For NSOPF:04, institutions were asked to provide a single, unduplicated (i.e., with duplicate entries removed) electronic list of faculty in any commonly used and easily processed format (e.g., ASCII fixed field, comma delimited, spreadsheet format). However, as in previous cycles, paper lists were accepted, as were multiple files (e.g., separate files of full- and part-time faculty) and lists in electronic formats that did not lend themselves to electronic processing (such as word processing formats). For the first time, institutions were given the option of transmitting their electronic faculty lists via a secure upload to the NSoFaS:04 website and were encouraged to do so. (In previous cycles, direct upload was available only by file-transfer protocols, an option that few institutions utilized.) Institutions were also given the option of sending a CD-ROM or diskette containing the list data or sending the list via e-mail (as an encrypted file, if necessary).

Follow-up with ICs was conducted by telephone, mail, and e-mail. As faculty lists were received, they were reviewed for completeness, readability, and accuracy. Additional follow-up to clarify the information provided or retrieve missing information was conducted by the institution contactors as necessary. For institutions lacking the resources to provide a complete list of full- and part-time faculty and instructional staff, list information was, if possible, abstracted from course catalogs, faculty directories, and other publicly available sources. Faculty lists abstracted in this fashion were reviewed for completeness against IPEDS before being approved for sampling.

Institution Questionnaire follow-up was conducted simultaneously with follow-up for lists of faculty. If an institution was unable to complete the questionnaire online, efforts were made to collect the information by telephone. To expedite data collection, missing questionnaire data was, in some instances, abstracted directly from benefits and policy documentation supplied by the institution or from information publicly available on the institution's website.

For the faculty data collection, NSOPF:04 also utilized a mixed-mode data collection methodology that allowed sample members to participate via a web-based self-administered questionnaire or via CATI. The NSOPF:04 faculty instrument was designed to minimize potential mode effects by using a single instrument for both self-administration and CATI interviews. Four weeks after the release of the web-based questionnaire, nonrespondents were followed up to conduct a CATI interview.

Faculty lists and questionnaire data were evaluated by the project staff for quality, item nonresponse, item mode effects, break-offs, coding, quality control monitoring of interviewers, and interviewer feedback.

In NSOPF:99, each of the three modes of questionnaire administration required separate systems for data capture. All self-administered paper questionnaires were optically scanned. The system was programmed so that each character was read and assigned a confidence level. All characters with less than a 100 percent confidence level were automatically sent to an operator for manual verification. The contractor verified the work of each operator and the recognition engines on each batch of questionnaires to ensure that the quality assurance system was working properly. Also, 100 percent of written-out responses (as opposed to check marks) were manually verified.

Each web respondent was assigned a unique access code, and respondents without a valid access code were not permitted to enter the website. A respondent could return to the survey website at a later time to complete a survey that was left unfinished in an earlier session. When respondents entered the website using the access code, they were immediately taken to the same point in the survey item sequence that they had reached during their previous session. If respondents, re-using an access code, returned to the website at a later time after completing the survey in a previous session, they were not allowed access to the completed web survey data record. Responses to all web-administered questionnaires underwent data editing, imputation, and analysis.

All telephone interviews used CATI technology. The CATI program was altered from the paper questionnaire to ensure valid codes, perform skip patterns automatically, and make inter-item consistency checks where appropriate. The quality control program for CATI interviewing included project-specific training of interviewers, regular evaluation of interviewers by interviewing supervisors, and regular monitoring of interviewers.

NSOPF:93 used both computer-assisted data entry (CADE) and CATI. The CADE/CATI systems were designed to ensure that all entries conformed to valid ranges of codes; enforce skip patterns automatically; conduct inter-item consistency checks, where appropriate; and display the full question-and-answer texts for verbatim responses. As part of the statistical quality control program, 100 percent verification was conducted on a randomly selected subsample of 10 percent of all Institution and Faculty questionnaires entered in CADE. The error rate was less than 0.5 percent for all items keyed. Quality assurance for CATI faculty interviews consisted of random online monitoring by supervisors.

Editing and Coding. For the study in general, a large part of the data editing and coding was performed in the data collection instruments, including range edits; across-item consistency edits; and coding of fields of teaching, scholarly activities, and highest degree. During and following data collection, the data were reviewed to confirm that the data collected reflected the intended skip-pattern relationships. At the conclusion of the data collection, special codes were inserted in the database to reflect the different types of missing data.

The data cleaning and editing process in NSOPF:04 consisted of the following steps:

- (1) *Review of one-way frequencies for every variable to confirm that there were no missing or blank values and to check for reasonableness of values.* This involved replacing blank or missing data with -9 for all variables in the instrument database and examining frequencies for reasonableness of data values.
- (2) *Review of two-way cross-tabulations between each gate-nest combination of variables to check data consistency.* Gate variables are items that determine subsequent instrument routing. Nest variables are items that are asked or not asked, depending on the response to the gate question. Legitimate skips were identified using the interview programming code as specifications to define all gate-nest relationships and replace -9 (missing values that were blank because of legitimate skips) with -3 (legitimate skip code). Additional checks ensured that the legitimate skip code was not overwriting valid data and that no skip logic was missed. In addition, if a gate variable was missing (-9), the -9 was carried through the nested items.

- (3) *Identify and code items that were not administered due to a partial or abbreviated interview.* This code replaced -9 values with -7 (item not administered) based on the section completion and abbreviated interview indicators.
- (4) *Recode “don’t know” responses to missing.* This code replaced -1 (don’t know) values with -9 (missing) for later stochastic imputation. For selected items for which “don’t know” seemed like a reasonable response, variables were created both with and without the “don’t know” category.
- (5) *Identify items requiring recoding.* During this stage, previously uncodable values (e.g., text strings) collected in the various coding systems were upcoded, if possible.
- (6) *Identify items requiring range edits, logical imputations, and data corrections.* Descriptive statistics for all continuous variables were examined. Values determined to be out-of-range were either coded to the maximum (or minimum) reasonable value or set to missing for later imputation. Logical imputations were implemented to assign values to legitimately skipped items whose values could be implicitly determined from other information provided. Data corrections were performed where there were inconsistencies between responses given by the sample member.

Estimation Methods

Weighting was used in NSOPF to adjust for sampling and unit nonresponse at both the institution and faculty levels. Imputation was performed to compensate for item nonresponse.

Weighting. In NSOPF:04, three weights were computed: full-sample institution weights, full-sample faculty weights, and a contextual weight (to be used in “contextual” analyses that simultaneously include variables drawn from the Faculty and Institution questionnaires). The formulas representing the construction of each of these weights are provided in the *2004 National Study of Postsecondary Faculty (NSOPF:04) Methodology Report* (Huer et al. 2005). NSOPF:99 used weighting procedures similar to those used in NSOPF:04. For details on these procedures, see the *1999 National Study of Postsecondary Faculty (NSOPF:99) Methodology Report* (Abraham et al. 2002).

The weighting procedures used in NSOPF:93 and NSOPF:88 are described below.

NSOPF:93. Three weights were computed for the NSOPF:93 sample—first-stage institution weights, final institution weights, and final faculty weights. The first-stage institution weights accounted for the institutions that participated in the study by submitting a faculty list that allowed faculty members to be sampled. The two final weights—weights for the sample faculty and for institutions that returned the Institution Questionnaire—were adjusted for nonresponse. The final faculty weights were poststratified to the “best” estimates of the number of faculty. The “best” estimates were derived following reconciliation and verification through recontact with a subset of institutions that had discrepancies of 10 percent or more between the total number enumerated in their faculty list and Institution Questionnaire. For more information on the reconciliation effort, see “Measurement Error” (in section 5 below). For more information on the calculation of the “best” estimates of faculty, see the *1993 National Study of Postsecondary Faculty Methodology Report* (Selfa et al. 1997).

NSOPF:88. The NSOPF:88 sample was weighted to produce national estimates of institutions, faculty, and department chairpersons by using weights designed to adjust for differential probabilities of selection and nonresponse. The sample weights for institutions were calculated as the inverse of the probability of selection, based on the number of institutions in each size substratum. Sample weights were adjusted to account for nonresponse by multiplying the sample weights by the reciprocal of the response rate. Sample weights for faculty in NSOPF:88 summed to the total number of faculty in the IPEDS universe of institutions, as projected from the faculty lists provided by participating institutions, and accounted for two levels of nonresponse: one for nonparticipating institutions and one for nonresponding faculty. Sample weights for department chairpersons in NSOPF:88 summed to the estimated total number of department chairpersons in the IPEDS universe of institutions and accounted for nonresponse of nonparticipating institutions and nonresponding department chairpersons.

Imputation. Data imputation for the NSOPF:04 Faculty Questionnaire was performed in four steps:

- (1) *Logical imputation.* The logical imputation was conducted during the data cleaning steps (as explained under “Editing and Coding” above).

- (2) *Cold deck.* Missing responses were filled in with data from the sample frame or institution record data whenever the relevant data were available.
- (3) *Sequential hot deck.* Nonmissing values were selected from “sequential nearest neighbors” within the imputation class. All questions that were categorical and had more than 16 categories were imputed with this method.
- (4) *Consistency checks.* After all variables were imputed, consistency checks were applied to the entire faculty data file to ensure that the imputed values did not conflict with other questionnaire items, observed or imputed. This process involved reviewing all of the logical imputation and editing rules as well.

Data imputation for the institution questionnaire used three methods, within-class mean, within-class random frequency, and hot deck. The imputation method for each variable is specified in the labels for the imputation flags in the institution dataset. Logical imputation was also performed in the cleaning steps described previously in the “Editing and Coding” section.

Imputation for the NSOPF:99 Faculty Questionnaire was performed in four steps:

- (1) *Logical imputation.* The logical imputation was conducted during the data cleaning steps (as explained under “Editing and Coding” above).
- (2) *Cold deck.* Missing responses were filled in with data from the sample frame whenever the relevant data were available.
- (3) *Sequential hot deck.* Nonmissing values were selected from “sequential nearest neighbors” within the imputation class. All questions that were categorical and had more than 16 categories were imputed with this method.
- (4) *Regression type.* This procedure employed SAS PROC IMPUTE. All items that were still missing after the logical, cold-deck, and hot-deck imputation procedures were imputed with this method. Project staff selected the independent variables by first looking through the questionnaire for logically related items and then by conducting a correlation analysis of the questions against each other to find the top correlates for each item.

Data imputation for the NSOPF:99 Institution Questionnaire used three methods. Logical imputation was also performed in the cleaning steps described under “Editing and Coding.”

- (1) *Within-class mean.* The missing value was replaced with the mean of all nonmissing cases within the imputation class. Continuous variables with less than 5 percent missing data were imputed with this method.
- (2) *Within-class random frequency.* The missing value was replaced by a random draw from the possible responses based on the observed frequency of nonmissing responses within the imputation class. All categorical questions were imputed with this method, since all categorical items had less than 5 percent missing data.
- (3) *Hot deck.* As with the faculty imputation, this method selected nonmissing values from the “sequential nearest neighbor” within the imputation class. Any questions that were continuous variables and had more than 5 percent missing cases were imputed with this method.

For a small number of items, special procedures were used. See the *1999 National Study of Postsecondary Faculty (NSOPF:99) Methodology Report* (Abraham et al. 2002).

In NSOPF:93, two imputation methods were used for the Faculty Questionnaire—PROC IMPUTE and the “sequential nearest neighbor” hot-deck method. PROC IMPUTE alone was used for the NSOPF:93 Institution Questionnaire. All imputation was followed by a final series of cleaning passes that resulted in generally clean and logically consistent data. Some residual inconsistencies between different data elements remained in situations where it was impossible to resolve the ambiguity as reported by the respondent.

Although NSOPF:88 consisted of three questionnaires, imputations were only performed for faculty item nonresponse. The within-cell random imputation method was used to fill in most Faculty Questionnaire items that had missing data.

Recent Changes

NSOPF:04 was, in one respect, unlike any previous cycle of NSOPF, as it was conducted in tandem with another major study, NPSAS:04, under one overarching contract: NSoFaS:04. NCES recognized that, historically, there had been considerable overlap in the institutions selected for participation in

NSOPF:04 and NPSAS:04. By combining the two independent studies under one contract, NCES sought to minimize the response burden on institutions and to realize data collection efficiencies. Nevertheless, NSOPF:04 and NPSAS:04 retain their separate identities. The purpose of this chapter is to summarize the methodology of NSOPF:04; sampling and data collection procedures for NPSAS:04 are referred to only as they are combined with, or impact, the parallel procedures for NSOPF:04.

The combination of NSOPF:04 and NPSAS:04 into NSoFaS:04 had important implications for the NSOPF:04 institution sample design and institution contacting procedures. Institutions for the NSOPF:04 sample were selected as a subsample of the NPSAS:04 sample. This combination resulted in a somewhat larger sample of institutions for the full-scale study than in previous NSOPF cycles (1,070 eligible institutions in NSOPF:04 compared to 960 in NSOPF:99) and created a need to balance the design requirements of both studies in all institution-related study procedures.

Future Plans

A specific date has not yet been selected for the next administration of NSOPF.

5. DATA QUALITY AND COMPARABILITY

NSOPF:04 included procedures for both minimizing and measuring nonsampling errors. A field test was performed before NSOPF:04, and quality control activities continued during interviewer training, data collection, and data processing.

Sampling Error

Standard errors for all NSOPF data can be computed using a technique known as Taylor Series approximation. Individuals opting to calculate variances with the Taylor Series approximation method should use a “with replacement” type of variance formula. Specialized computer programs, such as SUDAAN, calculate variances with the Taylor Series approximation method. The Data Analysis System (DAS) from NCES available on CD-ROM calculates variances using the Taylor Series method, and the DAS available online calculates variances using the balanced repeated replicate method.

Replicate weights are provided in the NSOPF data files (64 sets of replicates in NSOPF:99 and NSOPF:04 and 32 replicate weights in NSOPF:93). These weights

implement the balanced half-sample (BHS) method of variance estimation. They have been created to handle the certainty strata and to incorporate finite population correction factors for each of the noncertainty strata. Two widely available software packages, WesVar and PC CARP, have the capability to use replicate weights to estimate variances.

Analysts should be cautious about the use of BHS-estimated variances that relate to one stratum or to a group of two or three strata. Such variance estimates may be based upon far fewer than the number of replicates; thus, the variance of the variance estimator may be large. Analysts who use either the restricted-use faculty file or the institution file should also be cautious about cross-classifying data so deeply that the resulting estimates are based upon a very small number of observations. Analysts should interpret the accuracy of the NSOPF statistics in light of estimated standard errors and the small sample sizes.

Nonsampling Error

To minimize the potential for nonsampling errors, the NSOPF:04 Institution and Faculty questionnaires (as well as the sample design, data collection, and data processing procedures) were field-tested with a national probability sample of 150 postsecondary institutions (though only 80 of these were used for the full second-stage sampling of faculty and instructional staff) and 1,200 faculty members. A major focus of the field test was the effect of combining NSOPF and NPSAS. The field test also included an incentive experiment, which tested the use of incentives for increasing early responses and for obtaining interviews from nonrespondents. Other aspects of data quality were also examined.

The NSOPF:99 Institution and Faculty questionnaires (as well as the sample design, data collection, and data processing procedures) were field-tested with a national probability sample of 160 postsecondary institutions and 510 faculty members. Four methodological experiments—to increase unit response rates, speed the return of mail questionnaires, increase data quality, and improve the overall efficiency of the data collection process—were conducted as part of the field test. The experiments involved the use of prenotification, prioritized mail, a streamlined instrument, and the timing of CATI attempts. Another focus of the field test was the effort to reduce discrepancies between the faculty counts derived from the list of faculty provided by each institution and those provided in the Institution Questionnaire. Changes introduced to reduce discrepancies included providing clearer definitions of faculty eligibility (with consistency across forms and questionnaires) and

collecting list and Institution Questionnaire data simultaneously (with the objective of increasing the probability that both forms would be completed by the same individual and evidence fewer inconsistencies).

During the NSOPF:93 field test, a subsample of faculty respondents was reinterviewed to evaluate reliability. In addition, an extensive item nonresponse analysis of the field-tested questionnaires was conducted, followed by additional evaluation of the NSOPF:93 instruments and survey procedures. An item nonresponse analysis was also conducted for the full-scale data collection. Later, in 1996, NCES analyzed discrepancies in the NSOPF:03 faculty counts, conducting a retrieval, verification, and reconciliation effort to resolve problems.

Table 7. Summary of weighted response rates for selected NSOPF surveys

Questionnaire	List participation rate	Questionnaire response rate	Overall
NSOPF:93			
Institution	†	94	94
Faculty	84	83	70
NSOPF:99			
Institution	†	93	93
Faculty	88	83	74
NSOPF:04			
Institution	†	84	84
Faculty	91	76	69

†Not applicable.

SOURCE: Abraham, S.Y., Steiger, D.M., Montgomery, M., Kuhr, B.D., Tourangeau, R., Montgomery, B., and Chattopadhyay, M. (2002). *1999 National Study of Postsecondary Faculty (NSOPF:99) Methodology Report* (NCES 2002-154). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Huer, R., Kuhr, B., Fahimi, M., Curtin, T.R., Hinsdale, M., Carley-Baxter, L., and Green, P. (2005). *2004 National Study of Postsecondary Faculty (NSOPF:04) Methodology Report* (NCES 2006-179). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Selfa, L.A., Suter, N., Myers, S., Koch, S., Johnson, R.A., Zahs, D.A., Kuhr, B.D., and Abraham, S.Y. (1997). *1993 National Study of Postsecondary Faculty Methodology Report* (NCES 97-467). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Coverage Error. Because the IPEDS universe is the institutional frame for NSOPF, coverage of institutions is complete. However, there are concerns about the coverage of faculty and instructional staff. In NSOPF:04, prior to sampling, faculty counts from all lists provided by participating institutions were checked against both IPEDS and the counts that institutions provided in their Institution Questionnaire. (In NSOPF:99, the IPEDS comparison was used as a quality control check only when Institution Questionnaire counts were absent.) In NSOPF:04, as in NSOPF:99, institutions were contacted to resolve any discrepancies between data sources.

In NSOPF:99, in an effort to decrease the discrepancies in faculty counts noticed in NSOPF:93, ICs were asked to provide counts of full- and part-time faculty and instructional staff at their institutions as of November 1, 1998, the same reference date used for the 1997-98 IPEDS Fall Staff Survey; asked them to return both the faculty list and the Institution Questionnaire at the same time; and—giving them explicit warnings about potential undercounts of faculty—asked them to ensure that the counts provided in the list and questionnaire were consistent. These efforts appear to have worked, with 73 percent of institutions in NSOPF:99 providing questionnaire and list data that exhibited discrepancies of less than 10 percent, an improvement of 31 percentage points since NSOPF:93.

In NSOPF:93, a discrepancy between the faculty counts reported in the Institution Questionnaires and those provided in faculty lists by institutions at the beginning of the sampling process necessitated the “best estimates” correction to the NSOPF:93 faculty population estimates, as described earlier (in “Weighting,” section 4).

Nonresponse Error.

Unit Nonresponse. Unit response rates have been similar over NSOPF administrations, though they decreased slightly in NSOPF:04 (see table 7). Note that the overall faculty response rates are the percentage of faculty responding in institutions that provided faculty lists for sampling.

Item Nonresponse. For the NSOPF:04 Institution Questionnaire, 2 of the 90 items had more than 15 percent of the data missing. For the Faculty Questionnaire, 34 of the 162 items had more than 15 percent of the data missing. For further details on item nonresponse, see the *2004 National Study of Postsecondary Faculty (NSOPF:04) Methodology Report* (Huer et al. 2005).

For the NSOPF:99 Institution Questionnaire, the mean item nonresponse rate was 3.4 percent (weighted). Overall, the item nonresponse rate for the Faculty Questionnaire was 6.2 percent. More than half of the items in the Faculty Questionnaire (55 percent) had an item nonresponse rate of less than 5 percent, 25 percent had rates between 5 and 10 percent, and 20 percent had rates greater than 10 percent. For further details on item nonresponse, see the *1999 National Study of Postsecondary Faculty (NSOPF:99) Methodology Report* (Abraham et al. 2002).

For the NSOPF:93 Institution Questionnaire, the mean item nonresponse rate was 10.1 percent, with the level of nonresponse increasing in the latter parts of the questionnaire. For the Faculty Questionnaire, the mean item nonresponse rate was 10.3 percent.

Measurement Error. In NSOPF:04, as in prior administrations of this study, secured faculty lists were evaluated for accuracy and completeness of information before being processed for sampling. To facilitate quality control, faculty list counts were compared against counts obtained from the following supplementary sources:

- the Institution Questionnaire (or the file layout form, if a questionnaire was not completed but an overall faculty count was supplied);
- the 2001 IPEDS Fall Staff Survey;
- the Contact Information and File Layout (CIFL) form (which included faculty counts and was used when questionnaire data was unavailable); and
- NSOPF:99 frame data.

Discrepancies in counts of full- and part-time faculty between the faculty list and other sources that were outside the expected range were investigated. All institutions with faculty lists that failed any checks were recontacted to resolve the observed discrepancies. Because of time and definitional differences between NSOPF and IPEDS, it was expected that the faculty counts obtained from the institutions and IPEDS would include discrepancies. Consequently, quality control checks against IPEDS were less stringent than those against the Institution Questionnaire. However, list count comparisons against IPEDS and NSOPF:99 data were useful in identifying systematic errors, particularly those related to miscoding of the employment status of faculty members.

Results of the data quality evaluations showed that 82 percent of faculty list counts were within 10 percent of the corresponding Institution Questionnaire counts. There were greater variances between list counts and IPEDS, which is based on a narrower definition of faculty. Patterns of discrepancies between IPEDS and list data followed expected patterns, with list counts larger than counts from IPEDS. For more information, see the *2004 National Study of Postsecondary Faculty (NSOPF:04) Methodology Report* (Huer et al. 2005).

For NSOPF:99, NCES conducted an intensive follow-up with 230 institutions (29 percent of those participating) whose reports exhibited a variance of 5 percent or more between the list and questionnaire counts overall or between the two part-time counts. NSOPF has experienced discrepancies in faculty counts among IPEDS, Institution Questionnaires, and faculty lists across all cycles of the study. Even though identical information is requested in the questionnaire and in the list (e.g., in NSOPF:99, a count of all full- and part-time faculty and instructional staff as of November 1, 1998), institutions have continued to provide discrepant faculty data. As in NSOPF:93, large discrepancies tend to be concentrated among smaller institutions and 2-year institutions in NSOPF:99. Undercounting of part-time faculty and instructional staff without faculty status in the list remains the primary reason for the majority of these discrepancies.

However, procedures implemented in NSOPF:99 improved the consistency of the list and questionnaire counts when compared to previous cycles of NSOPF. The percentage of institutions providing list and questionnaire data that had less than a 10 percent discrepancy increased from 42 percent in NSOPF:93 to 73 percent in NSOPF:99. A total of 43 percent provided identical data in the list and questionnaire in NSOPF:99 (compared to only 2.4 percent in NSOPF:93). Moreover, schools providing identical list and questionnaire data were shown to have provided more accurate and complete data in both the list and questionnaire. These findings suggest that the changed procedures that were introduced in the 1998 field test and NSOPF:99 resulted in more accurate counts of faculty and instructional staff. Institutions may also be in a better position to respond to these requests for data. Their accumulated experience in handling NSOPF and IPEDS (and other survey) requests, their adoption of better reporting systems, more flexible computing systems and staff, and a general willingness to provide the information are probably also a factor in their ability to provide more consistent faculty counts, although data to support these assertions are not available. For more detail, see the *1999 National Study*

of Postsecondary Faculty (NSOPF:99) Methodology Report (Abraham et al. 2002).

NCES conducted three studies to examine possible measurement errors in NSOPF:03, including (1) a reinterview study of selected faculty questionnaire items, conducted after the field test; (2) a discrepancy and trends analysis of faculty counts in the full-scale data collection; and (3) a retrieval, verification, and reconciliation effort involving recontact of institutions. For detail on these studies, see *Measurement Error Studies at the National Center for Education Statistics* (Salvucci et al. 1997) and the *1993 National Study of Postsecondary Faculty Methodology Report* (Selfa et al. 1997).

Reinterview Study. A reliability reinterview study was conducted after the NSOPF:93 field test to identify Faculty Questionnaire items that yielded low-quality data and the item characteristics that caused problems, thus providing a basis for revising the questionnaire items prior to implementation of the full-scale data collection. The analysis of the reinterview items was presented by item type—categorical or continuous variables—rather than by subject area. The level of consistency between the field-test responses and the reinterview responses was relatively high: a 70 percent consistency for most of the categorical variables and a 0.7 correlation for most of the continuous variables. A detailed analysis of the question on employment sector of last main job was conducted because it showed the highest percentage of inconsistent responses (28 percent) and the highest inconsistency index (36.0). It was concluded that the large number of response categories and the involvement of some faculty in more than one job sector were plausible reasons for the high inconsistency rate. The items with the lowest correlations were those asking for retrospective reporting of numbers that were small fractions of dollars or hours and those asking for summary statistics on activities that were likely to fluctuate over time—the types of questions shown to be unreliable in past studies.

Discrepancy and Trends Analysis of Faculty Counts. This analysis compared discrepancies between different types of institutions to identify systematic sources of discrepancies in faculty estimates between the list counts provided by the institutions and the counts they reported in the Institution Questionnaire. The investigation found that list estimates tended to exceed questionnaire estimates in large institutions, in institutions with medical components, and in private schools. Questionnaire estimates tended to be higher in smaller institutions, in institutions without medical components, and in public schools. Institutions

supplied much higher questionnaire estimates than list estimates for part-time faculty. Faculty lists submitted early in the list collection process showed little difference in the magnitude of questionnaire/list discrepancies from faculty lists submitted later in the process.

Retrieval, Verification, and Reconciliation. This effort involved recontacting 509 institutions: 450 institutions (more than half of all institutions) whose questionnaire estimate of total faculty differed from their list estimate by 10 percent or more and an additional 59 institutions NCES designated as operating medical schools or hospitals. All institutions employing health sciences faculty and participating in NSOPF:93 were selected for recontact.

NCES accepted the reconciled estimates obtained in this study as the true number of faculty. More than half (57 percent) of the recontacted institutions identified the questionnaire estimate as the most accurate response, while 25 percent identified the list estimate as the most accurate. Another 11 percent of the institutions provided a new estimate; 1 percent indicated that their IPEDS estimate was the most accurate response; and 6 percent could not verify any of the estimates and thus accepted the original list estimate.

The majority of discrepancies in faculty counts resulted from the exclusion of some full- or part-time faculty from the list or questionnaire. Another factor was the time interval between the date the list was compiled and the date the questionnaire was completed. Downsizing also affected faculty counts at several institutions. Some of the reasons for the discrepancies were unexpected. For example, some institutions provided “full-time equivalents” (FTEs) on the Institution Questionnaire instead of an actual headcount of part-time faculty.

Sometimes part-time faculty were overreported—often as a result of confusion over the pool of part-time and temporary staff employed by, or available to, the institution during the course of the academic year versus the number actually employed during the fall semester. Another reason for overreporting part-time faculty was an inability to distinguish honorary/unpaid part-time faculty from paid faculty and teaching staff. This study also confirmed that a small number of institutions, those that considered their medical schools separate from their main campuses, excluded medical school faculty from their lists of faculty.

While these results indicate that there may have been some bias in the NSOPF:93 sample, no measure of the

potential bias, such as the net difference rate, was computed. Instead, the reconciliation prompted NCES to apply a poststratification adjustment to the estimates based entirely on the “best” estimates obtained during the reinterview study described above. Problems with health science estimates, however, could only be partly rectified by the creation of new “best” estimates. For more information on the calculation of the “best” estimates and further discussion of the health science estimates, see the *1993 National Study of Postsecondary Faculty Methodology Report* (Selfa et al. 1997).

Data Comparability

Design Changes. Each succeeding cycle of NSOPF has expanded the information base about faculty. NSOPF:04 was designed both to facilitate comparisons over time and to examine new faculty-related issues that had emerged since NSOPF:99. The NSOPF:04 sample was designed to allow detailed comparisons and high levels of precision at both the institution and faculty levels. The merging of NSOPF with NPSAS for the 2003–04 administration allowed for the inclusion of a larger number of institutions in NSOPF while reducing respondent burden. Since NSOPF:93, the operant definition of “faculty” for NSOPF has included instructional faculty, noninstructional faculty, and instructional personnel without faculty status.

NSOPF:04, NSOPF:99, and NSOPF:93 consisted of two questionnaires: an Institution Questionnaire and a Faculty Questionnaire. NSOPF:88 included, in addition, a Department Chairperson Questionnaire.

Definitional Differences. *Comparisons among the cycles must be made cautiously because the respondents in each cycle were different.* At the institution level, the NSOPF:04 sample consisted of all public and private, not-for-profit Title IV-participating, 2- and 4-year degree-granting institutions in the 50 states and the District of Columbia. The sample was first constituted in this way in NSOPF:99 so that the NSOPF sampling universe would conform with that of IPEDS. In the two previous rounds of the study (NSOPF:93 and NSOPF:88), the sample consisted of public and private, not-for-profit 2- and 4-year (and above) higher education institutions.

The definition of faculty and instructional staff for each NSOPF cycle is given above (see Section 3, “Key Concepts”). On the design level, note that NSOPF:04, NSOPF:99, and NSOPF:93 requested a listing of *all faculty (instructional and noninstructional) and instructional staff* from institutions for the purpose of sampling. For NSOPF:88, institutions were asked to provide only the names of *instructional faculty*.

Although not specifically stated, NCES expected that institutions would provide information on instructional staff as well. The term faculty was used generically. However, there is no way of knowing how many institutions that had instructional staff as well as instructional faculty provided the names of both. Each institution was allowed to decide which faculty members belonged in the sample, thereby creating a situation that does not allow researchers to precisely match the *de facto* sample definition used by institutions in NSOPF:88.

Content Changes. Major goals for NSOPF:04 included making the questionnaires shorter and easier to complete. Other changes were implemented to bring NSOPF up to date with current issues in the field. As a result, 9 items from the NSOPF:99 Institution Questionnaire were eliminated from the NSOPF:04 Institution Questionnaire, 14 items were revised, and 3 items were repeated without change. For the NSOPF:04 Faculty Questionnaire, 39 items from the NSOPF:99 Faculty Questionnaire were eliminated, 51 items were simplified or otherwise revised, 1 item was added, and 3 items were unchanged.

Comparisons with other surveys. Comparisons of NSOPF:93 salary estimates with salary estimates from IPEDS and from the American Association of University Professors indicate that NSOPF data are consistent with these other sources. Most differences are relatively small and can be easily explained by methodological differences between the studies. The NSOPF estimates are based on self-reports of individuals, whereas the other two studies rely on institutional reports of salary means for the entire institution.

However, the reader should be aware of differences in faculty definitions between NSOPF and IPEDS. In IPEDS, individuals have to be categorized according to their primary responsibility (administrator, faculty, or other professional); in NSOPF, it is possible to categorize individuals according to any of their responsibilities.

Because NSOPF includes all faculty and instructional staff, it is possible for an “other professional” to have instructional responsibilities and/or be a faculty member, and it is also possible for an administrator to have instructional responsibilities and/or be a faculty member. Therefore, NSOPF includes all faculty under IPEDS, some of the administrators under IPEDS, and some of the other professionals under IPEDS.

6. CONTACT INFORMATION

For content information on NSOPF, contact:

Aurora M. D'Amico
Phone: (202) 502-7334
E-mail: aurora.damico@ed.gov

Mailing Address:

National Center for Education Statistics
Institute of Education Sciences
U.S. Department of Education
1990 K Street NW
Washington, DC 20006-5651

7. METHODOLOGY AND EVALUATION REPORTS

General

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Chapter 14: National Postsecondary Student Aid Study (NPSAS)

1. OVERVIEW

The National Postsecondary Student Aid Study (NPSAS) is a comprehensive nationwide study conducted periodically by the National Center for Education Statistics (NCES) to determine how students and their families pay for postsecondary education. It is designed to address policy questions resulting from the rapid growth of financial aid programs and the succession of changes in financial aid program policies since 1986. The first NPSAS was conducted in the 1986–87 academic year (NPSAS:87). The seventh and most recently completed in the series was administered in the 2007–08 academic year (NPSAS:08). Other administrations have been conducted in academic year 1989–90 (NPSAS:90), 1992–93 (NPSAS:93), 1995–96 (NPSAS:96), 1999–2000 (NPSAS:2000), and 2003–04 (NPSAS:04).

NPSAS is based on a nationally representative sample of all students in eligible postsecondary education institutions in the 50 states, the District of Columbia, and Puerto Rico. Sampled institutions represent all major sectors, including public and private, not-for-profit and for-profit, and less-than-2-year schools, community colleges, 4-year colleges, and major universities with graduate-level programs. Study members include both undergraduate and graduate students who receive financial aid as well as those who do not. NPSAS data are obtained from administrative records of student financial aid, interviews with students, and, in prior cycles, interviews with a subsample of parents. Information has been gathered on as many as 130,000 students in a study cycle.

NPSAS also provides baseline data for two longitudinal studies: the Beginning Postsecondary Students Longitudinal Study (BPS) and the Baccalaureate and Beyond Longitudinal Study (B&B; see chapters 15 and 16, respectively). NPSAS:90, NPSAS:96, and NPSAS:04 served as baselines for BPS cohorts; NPSAS:93, NPSAS:2000, and NPSAS:08 were the baselines for B&B cohorts.

Unlike prior administrations, NPSAS:04 was conducted as the student component study of the 2004 National Study of Faculty and Students (NSoFaS:04). The faculty component—the 2004 National Study of Postsecondary Faculty (NSOPF:04)—was conducted primarily as a separate study, with the exception of institution sampling and contacting (see chapter 13). In both NPSAS NPSAS:04 and NPSAS:08 study samples were supplemented to provide representative estimates by institutional sector for several states.

Purpose

The purpose of the NPSAS is to produce reliable national estimates of characteristics related to financial aid for postsecondary students, the role of financial aid in how students and their families finance postsecondary education, and the extent to which the financial aid system is meeting the needs of students and families.

SAMPLE SURVEY OF POSTSECONDARY INSTITUTIONS AND STUDENTS; CONDUCTED EVERY 3 to 4 YEARS

NPSAS collects information from:

- Student institutional record abstracts
- U.S. Department of Education administrative records
- Student interviews
- Parent interviews

Components

NPSAS collects data on students from several sources, including: student records at the institution attended, student interviews, the Federal Student Aid Central Processing System (CPS), the National Student Loan Data System (NSLDS), the National Student Clearinghouse (NSC), ACT and SAT files, and the IPEDS Institutional Characteristics (IC) file.

Student Record Collection. The following information on students is obtained from institutional records: year in school, major field of study, type and control of institution, attendance status, tuition and fees, admission test scores, financial aid awards, cost of attendance, student budget information and expected family contribution for aided students, grade point average, age, and date first enrolled. Typically, an appointed Institutional Coordinator or a field data collector extracts the information from student records at a sample institution and enters it into a secure, customized web data collection system. In some cases, institutions and centralized systems choose to create and transmit a data file containing this information for all sample students from the sample institution(s).

Student Interview. Web-based student interviews (completed as a telephone interview or by self-administration) provide data on level (undergraduate, graduate, first-professional), major field of study, financial aid at other schools attended during the year, other sources of financial support, reasons for selecting the school currently being attended, current marital status, age, race/ethnicity, sex, highest degree expected, employment and income, voting in recent elections, and community service.

U.S. Department of Education Administrative Records. Since NPSAS:96, the following information has been collected from U.S. Department of Education Central Processing System (CPS) and National Student Loan Data System (NSLDS): types and amounts of federal financial aid received, cumulative Pell Grant and Stafford loan amounts, and loan repayment status. In NPSAS:08, information was also obtained for recipients of the new Academic Competitiveness Grant (ACG) and the National Science and Mathematics Access to Retain Talent Grant (National SMART Grant).

Other administrative databases. Data collected from commercial databases, such as: enrollment, degree, and certificate records from the National Student Clearinghouse (NSC); and ACT and SAT test score data

Parent Interview. Telephone interviews with a limited

sample of students' parents (conducted through NPSAS:96) collected supplemental data, including parents' marital status, age, highest level of education achieved, income, amount of financial support provided to children, types of financing used to pay children's educational expenses, and occupation and industry.

Out-of-School Student Loan Recipient Survey. This survey was only conducted as part of NPSAS:87. It collected data on major field of study; years attended and degrees received (if any); type and control of institution; financial aid; aid repayment status; age; sex; race/ethnicity; marital status; income; and employment history (occupation, industry, and salary).

Periodicity

Triennial from 1986–87 through 1995–96, and quadrennially beginning in 1999–2000. The next data collection is scheduled for 2012.

2. USES OF DATA

The goal of the NPSAS study is to identify institutional, student, and family characteristics related to participation in financial aid programs. Federal policymakers use NPSAS data to determine future federal policy concerning student financial aid. With these data, it is possible to analyze special population enrollments in postsecondary education, including students with disabilities, racial and ethnic minorities, students taking remedial/developmental courses, students from families with low incomes, and older students. The distribution of students by major field of study can also be examined. Fields of particular interest are mathematics, science, and engineering, as well as teacher preparation and health studies. Data can also be generated on factors associated with choice of postsecondary institution, participation in postsecondary vocational education, parental support for postsecondary education, and occupational and educational aspirations.

It is important that statistical analyses be conducted using software that properly accounts for the complex sampling design of NPSAS. NCES has recently developed new software tools for analysis of complex survey data: QuickStats allows users to generate simple tables and graphs quickly, and PowerStats allows researchers to generate more complex tables and run linear and logistic regressions. Data from NPSAS:04 and NPSAS:08 can be analyzed with QuickStats and PowerStats. The Data Analysis System (DAS) may be used for analyses using NPSAS data prior to 2003-04. For information on other software packages and

statistical strategies useful for analysis of complex survey data, see appendix M of *the 2004 National Postsecondary Student Aid Study (NPSAS:04) Full-Scale Methodology Report* (Cominole et al. 2006).

3. KEY CONCEPTS

Described below are several key concepts relevant to financial assistance for postsecondary education. For additional NPSAS terms, refer to the glossaries in published statistical analysis reports and database documentation.

Institution Type. A derived variable that combines information on the level and control of the NPSAS institution. Institution level concerns the institution's length of program and highest degree offering and is defined as less than 2-year, 2- to 3-year, 4-year nondoctorate, or 4-year doctorate (including first-professional degree). Institution control concerns the source of revenue and control of operations and is defined as public, private not-for-profit, or private for-profit.

Attendance Pattern. A student's intensity and persistence of attendance during the NPSAS year. Intensity refers to whether the student attended full- or part-time while enrolled. Persistence refers to the number of months a student is enrolled during the year. Students are considered to be enrolled for a full year if they are enrolled 8 or more months during the year. Months do not have to be contiguous or at the same institution, and students do not have to be enrolled for a full month to be considered enrolled for that month. In surveys prior to NPSAS:96, a full year was defined as 9 or more months.

Dependency Status. If a student is considered financially dependent, the parents' assets and income are considered in determining aid eligibility. If the student is financially independent, only the student's assets are considered, regardless of the relationship between student and parent. The federal definition of dependency status has remained the same in each administration of NPSAS from academic year 1995–96 through 2007–08. All students who are age 24 or over in the fall term of the NPSAS year are considered to be independent. Students under 24 who are married, have legal dependents other than a spouse, are veterans, or are an orphan or ward of the courts are also independent. Other undergraduates under age 24 are considered to be dependent, unless they can demonstrate to a financial aid officer that they do not receive any financial support from their parents. All

graduate and professional students in programs beyond a bachelor's degree are considered to be independent.

Expected Family Contribution (EFC). The amount of financial support for the student's undergraduate education that is expected to be provided by the student's family, or directly by the student if the student is financially independent. This amount is used to determine financial need and is based upon dependency status (see above definition), family income and assets, family size, and the number of children in the family enrolled in postsecondary education. This information is gathered from the Department of Education's financial aid system (the Central Processing System), or it is imputed from student income.

Title IV Financial Aid. The sum of the following types of federal aid: Pell Grants, Supplemental Educational Opportunity Grants (SEOG), Perkins Loans, Stafford Loans, PLUS Loans, and Federal Work Study. NPSAS:08 also included Academic Competitiveness Grants and National SMART Grants.

4. SURVEY DESIGN

Target Population

The *target population* is defined as all eligible students enrolled at any time during the federal financial aid award year in postsecondary institutions in the United States or Puerto Rico that have a signed Title IV participation agreement with the U.S. Department of Education (thus making these institutions eligible for federal student aid programs). The population includes both students who receive aid and those who do not receive aid. It excludes students who are enrolled solely in a general equivalency diploma (GED) program or are concurrently enrolled in high school.

Sample Design

The design for the NPSAS sample involves the selection of a nationally representative sample of postsecondary education institutions and students within these institutions. Prior to NPSAS:96, a geographic-area-clustered, three-stage sampling design was used to: (1) construct geographic areas from three-digit postal zip code areas; (2) sample institutions within the geographic sample areas; and (3) sample students within sample institutions. Beginning with NPSAS:96, the sample design eliminated the first stage of sampling (geographic area construction), thereby increasing the precision of the estimates. Institutional and student sample sizes vary somewhat from cycle to cycle depending on study design and budget

considerations at the time. Approximately 1,960 institutions and 137,800 students were initially selected for participation in NPSAS:08.

Institution Sample. To be eligible for inclusion in the institution sample, an institution must satisfy the following conditions: (1) offer an education program designed for persons who have completed secondary education; (2) offer an academic, occupational, or vocational program of study lasting at least 3 months or 300 clock hours; (3) offer access to the general public; (4) offer more than just correspondence courses; (5) be located in the 50 states, the District of Columbia, or Puerto Rico; and (6) be other than a U.S. Service Academy. Also, beginning with NPSAS:2000, eligible institutions must have a signed Title IV participation agreement with the U.S. Department of Education.

The institution-level sampling frame is constructed from the Integrated Postsecondary Education Data System (IPEDS) Institutional Characteristics (IC) and header files (see chapter 12). Although the institutional sampling strata have varied across NPSAS administrations, in all years the strata are formed by classifying institutions according to control (public or private), level, and highest degree offering. The NPSAS:04 strata were also formed by Carnegie classification and state, and the NPSAS:08 strata were also formed by state. A stratified sample of institutions is then selected with probability proportional to size. School enrollment, as reported in the IPEDS, defines the measure of size; enrollment is imputed if missing in the IPEDS file. Institutions with expected frequencies of selection greater than unity are selected with certainty. The remainder of the institution sample is selected from the other institutions within each stratum.

Additional implicit stratification is accomplished within each institutional stratum by sorting the stratum sampling frame in a serpentine manner. Implicit stratification allows the approximation of proportional representation of institutions on additional measures. In NPSAS:08, the implicit strata were formed using (1) Historically Black Colleges and Universities (HBCU) indicator; (2) Hispanic-Serving Institutions (HSI) indicator; (3) Carnegie classifications of postsecondary institutions; (4) the Office of Business Economics (OBE) Region from the IPEDS header file (Bureau of Economic Analysis of the U.S. Department of Commerce Region); and (5) an institution measure of size. Further implicit stratification was done for the State University of New York (SUNY) and City University of New York (CUNY) systems in New York, the state and technical colleges in Georgia, and the state universities in California.

In NPSAS:04, the implicit strata were formed using (1) the HBCU indicator; (2) Carnegie classifications (3) OBE Region; and (4) an institution measure of size. In NPSAS:2000, for less-than-2-year, 2-year, and private for-profit institutions, the implicit strata were formed using (1) institutional level of offering (where levels had been collapsed to form strata); (2) the OBE Region from the IPEDS header file; (3) the Federal Information Processing Standard (FIPS) state code; and (4) an institution measure of size. For public 4-year and private not-for-profit 4-year institutions, the implicit strata were formed using (1) Carnegie classifications of institutions or groupings of Carnegie classifications; (2) the HBCU indicator; (3) the OBE Region from the IPEDS header file; and (4) an institution measure of size. In NPSAS:96, the implicit strata were formed using (1) institutional level of offering; (2) the IPEDS IC-listed U.S. Department of Commerce Region; and (3) an institution measure of size. Selected institutions are asked to verify their IPEDS classification (institutional control and highest level of offering) and the calendar system that they use (including dates that terms start).

The NPSAS:08 institution sampling frame was constructed from the 2004–05 IPEDS IC, header, and Fall Enrollment files and, because NPSAS:08 also serves as the base-year survey for a longitudinal cohort of baccalaureate recipients (i.e., B&B), the 2004–05 IPEDS Completions file. A total of 1,960 of the 6,780 institutions in the survey universe were selected for the NPSAS:08 sample. The sampled institutions were stratified into 22 national strata and 24 state strata based on institutional control, institutional offering, and highest degree offering.

The institutional sampling frame for NPSAS:04 was constructed from the 2000–01 IPEDS IC, header, and Fall Enrollment files; 1,670 of the 7,710 institutions in the survey universe were selected for NPSAS:04. The sampled institutions were stratified into 22 national strata and 36 state strata based on institutional control, institutional offering, highest degree offering, and Carnegie classification. The institutional sampling frame for NPSAS:2000 was constructed from the 1998–99 IPEDS IC file and, because NPSAS:2000 also served as the base-year survey for a B&B cohort, the 1996–97 IPEDS Completions file. Eligible institutions were partitioned into 22 institutional strata based on institutional control, highest level of offering, and percentage of baccalaureate degrees awarded in education. Approximately 1,100 institutions were initially selected for NPSAS:2000. As noted above, NPSAS:96 was the first administration of NPSAS to employ a single-stage institutional sampling design, no longer constructing geographic areas as the initial step.

The sampling frame for NPSAS:96 was the 1993–94 IPEDS IC file; 9,470 of the 10,650 institutions in the file were deemed eligible for NPSAS:96. Eligible institutions were stratified into nine strata based on institutional control and highest level of offering.

Student Sample. Full- and part-time students enrolled in academic or vocational courses or programs at eligible institutions, and not concurrently enrolled in a high school completion program, are eligible for inclusion in NPSAS. NPSAS:87 sampled students enrolled in the fall of 1986. Beginning with NPSAS:90, students enrolled at any time during the year were eligible for the study. This design change provided the data necessary to estimate full-year financial aid awards.

Sampled institutions are asked to provide student enrollment lists with the following information for each student: full name, identification number, Social Security number, educational level, an indication of first-time beginning student (FTB) status or baccalaureate reciprocity (depending on the longitudinal cohort being launched), major, and, beginning with NPSAS:04, a local address, a local telephone number, a campus e-mail, a permanent address, a permanent phone number, and a permanent e-mail. Additionally, date of birth and class level of undergraduates were requested for NPSAS:08. The student sample is drawn from these lists, which were provided by 1,730 of 1,940 eligible institutions in NPSAS:08; 1,360 of 1,630 eligible institutions in NPSAS:04; 1,000 of the nearly 1,100 eligible institutions in NPSAS:2000; and 840 of 900 eligible institutions in NPSAS:96.

Basic student sample. Students are sampled on a flow basis (using stratified systematic sampling) from the lists provided by institutions. Steps are taken to eliminate both within- and cross-institution duplication of students. NPSAS classifies students by educational level as undergraduate, master's, doctor's, other graduate, or first-professional students. For the purpose of defining the third cohort of B&B, NPSAS:08 classified undergraduates into (1) business major potential baccalaureate recipients, (2) other potential baccalaureate recipients, and (3) other undergraduates. Potential baccalaureate recipients were further stratified by those who are science, technology, engineering, or mathematics (STEM) majors and all other majors and by SMART Grant recipients and non-recipients. Other undergraduates were further stratified by SMART Grant recipients, Academic Competitiveness Grant (ACG) recipients, and non-recipients. The categories for potential baccalaureate recipients and other undergraduates were then stratified

by in-state and out-of-state status. NPSAS:04 stratified undergraduate students as (1) potential FTBs and (2) other undergraduates. These two categories were then stratified by in-state and out-of-state status. The FTBs in NPSAS:04 make up the third cohort of BPS. For the purpose of defining the second cohort of B&B, NPSAS:2000 also broke down undergraduates into: (1) business major baccalaureate recipients, (2) other baccalaureate recipients, and (3) other undergraduates. In NPSAS:96, FTBs, or students beginning their postsecondary education during one of the terms of the NPSAS:96 sample year composed the second cohort of the BPS, with the data collected serving as the base-year data for the subsequent longitudinal studies.

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.

In NPSAS:08, adjustments to the initial sampling rates resulted in some additional variability in the student sampling rates and, hence, in a likely increase in survey design effects. Such rate adjustment procedures have generally proven effective. The overall sample yield in NPSAS:08 was close to expected (137,800 students vs. the target of 138,000). The student sample consisted of 29,470 potential baccalaureate recipients; 95,650 other undergraduates; 6,530 master's students; 3,760 doctoral students; 470 other graduate students; and 1,920 first-professional students.

Initial sampling rates were adjusted in NPSAS:04, NPSAS:2000, and NPSAS:96, as well. The overall sample yield in NPSAS:04 was less than expected (109,210 students vs. the target of 121,680). The student sample consisted of 49,410 FTBs; 47,680 other undergraduates; 3,720 master's students; 4,950 doctoral students; 1,660 other graduate students; and 1,790 first-professional students. (See "FTB sample" below for more detail on the sampling of FTBs.) In NPSAS:2000, the overall sample yield was very close to expected (70,230 students vs. the target of 70,270). The student sample consisted of 57,600 undergraduates; 5,960 master's students; 3,950 doctoral students; 1,370 other graduate students; and 1,350 first-professional students. In NPSAS:96, the overall sample yield was actually greater than expected (63,620 students vs. the target of 59,510). The student sample consisted of 23,610 potential FTBs; 27,540

other undergraduates; 9,690 graduate students; and 2,780 first-professional students.

Student interview sample. NPSAS:04 was the first administration of NPSAS to offer the option of self-administration of the student interview via the Web, in addition to computer-assisted telephone interviewing (CATI). In NPSAS:08, these procedures resulted in 95,360 completed interviews, about two-thirds of which were completed by self-administration and one-third by CATI. In NPSAS:04, these procedures resulted in 62,220 completed interviews, 28,710 of which were completed by self-administration and 33,510 by CATI.

In NPSAS:2000, student interviews were conducted primarily by CATI. To help reduce the level of nonresponse to CATI, computer-assisted personal interviewing (CAPI) procedures, using field interviewers, were used for the first time. Of the 66,340 eligible students in the initial CATI sample, some 51,010 were located for CATI interviewing, while 11,960 were “unlocatable” in CATI and were eligible for field locating and/or CAPI; the rest were either ineligible or excluded.

Due to budget limitations, NPSAS:96 attempted CATI interviews for only a subsample of the basic student sample. A two-phase, nonrespondent follow-up subsampling design was used to maximize the yield of completed student interviews obtained from the CATI subsample while achieving acceptable response rates. These procedures resulted in 51,200 students being selected for Phase 1 of the CATI interviewing. A sample of nonrespondents to Phase 1 was selected for Phase 2 with specified rates based on the outcome of the Phase 1 efforts and the seven sampling strata; 25,770 students were selected for Phase 2.

Parent interview subsample. In NPSAS:96, a subsample of students selected for the student interview was also designated for parent interviews. In the Phase 1 CATI subsample of NPSAS:96, students were designated for parent interviews if they met one of the following criteria: they were dependent undergraduate students not receiving federal aid; they were dependent undergraduate students receiving federal aid whose parents’ adjusted gross income was not available; or they were independent undergraduate students who were 24 or 25 years old on December 31, 1995. All 8,800 students who fell into one of these groups were sampled for parent interviews. The parent interview was discontinued after NPSAS:96.

Longitudinal Study Samples. In NPSAS:90, a new longitudinal component collected baseline data for students who started their postsecondary education in

the 1989–90 academic year. These students were followed over time in BPS, with the first follow-up in 1992. Beginning postsecondary students from NPSAS:96 and NPSAS:04 were also followed up and surveyed two and five years later. Similarly, NPSAS:93, NPSAS:2000, and NPSAS:08 provided baseline data for students who received baccalaureates in the 1992–93, 1999–2000, and 2007–08 academic years, respectively. These graduates have been followed over time as part of B&B. The next cohort of BPS will be identified in NPSAS:12 and follow-up studies will be conducted in 2014 and 2017.

BPS sample. Final FTB status is determined based on data from several sources: enrollment lists, student record data, student interviews, loan history data from NSLDS, and enrollment history data from NSC.

First, however, institutions are asked to identify potential FTBs in the student lists they provide. However, the information available to institutions is often insufficient for determining an accurate count of FTBs; for example, students transferring from another institution without transfer credits might mistakenly be counted as FTBs. In NPSAS:04, FTB sampling rates were based primarily on the BPS experience in NPSAS:96, which indicated that the number of students listed as potential FTBs who were not actual FTBs far exceeded the number of students not identified as potential FTBs who later proved to be FTBs. As in the past, the NPSAS:04 longitudinal cohort was oversampled to support the next round of BPS.

B&B sample. B&B:08 is the third cohort in the B&B series and the second to gather college transcript data on such a longitudinal sample. The first B&B longitudinal cohort was identified in NPSAS:93 and consisted of students who received their bachelor’s degree in academic year 1992–93. NPSAS:93 provided the base-year data, and students were interviewed in an initial follow-up in 1994; this follow-up also included a collection of transcript data. The 1993 cohort was surveyed again in 1997 and 2003. The first transcript collection was conducted as part of B&B:93/94. The second B&B cohort was selected from NPSAS:2000, which became the base year for a single follow-up in spring 2001.

The B&B:08 sample consists of students eligible to participate in the NPSAS:08 full-scale study who completed requirements for the bachelor’s degree in the 2007–08 academic year. The first follow-up study (B&B:08/09) involved two data collection components. First, postsecondary transcripts were collected from each of the NPSAS institutions where sample members

completed their program requirements. It was followed by an interview focusing on plans after degree completion.

B&B status is determined on the basis of multiple sources: student enrollment lists from institutions, student record collection, student interviewing, and transcripts (in B&B:93/94 and B&B:08/09).

Data Collection and Processing

Reference Dates. Data are collected for the financial aid award year, which spans from July 1 of one year through June 30 of the following year.

Data Collection. NPSAS involves a multistage effort to collect information related to student aid. The first stage involves collecting applicants from the U.S. Department of Education's Central Processing System (CPS).

Another stage of data collection involves collecting information from the student's records at the school from which he or she was sampled. Since NPSAS:93, these data have been collected through a computerized system, which facilitates both the collection and transfer of information to subsequent electronic systems. To reduce respondent burden, several data elements are preloaded into the records collection system records prior to collection at the institution. These include student demographics, Student Aid Report information on federal financial aid applicants, and nonfederal aid common to a particular institution. Institutional Coordinators are given the option of having their staff or contractor field data collectors perform the data collections. About 66 percent of the institutions in NPSAS:04, as well as 74 percent in NPSAS:2000, and 57 percent in NPSAS:96 chose self-administration, using a computer-based program to provide student record data. In NPSAS:08, very few institutions (about 1 percent) chose the field interviewer option for completion. Approximately 63 percent chose self-administration, and 36 percent provided the student record data via electronic files (primarily large institutions or systems).

In the student interview stage of data collection, information on family characteristics, demographic characteristics, and educational and work experiences and aspirations is obtained from students. Student and parent paper questionnaires were used to collect this information in NPSAS:87, but beginning with NPSAS:90, student and parent data were collected by computer-assisted-telephone-interviewing (CATI). Parent interviews, however, were not conducted after NPSAS:96. NPSAS:04 was the first administration of NPSAS to offer students the opportunity to participate

by self-administered web surveys or by CATI, an approach that continued in NPSAS:08.

The NPSAS:08 student interview contained six sections and was programmed for both self-administered web surveys and CATI. An abbreviated interview was developed that contained a subset of key items from the main interview. This version was used during refusal conversion toward the end of data collection. The abbreviated interview was also translated into Spanish for telephone administration to Spanish speakers with limited English proficiency.

The student interview included an online coding system used to obtain IPEDS information for postsecondary institutions (other than the NPSAS institution from which the student was sampled) that the student attended during the same year. After the respondent or interviewer provided the state and city in which the institution is located, the online coding system displayed the list of all postsecondary institutions in that location, and the respondent/interviewer could select the appropriate institution. Upon selection, the name of the institution, as well as selected IPEDS variables (institutional level, control), was inserted into the database.

An assisted coding system was also developed to facilitate the coding of major/field of study into categories that can be mapped to values in NCES's Classification of Instructional Programs (CIP).

The data collection design for student interviewers has evolved over time. In NPSAS:2000, student interviews were conducted primarily by telephone, and occasionally in person, using CATI/CAPI technology. In NPSAS:04 and NPSAS:08 abbreviated interviews were developed to convert refusals toward the end of data collection, and an online coding system was used, to obtain IPEDS information. NPSAS:96 differed from other cycles in that only a subsample of the initial student sample was selected for the interview stage (in order to reduce overall costs for the study).

The final stage of data collection involves retrieval of additional Student Aid Report (ISAR) data (for the academic year beyond the NPSAS year) from the Central Processing System (CPS), data on Pell Grant applications for the NPSAS year from the Pell Grant file, and data on recipients of Academic Competitiveness Grants and SMART Grant, as well as loan histories of applicants for federal student loans from the National Student Loan Data System (NSLDS). All of these files are maintained by the U.S. Department of Education. Additional data for the NPSAS sample are obtained from other sources as

well, including test score data from the ACT and College Board (SAT), enrollment data from the National Student Clearinghouse (NSC), and data from the Veterans Administration.

Editing. Initial editing takes place during data entry. The web-based data collection systems used for the student interview and student record collection have built-in quality control checks to notify users of invalid or out-of-range entries. For example, the student records collection system will notify the user of any student records that are incomplete (and the area of incompleteness) and any records that have not yet been accessed. A pop-up screen provides full and partial completion rates for institutional record collection. Data are subjected to edit checks for completeness of critical items.

Following the completion of data collection, all student record and interview data are edited to ensure adherence to range and consistency checks. Range checks are summarized in the variable descriptions contained in the data files. Inconsistencies, either between or within data sources, are resolved in the construction of derived variables. Items are checked for validity by comparing the student interview responses to information available in institutional records. Missing data codes characterize blank fields as don't know/data not available; refused; legitimate skip; data source not available (not applicable to the student); or other.

Estimation Methods

Weighting is used to adjust NPSAS data to national population totals and to adjust for unit nonresponse. Imputation is used to compensate for item nonresponse and mitigate associated bias.

Weighting. For the purpose of obtaining nationally representative estimates, sample weights are created for both the institution and the student. Additional weighting adjustments, including nonresponse and poststratification adjustments, compensate for potential nonresponse bias and frame errors (differences between the survey population and the ideal target population). The weights are also adjusted for multiplicity at the institution and student levels and for unknown student eligibility.

In NPSAS:08 and NPSAS:04, the institution weight was computed first and then used as a component of the student weight. Student weights were calculated as the product of the total of 10 weight components for NPSAS:08 and 13 weight components for NPSAS:04, each representing either a probability of selection or a weight adjustment.

In NPSAS:2000, statistical analysis weights were computed for two sets of respondents: CATI respondents and other study respondents. These were calculated as the product of 13 weight components, again representing either a probability of selection or a weight adjustment.

In NPSAS:96, study weights were applied to students who responded to specified student record or CATI data items. Study and CATI weights were calculated as the product of 14 weight components. First-time beginning students (FTBs) whose first postsecondary institution was not the NPSAS sample institution were not included in BPS. To compensate for their exclusion, FTB weights were computed by making a final weighting class adjustment to the CATI weights by institution type. All adjustment factors were close to one, ranging from 1.00 to 1.02. The development of the student record weight components was similar to the development of the study and CATI weight components—except that the student record components applied to a different set of respondent data and did not include the CATI weight components.

Imputation. When the editing process (including logical imputations) is complete, the remaining missing values for all variables with missing data are statistically imputed in order to reduce the bias of survey estimates caused by missing data. Variables are imputed using a weighted sequential hot-deck procedure whereby missing data are replaced with valid data from donor records that match the recipients with respect to the matching criteria.

In NPSAS:08 and NPSAS:04, variables requiring imputation were not imputed simultaneously. However, some variables that were related substantively were grouped together into blocks, and the variables within a block were imputed simultaneously. Basic demographic variables were imputed first using variables with full information to determine the matching criteria. The order in which variables were imputed was also determined to some extent by the substantive nature of the variables. For example, basic demographics (such as age) were imputed first and these were used to process education variables (such as student level and enrollment intensity), which, in turn, were used to impute financial aid variables (such as aid receipt and loan amounts).

For variables with less than 5 percent missing data, the variables used for matching criteria were selected based on prior knowledge about the dataset and the known relationships between the variables. For variables with more than 5 percent missing data, a

statistical process called Chi-Squared Automatic Interaction Detection (CHAID) was used to identify the matching criteria that were most closely related to the variables being imputed.

In NPSAS:2000, the remaining missing values for 23 analysis variables were imputed statistically; most of the variables were imputed using a weighted hot-deck procedure. To implement the weighted hot-deck procedure, imputation classes and sorting variables relevant to each item being imputed were defined. If more than one sorting variable was chosen, a serpentine sort was performed where the direction of the sort (ascending or descending) changed each time the value of a variable changed. The serpentine sort minimized the change in the student characteristics every time one of the variables changed its value.

The respondent data for five of the items being imputed were modeled using a CHAID analysis to determine the imputation classes. These items were parent income (imputed for dependent students only), student income (imputed for independent students only), student marital status, local residence, and a dependents indicator.

A CHAID analysis was performed on these variables because of their importance to the study and the large number of candidate variables available with which to form imputation classes. Also, for the income variables, trying to define the best possible imputation classes was important due to the large amount of missing data. The CHAID analysis divided the respondent data for each of these five items into segments that differed with respect to the item being imputed. The segmentation process first divided the data into groups based on categories of the most significant predictor of the item being imputed. It then split each of these groups into smaller subgroups based on other predictor variables. It also merged categories of a variable that were found insignificant. This splitting and merging process continued until no more statistically significant predictors were found (or until some other stopping rule was met). The imputation classes were then defined from the final CHAID segments.

In NPSAS:96, some 22 analysis variables were statistically imputed. All variables, with the exception of the estimated family contribution were imputed using a weighted hot-deck procedure. First, the respondent data for six key items were modeled using a CHAID analysis to determine the imputation classes. These items were race/ethnicity, parent income (for dependent students only), student income, student marital status, a dependents indicator, and number of

dependents. Then, 21 items imputed by the weighted hot-deck approach. The remaining 15 items were: parent family size, parent marital status, student citizenship, student gender, student age, dependency status, local residence, type of high school degree, high school graduation year, fall enrollment indicator, attendance intensity in fall term, student level in last term, student level in first term, degree program in last term, and degree program in first term. Only four of these 15 items had more than 5 percent of their cases imputed: parent family size (18 percent), parent marital status (16 percent), high school degree (5 percent), and high school graduation year (5 percent).

Recent Changes

NPSAS:04 included important new features in sample design and data collection. For the 2004 study, NPSAS and NSOPF were conducted together under one contract: the 2004 National Study of Faculty and Students (NSoFaS:04). There has historically been a great deal of overlap in the institution samples for these two studies since the target populations for both involve postsecondary institutions. To minimize institutional burden, and to maximize efficiency in data collection procedures, the two studies were combined.

Another important change in NPSAS:04 was that it was designed to provide state-level representative estimates for undergraduate students within three institutional strata—public 2-year institutions, public 4-year institutions, and private not-for-profit 4-year institutions—in 12 states that were categorized into three groups based on population size (four large, four medium, and four small): California, Connecticut, Delaware, Georgia, Illinois, Indiana, Minnesota, Nebraska, New York, Oregon, Tennessee, and Texas. NPSAS:08 was designed to provide state-level representative estimates for undergraduates within four institutional strata—public 2-year institutions, public 4-year institutions, private not-for-profit 4-year institutions, and private for-profit degree-granting 2-year-or-more institutions. In NPSAS:08, state-level estimates were provided for California, Texas, New York, Illinois, Georgia, and Minnesota.

Also of importance is the inclusion of an option for self-administration via the Web of the student interview in NPSAS:04. This option was provided in addition to CATI interviews, which were employed in past rounds of NPSAS. Regardless of completion mode, a single web-based instrument was employed.

NPSAS:08 was again conducted independently of the NSOPF study but carried along all of the technical innovations and design enhancements of prior rounds. It was also designed to provide state-level

representative estimates for undergraduates within four institutional strata—public 2-year institutions, public 4-year institutions, private not-for-profit 4-year institutions, and private for-profit degree-granting 2-year-or-more institutions. In NPSAS:08, state-level estimates were provided for California, Texas, New York, Illinois, Georgia, and Minnesota.

The most significant enhancement to NPSAS:2000 involved the development and implementation of a new web-based system for use in the student record abstraction process. This web-based software had an improved user interface compared to the NPSAS:96 system and addressed several of the student records collection issues raised during NPSAS:96 (e.g., insufficient computer memory, failures during diskette installation and virus scanning, and lack of information regarding institutions' progress during data collection).

Other changes in NPSAS:2000 included: adding a series of questions about financial aid, as a new way of obtaining information about financial assistance received from sources other than federal student aid; adding several new items intended to capture the increased use of technology among students; and adding a new eligibility requirement for postsecondary institutions—to have a signed Title IV participation agreement with the U.S. Department of Education during the NPSAS academic year.

NPSAS:96 introduced important new features in sample design and data collection. It was the first NPSAS to employ a single-stage institutional sampling design (no longer using an initial sample of geographic areas and institutions within geographic areas). This design change increased the precision of study estimates. NPSAS:96 was also the only NPSAS to select a subsample of students for telephone interviews and to take full advantage of administrative data files. Through file matching/downloading arrangements with the Department of Education's Central Processing System, the study obtained financial data on federal aid applicants for both the NPSAS year and the following year. Through similar arrangements with the National Student Loan Data System, full loan histories were obtained. Cost efficiencies were introduced through a dynamic two-phase sampling of students for CATI, and the quality of collected institutional data was improved through an enhanced student records collection procedure. New procedures were also introduced to broaden the base of postsecondary student types for whom telephone interview data could be collected: the use of Telephone Display for the Deaf technology to facilitate telephone communications with hearing-impaired students, and a separate Spanish translation interview for administration to students with limited

English language proficiency.

Future Plans

The next NPSAS data collection (NPSAS:12) is scheduled for 2012 and will serve as the base for the fourth cohort of BPS (BPS:12/14, BPS:12/17).

5. DATA QUALITY AND COMPARABILITY

Every major component of the study is evaluated on an ongoing basis so that necessary changes can be made and assessed prior to task completion. Separate training is provided for CADE and CATI data collectors, and interviewers are monitored during CATI operations for deviations from item wording and skipping of questions. The CATI system includes online coding of postsecondary education institution and major field of study, so that interviewers can request clarification or additional information at the time of the interview. Quality circle meetings of interviewers, monitors, and supervisors provide a forum to address work quality, identify problems, and share ideas for improving operations and study outcomes. Even with such efforts, however, NPSAS—like every survey—is subject to various types of errors, as described below.

Sampling Error

Because NPSAS samples are probability-based samples rather than simple random samples, simple random sample techniques for estimating sampling error cannot be applied to these data. Two procedures for estimating variances, the Taylor Series linearization procedure and the Jackknife replicate procedure, are available for use with NPSAS:96 data. The Taylor Series linearization procedure and the balanced repeated replication (BRR) procedure are available on the NPSAS:2000 data files. The Taylor Series linearization procedure and the bootstrap replication procedure are available on the NPSAS:08 and NPSAS:04 data files.

Taylor Series. For NPSAS:96, analysis strata and replicates for three separate datasets were defined: all students, all undergraduate students, and all graduate/first-professional students. For NPSAS:2000, analysis strata and replicates for four separate datasets were defined: all students, all undergraduate students, all graduate/first-professional students, and all baccalaureate recipients. For NPSAS:08 and NPSAS:04, analysis strata and replicates were defined for the combined set of all students.

Jackknife. In NPSAS:96, the Jackknife analysis strata were defined to be the same as the analysis strata defined for the Taylor Series procedure. Based on the

Jackknife strata and replicate definitions, seven replicate weight sets were created—one set for the CADE weights and three sets each for the study and CATI weights. The study and CATI sets included separate replicate weights for all students, undergraduates only, and graduates only.

Balanced Repeated Replication. The BRR procedure is an alternative variance estimation procedure that computes the variance based on a balanced set of pseudo-replicates. To form pseudo-replicates for BRR variance estimation, the Taylor Series analysis strata were collapsed. The number of Taylor Series analysis strata and primary sampling units were different for all students combined, graduates/first-professionals, and baccalaureate recipients, so the collapsing was done independently and, hence, with different results. Replicate weights were created, associated with the two analysis weights: study weights and CATI weights. Thus, a total of five replicate weight sets were created for NPSAS:2000. For the study weights, this included separate replicate weights for all students and for graduate/first-professional students only; for the CATI weights, this included separate replicate weights for all students, graduate/first-professional students only, and baccalaureates only.

Bootstrap. In NPSAS:08 and NPSAS:04, a vector of bootstrap sample weights was added to the analysis file to facilitate computation of standard errors for both linear and nonlinear statistics. These weights are zero for units not selected in a particular bootstrap sample; weights for other units are inflated for the bootstrap subsampling. The initial analytic weights for the complete sample are also included for the purpose of computing the desired estimates. The vector of replicate weights allows for computing additional estimates for the sole purpose of estimating a variance. The replicate in NPSAS:08 were produced using methodology adapted from Kott (1998) and Flyer (1987) and those in NPSAS:04 weights were produced using a methodology and computer software developed by Kaufman (2004). NPSAS:08 included 200 replicate weights.

Nonsampling Error

Coverage Error. Because the institutional sampling frame is constructed from the IPEDS IC file, there is nearly complete coverage of the institutions in the target population. Student coverage, however, is dependent upon the enrollment lists provided by the institutions. In NPSAS:08, approximately 1,730 of the 1,940 eligible institutions provided student lists or databases that could be used for sample selection. A total of 1,360 of the 1,630 eligible institutions in NPSAS:04; 1,000 of the nearly 1,100 eligible

institutions in NPSAS:2000; and 840 of the 900 eligible institutions in NPSAS:96 provided student lists or databases that could be used for sample selection.

Several checks for quality and completeness of student lists are made prior to actual student sampling. In NPSAS:96 and NPSAS:04, *completeness checks* failed if (1) FTBs were not identified (unless the institution explicitly indicated that no such students existed) or (2) student level (undergraduate, graduate, or first professional) was not clearly identified. In NPSAS:2000 and NPSAS:08, completeness checks failed if (1) baccalaureate recipients/graduating seniors were not identified, (2) student level was not clearly identified, or (3) major fields of study or CIP codes were not clearly identified for baccalaureates.

Quality checks are performed by comparing the unduplicated counts (by student level) in institution lists with the nonimputed unduplicated counts in IPEDS IC files. Institutions failing these checks were called to rectify the problems before sampling began. These checks were performed through the 2007–08 administration. In NPSAS:08, after any necessary revisions, all but seven lists submitted were usable for selecting the student sample; in NPSAS:04, all but two lists submitted were usable for selecting the student sample.

Nonresponse Error. The response rates described in this section refer to NPSAS:08.

Unit nonresponse. Some 90 percent (weighted) of eligible sample institutions provided student enrollment lists. The total weighted student response rate was 96 percent. Table 8 provides a summary of response rates across NPSAS administrations.

There are several types of participation/coverage rates in NPSAS. In NPSAS:08, institution participation rates were generally lowest among for-profit institutions and institutions whose highest offering is less than a 4-year program.

For the *student record abstraction* phase of the study (referred to as CADE), institution completion rates were 94 percent (weighted) for institutions choosing field-CADE, 96 percent for institutions choosing self-CADE, and 98 percent for data-CADE (submitting data via electronic files). CADE completion rates varied by type of institution, ranging from 92 percent for private not-for-profit less-than-2-year institutions to 100 percent for private not-for-profit less-than-4-year institutions. Overall, the student-level CADE completion rate (the percentage of NPSAS-eligible sample members for whom a completed CADE record

was obtained) was 96 percent (weighted). Weighted student-level completion rates ranged from 87 percent for private, not-for-profit, less-than-4-year institutions to 99 percent for public, 4-year, non-doctorate-granting institutions. Weighted completion rates by student type were 97 percent for undergraduate and 98 percent for graduate and first-professional students.

the type of data it maintains for its students. Because not all desired information is available at every institution, the CADE software allows entry of a “data not available” code. In NPSAS:08, item response rates student record abstraction were very high overall. Two items had low response rates: marital status (46 percent) and additional phone numbers (17 percent). Thus, student records frequently lack these items. The

Table 8. Weighted response rates for selected NPSAS administrations.

Component	Institution list participation rate	Student response rate	Overall
NPSAS:96			
Student survey (analysis file ¹)	91	96	88
Student survey (student interview)	91	76	70
NPSAS:2000			
Student survey (analysis file ¹)	91	97	89
Student survey (student interview)	91	72	66
NPSAS:04			
Student survey (analysis file ¹)	80	91	72
Student survey (student interview)	80	71	56
NPSAS:08			
Student survey (analysis file ¹)	90	96	86
Student survey (student interview)	90	71	64

—Not available.

¹NPSAS analysis file contains analytic variables derived from all NPSAS data sources (including institutional records and extant data sources) as well as selected direct student interview variables.

NOTE: The student interview response rates for NPSAS:96 and NPSAS:2000 are for CATI interviews only. The response rates for student interviews in NPSAS:04 include all interview modes.

SOURCE: Cominole, M.B., Siegel, P.H., Dudley, K., Roe, D., and Gilligan, T. (2006). *2004 National Postsecondary Student Aid Study (NPSAS:04) Full-Scale Methodology Report* (NCES 2006-180). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Riccobono, J.A., Cominole, M.B., Siegel, P.H., Gabel, T.J., Link, M.W., and Berkner L.K. (2001). *National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000) Methodology Report* (NCES 2002-152). National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. 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). National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Wei, C.C., Berkner, L., He, S., Lew, S., Cominole, M., and Siegel, P. (2009). *2007–08 National Postsecondary Student Aid Study (NPSAS:08): Student Financial Aid Estimates for 2007–08: First Look* (NCES 2009-166). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Overall, 95,360 of approximately 132,800 eligible sample members (72 percent unweighted) completed either a full or partial NPSAS:08 student interview. The weighted response rate was 71 percent overall and ranged from 56 percent for private, for-profit, less-than-2 year institutions to 77 percent for public, 4-year, doctorate-granting institutions.

Item nonresponse. Each NPSAS institution is unique in

other items had response rates ranging from 73 percent to just below 100 percent.

Missing data for items in the NPSAS:08 student interview were associated with several factors: (1) a true refusal to answer, (2) an unknown answer, (3) confusion over the question wording or response options, or (4) hesitation to provide a “best guess” response. Item nonresponse rates were based on the

number of interview respondents to whom the item was applicable and of whom it was asked. Overall, item-level nonresponse rates were low, with only 23 items out of approximately 500 having more than 10 percent of data missing

Measurement Error. Due to the complex design of NPSAS, there are several possible sources of measurement error, as described below.

Sources of response. Each source of information in NPSAS has both advantages and disadvantages. While students are more likely than institutions to have a comprehensive picture of education financing, they may not remember or have records of exact amounts and sources. This information may be more accurate in student financial aid records and government databases since it is recorded at the time of application for aid.

Institutional records. While financial aid offices maintain accurate records of certain types of financial aid provided at their own institution, these records are not necessarily inclusive of all support and assistance. They may not maintain records of financial aid provided at other institutions attended by the student, and they may not include employee educational benefits and institutional assistantships, which are often treated as employee salaries. These amounts are assumed to be underreported.

Government databases. Federal aid information can only be extracted from federal financial aid databases if the institution can provide a valid Social Security number for the student. It is likely that there is some undercoverage of federal aid data in NPSAS.

CATI question delivery and data entry. Any deviation from item wording that changes the intent of the question or obscures the question meaning can result in misinterpretation on the part of the interviewee and an inaccurate response. CATI entry error occurs when the response to a question is recorded incorrectly. Measures of question delivery and data entry are used for quality assurance monitoring. Due to ongoing monitoring of student telephone interviews, problems are usually detected early and the CATI interviewers are retrained, if necessary. Overall error rates in NPSAS:08 were low (typically below 2 percent) and within control limits.

Self-administered web survey. Self-administration introduces challenges not experienced with single-mode interviewer-administered surveys. For instance, in self-administration, interviewers are not able to clarify question intent and probe when responses are unclear. Surveys also require modifications to account

for the mixed-mode presentation (i.e., self-administered and CATI) to maintain data quality and to make the interview process as efficient as possible for respondents. These considerations were addressed in the design of the survey, making the two modes as consistent as possible.

Data Comparability

As noted above, important design changes have been implemented in NPSAS across administrations. While sufficient comparability in survey design and instrument was maintained to ensure that comparisons with past NPSAS studies could be made, data from the later studies are not comparable to data from the first study (NPSAS:87) for the following reasons: (1) NPSAS:87 only sampled students enrolled in fall 1986, whereas the later studies sampled from enrollments covering a full year; and (2) NPSAS:87 did not include students from Puerto Rico, whereas NPSAS:90 and later studies have included a small sample of Puerto Rican students. However, users of NPSAS data files can produce estimates for the later studies comparable to those from NPSAS:87 by selecting only students enrolled in the fall and excluding those sampled from Puerto Rico. Note also that the method used to generate the lists of students from which to sample was changed for NPSAS:93 and later NPSAS studies.

Comparisons with IPEDS Data. NCES recommends that readers not try to produce their own estimates (e.g., the percentage of all students receiving aid or the numbers of undergraduates enrolled in the fall who receive federal or state aid) by combining estimates from NPSAS publications with IPEDS enrollment data. The IPEDS enrollment data are for fall enrollment only and include some students not eligible for NPSAS (e.g., those enrolled in U.S. Service Academies and those taking college courses while enrolled in high school).

6. CONTACT INFORMATION

For content information on NPSAS, contact:

Aurora M. D'Amico
Phone: (202) 502-7334
E-mail: aurora.damico@ed.gov

Mailing Address:

National Center for Education Statistics
Institute of Education Sciences
U.S. Department of Education
1990 K Street NW
Washington, DC 20006-5651

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Chapter 15: Beginning Postsecondary Students (BPS) Longitudinal Study

1. OVERVIEW

The Beginning Postsecondary Students (BPS) Longitudinal Study was implemented in 1990 to complement the NCES longitudinal studies of high school cohorts and improve data on participants in postsecondary education. BPS draws its cohorts from the National Postsecondary Student Aid Study (NPSAS), which regularly collects financial aid and other data on nationally representative cross-sectional samples of postsecondary students (see chapter 14). NPSAS provides the base-year data for first-time beginning (FTB) postsecondary students; BPS then follows these students through school and into the workforce.

BPS includes nontraditional (older) students as well as traditional students and is, therefore, representative of *all* beginning students in postsecondary education. By starting with a cohort that has already entered postsecondary education and following it every 2 to 3 years for at least 6 years, BPS can describe to what extent, if any, students who start their education later differ in progress, persistence, and attainment from students who start earlier. In addition to the student data, BPS collects federal financial aid records covering the entire undergraduate period, providing complete information on progress and persistence in school.

The first BPS cohort followed a subset of NPSAS:90 respondents who began their postsecondary education in the 1989-90 academic year. About 8,000 eligible students from NPSAS:90 were included in the first and the second BPS follow-ups in 1992 and 1994. The second BPS cohort was based on NPSAS:96 with the first BPS follow-up in 1998 and the second in 2001. This cohort followed about 10,200 eligible students who started their postsecondary education in the 1995-96 academic year. The third BPS cohort was selected from NPSAS:04 and included students who began their postsecondary education in 2003-04. Approximately 18,600 students were determined to be eligible for inclusion in the third BPS cohort. The first follow-up with these students occurred in 2006 and the second in 2009.

Purpose

To collect data related to persistence in and completion of postsecondary education programs, relationships between work and education, and the effect of postsecondary education on the lives of individuals.

Components

BPS consists of base-year data obtained from NPSAS, follow-up data collected in BPS surveys, student aid data from the U.S. Department of Education, including information from the Federal Student Aid Central Processing System (CPS), the National Student Loan Data System (NSLDS), and program data files, such as Pell and other grant programs; and administrative records available from the other sources (e.g., the National Student Clearinghouse).

LONGITUDINAL SAMPLE SURVEY OF FIRST-TIME BEGINNING POSTSECONDARY STUDENTS, INCLUDING BOTH TRADITIONAL AND NONTRADITIONAL STUDENTS

BPS includes:

- Base-year NPSAS data
- Student interviews
- Financial aid records

Base-Year Data (from NPSAS). Base-year data for BPS are collected in NPSAS from students, parents (in the first and second cohorts only), institutional records, and Department of Education financial aid records. These data cover major field of study; type and control of institution; financial aid; cost of attendance; age; sex; race/ethnicity; family income; reasons for school selection; current marital status; employment and income; community service; background and preparation for college; college experience; future expectations; and parents' level of education, income, and occupation. These data represent the 1989–90 academic year for the first BPS cohort, the 1995–96 academic year for the second BPS cohort, and the 2003–04 academic year for the third BPS cohort.

BPS Follow-up Surveys. Follow-up data are obtained from student interviews and financial aid records on year in school; persistence in enrollment; academic progress; degree attainment; change in field of study; institution transfer; education-related experiences; current family status; expenses and financial aid; employment and income; employment-related training; community service; political participation; and future expectations.

Follow-ups for the first BPS cohort were conducted in spring 1992 (BPS:90/92) and spring 1994 (BPS:90/94). BPS:90/92 focused on continued education and experience, employment and financing, educational aspirations, and family formation. The focus of BPS:90/94 was on continuing education experiences and financing, including degree attainment and graduate/professional school access; employment experiences; educational and employment aspirations; and family formation.

The second BPS cohort participated in two follow-up surveys as well. These follow-ups were conducted in 1998 (BPS:96/98) and 2001 (BPS:96/01). The BPS:96/98 interview collected information on postsecondary enrollment, employment, income, family formation/household composition, student financial aid, debts, education experiences, and education and career aspirations. BPS:96/01 focused exclusively on activities since the BPS:96/98 interview, collecting information on postsecondary enrollment and degree attainment; undergraduate education experiences; postbaccalaureate education experiences (for those sample members who had completed a bachelor's degree since the last interview); employment; and family, financial, and disability status as well as civic participation since the last interview.

Follow-ups for the third BPS cohort were conducted in 2006 (BPS:04/06) and 2009 (BPS:04/09). The 2006 follow-up focused primarily on continued education

and experience, education financing, entry into the workforce, the relationship between experiences during postsecondary education and various societal and personal outcomes, and returns to the individual and to society on the investment in postsecondary education. The second follow-up in 2009 focused primarily on employment, baccalaureate degree completion, graduate and professional school access issues, and returns to the individual and to society from the completion of a postsecondary degree. In addition, postsecondary transcripts were collected from all institutions attended by members of the third BPS cohort.

Periodicity

BPS cohorts are followed at least twice after first entering postsecondary education (as determined in NPSAS). Follow-ups take place at 2- to 3-year intervals.

2. USES OF DATA

BPS addresses persistence, progress, and attainment after entry into postsecondary education and also directly addresses issues concerning entry into the workforce. Its unique contribution is the inclusion of students who are not direct entrants to postsecondary education from high school, a steadily growing segment of the postsecondary student population. Their inclusion allows analysis of the differences, if any, between traditional (recent high school graduates) and nontraditional students in aspirations, progress, persistence, and attainment.

Congress and other policymakers use BPS data when they consider how new legislation will affect college students and others in postsecondary education. BPS data can answer such questions as: What percentage of beginning students complete their degree programs? What are the financial, family, and school-related factors that prevent students from completing their programs, and what can be done to help them? Do students receiving financial aid do as well as those who do not? Would it be better if the amount of financial aid was increased? Additional questions that BPS can address include the following: Do students who are part-time or discontinuous attenders have the same educational goals as full-time, consistent attenders? Are they as likely to attain similar educational goals? Are students who change majors more or less likely to persist?

3. KEY CONCEPTS

Institution Type. Defined by level of degree offering and length of program at the postsecondary institution. Institutions are generally classified as (1) less than 2-year (offers only programs of study that are less than 2 years in duration); (2) 2- to 3-year, sometimes referred to in reports as 2-year (confers at least a 2-year formal award, but not a baccalaureate degree, or offers a 2- or 3-year program that partially fulfills the requirements for a baccalaureate or higher degree at a 4-year institution; this category includes most community and junior colleges); and (3) 4-year (confers at least a baccalaureate degree and may also confer higher level degrees, such as master's, doctoral, and first-professional degrees; this category is often broken down into doctorate-granting vs. nondoctorate-granting).

Institution Control. Control of postsecondary institution is classified as follows: (1) public; (2) private not-for-profit; and (3) private for-profit.

First-Time Beginning Students (FTBs). The target population for BPS. For the first BPS cohort, FTBs were defined as students who enrolled in postsecondary education for the first time after high school in the 1989–90 academic year (*pure FTBs*). Individuals who started postsecondary education earlier, left, and then returned were not included. The second BPS cohort comprised both students who enrolled for the very first time in the 1995–96 academic year and students who had previously enrolled but had not completed a postsecondary course for credit prior to July 1, 1995 (*effective FTBs*). This expanded definition shifted the requirement from the act of enrollment to successful completion of a postsecondary course. The third BPS cohort comprised both students who enrolled for the first time in the 2003–04 academic year and those who had previously enrolled but had not completed a postsecondary course for credit prior to July 1, 2003.

Nontraditional Students. Primarily older students who delayed postsecondary enrollment; that is, students who did not enter postsecondary education in the same calendar year as high school graduation or who received a general equivalency diploma (GED) or other certificate of high school completion.

Persistence. Continuous enrollment in postsecondary education with the goal of obtaining a degree or other formal award.

Attainment. Receipt of the degree or other formal award while enrolled in postsecondary institutions.

4. SURVEY DESIGN

Target Population

All students who first entered postsecondary education after high school in the 1989–90 academic year (the first BPS cohort), the 1995–96 academic year (the second BPS cohort), and the 2003–04 academic year (the third BPS cohort). The definition of FTB was refined for the second and third BPS cohorts to include students who had enrolled in postsecondary education prior to completion of high school if they had not completed a postsecondary course for credit before July 1, 1995 (the beginning of the 1995–96 academic year, for the second BPS cohort) or July 1, 2003 (the beginning of the 2003–04 academic year, for the third BPS cohort). BPS includes students in nearly all types of postsecondary education institutions located in the 50 states, the District of Columbia, and Puerto Rico: public, private not-for-profit, and private for-profit institutions; 2-year, 2- to 3-year, and 4-year institutions; and occupational programs that last for less than 2 years. Excluded are students attending U.S. Service Academies, institutions that offer only correspondence courses, and institutions that enroll only their own employees. Generally BPS data are nationally representative by institutional level and control (for more information, readers should consult each study's methodological report). Data; the data are not representative at the state level.

Sample Design

Student eligibility for BPS is determined in two stages. The first stage involves selection for the base-year NPSAS sample; see chapter 14 for a description of NPSAS sample design and determination of FTBs who make up the BPS cohorts. All FTBs who complete interviews in NPSAS are considered eligible for BPS. The second stage involves a review of NPSAS data to see if any potential FTBs have been misclassified. FTB status for additional students may be determined through (1) reports from NPSAS institutions; (2) responses of the sample member during the BPS interview; and (3) modeling procedures used following data collection.

First BPS Cohort (1989–90). The first BPS cohort initially consisted of 11,700 students (from about 1,090 institutions) who had been interviewed in the 1989–90 NPSAS. In the second follow-up of this cohort (in 1994), a working sample of 7,910 individuals was initially used. It consisted of the first follow-up eligible respondents plus those nonrespondents for whom FTB status had yet to be determined. Only 7,130 sample members could be located. Of these, 6,790 members were interviewed (either fully or partially). Some of

those interviewed (170) were determined to be non-FTBs, leaving 6,620 eligible FTBs who were either fully (5,930) or partially (690) interviewed in the second follow-up.

Second BPS Cohort (1995–96). In the second BPS cohort, 12,410 confirmed and potential FTBs were selected (from about 800 institutions) for continued follow-up from a total NPSAS pool of 15,730 confirmed or potential FTBs. This pool included 3,740 who had not been interviewed in the 1995–96 NPSAS (of whom 430 were selected for potential continued inclusion in BPS). This BPS-eligible sample of 12,410 individuals was further reduced when an additional 230 were determined to be ineligible. The BPS-eligible sample contained 10,270 FTBs who were given full or partial interviews in the first follow-up; 1,060 were not able to be contacted, and 850 did not respond.

The final sample for this cohort included 10,370 individuals. This included all respondents to earlier follow-ups as well as a subsample of earlier nonrespondents and other individuals who were unavailable for earlier data collections.

Third BPS Cohort (2003–04). The third BPS cohort consisted of 23,090 confirmed and potential FTBs (from 1,360 institutions), of whom approximately 18,640 were determined to be eligible. Of this final BPS-eligible sample, 14,900 FTBs were given full or partial interviews in the first follow-up; 2,060 were not located, and 1,670 did not respond. Prior to the second follow-up, 30 sample members were determined to be deceased. Of the remaining sample, 15,160 FTBs were given full or partial interviews; 1,690 were not located; 1,440 did not respond; and 320 were determined to be exclusions.

Data Collection and Processing

For the first and second BPS cohorts, computer-assisted telephone interviewing (CATI) was the primary data collection tool. All locating, interviewing, and data processing activities were under the control of an Integrated Control System (ICS), consisting of a series of PC-based, fully linked modules. The various modules of the ICS provided the means to conduct, control, coordinate, and monitor the several complex, interrelated activities required in the study and served as a centralized, easily accessible repository for project data and documents.

For the third BPS cohort, a self-administered web interview was introduced as an additional data collection option. A single web-based instrument was developed for these self-administered interviews as well as for CATI interviews and computer-assisted

personal interviews (CAPI). All aspects of the study for the third cohort were controlled using an Integrated Management System (IMS): a comprehensive set of desktop tools that included a management module, a Receipt Control System (RCS) module, and an instrumentation module.

BPS is conducted for NCES by the Research Triangle Institute.

The following sections describe the data collection and processing procedures for BPS follow-ups. Refer to chapter 14 for a description of data collection and processing for the base-year data obtained from NPSAS.

Reference Dates. The base-year (NPSAS) survey largely refers to experiences in postsecondary schooling in the academic year covered by NPSAS. The follow-ups cover the 2- to 3-year interval since the previous round of data collection. Some data are collected retrospectively for the previous survey.

Data Collection. Data collection in BPS follow-ups involves concerted mail and telephone efforts to trace potential sample members to their current location and to conduct a CATI interview both to establish study eligibility and collect data. Field locating and CAPI interviews were also used with the second and third cohorts. The third cohort introduced self-administered web interviews as an additional initial data collection method.

Locating students begins with information provided by the BPS locating database, which is updated by a national change-of-address service before the locating effort begins. Cases not located during the previous round of the survey are forwarded to pre-CATI telephone tracing and, subsequently, to field locating if intensive telephone tracing is unsuccessful. Prior to the start of CATI operations, a pre-notification mailing is sent to the student, and the current contact information is provided to interviewers for basic CATI locating. (For the third BPS cohort, there was an additional 4-week early response period during which sample members could complete a self-administered web interview before CATI operations began.) In the event that CATI locating is unsuccessful, cases are sent to post-CATI central telephone tracing and, again as necessary, field locating. During tracing operations, cases of “exclusion” are identified, such as those who are (1) outside of the calling area; (2) deceased; (3) institutionalized or physically/mentally incapacitated and unable to respond to the survey; or (4) otherwise unavailable for the entire data collection period.

Throughout the data collection period, interviewers are monitored for delivery of questionnaire text and recognition statements, probing, feedback, and CATI entry errors.

Each coding operation is subjected to quality control review and recoding procedures by expert coders. Subsequent to data collection, all “other, specify” responses are evaluated for possible manual recoding into existing categories or into new categories created to accommodate responses of high frequency through a process known as “upcoding.” Efforts are also made to convert several items with high rates of undetermined responses (including refusal or “don’t know”). In order to reduce indeterminacy rates for personal, parent, and household income items, as well as for other financial amount items, specific questions are included in the survey to route initial “don’t know” responses through a series of screens that seek closer and closer financial estimates.

In the second follow-up of the first BPS cohort, amount ranges for the “don’t know” conversion screens were based on frequencies obtained from the second follow-up field test for the same items. Indeterminacy conversion was attempted for five financial amount items (financial aid amount, total loan amount, respondent gross income, parents’ gross income, and household gross income) and was very successful for initial “don’t know” responses. Conversion rates were greater than 50 percent for every item attempted, with an overall success rate of 65 percent.

With the second BPS cohort, approximately 1,930 sample members initially refused to participate in the first follow-up. Fifty-three percent (1,020) of these refusals were converted. For the second follow-up of this cohort, 1,860 sample members refused to participate at least once. Of these, 74 percent were converted.

For the first follow-up of the third BPS cohort, 1,850 sample members refused to be interviewed at some point in the data collection. Of these refusals, 700 (approximately 38 percent) ultimately completed an interview. In the second follow-up, 8,380 sample members reached the nonrespondent phase of interviewing, with 4,860 (almost 58 percent) completing the interview before the end of data collection.

Editing. The CATI data are edited and cleaned as part of the preparation of the data file. Modifications to the data are made, to the extent possible, based on problem sheets submitted by interviewers, which detail item corrections, deletions, and prior omissions. In addition,

variables are checked for legitimate ranges and interim consistency. Coding corrections and school information from the Integrated Postsecondary Education Data System (IPEDS) Institutional Characteristics files are merged into the CATI files. Data inconsistencies identified during analyses are also corrected, as appropriate and feasible.

In addition, the web instrument for the follow-up interviews with the third BPS cohort (BPS:04/06 and BPS:04/09) included online coding systems which ensured that most codes were assigned during data collection rather than during data editing. Post-data collection, data were edited using procedures developed for previous NCES-sponsored studies, including the base-year study (NPSAS:04). These included quality checks and examinations of skip patterns and the reasons for missing data.

Estimation Methods

Weighting is used to adjust for unit nonresponse. Only minimal imputation is performed to compensate for item nonresponse.

Weighting. BPS follow-ups involve further identification of FTB status for sample members who were in the earlier round of BPS. Furthermore, post hoc modeling is implemented following the first follow-up data collection in an attempt to identify non-FTBs among nonrespondents.

Four sets of weights were computed for use with BPS data for the first (1989–90) cohort: (1) 1992 cross-sectional weights for cross-sectional analyses of the first cohort at the time of the first follow-up, based on the first follow-up data collection; (2) 1994 cross-sectional weights for cross-sectional analyses of the first cohort at the time of the second follow-up data collection; (3) 1992 cross-sectional weights for the first follow-up information that was collected either during the first follow-up or retrospectively in the second follow-up; and (4) longitudinal weights for comparison of the responses pertaining to the 1990, 1992, and 1994 cross-sectional populations (e.g., trend analyses) for those students who responded to each of the three surveys: the 1989–90 NPSAS, the BPS first follow-up (in 1992), and the BPS second follow-up (in 1994). For computation of these weights, see the technical report for the second follow-up (BPS:90/94; Pratt et al. 1996).

The 1994 cross-sectional weights can also be used for longitudinal analyses involving data items collected retrospectively in the second follow-up, because those data items are available for 1992 (either directly from the first follow-up or retrospectively from the second follow-up if the student responded in 1994). Each set

of weights consists of an analysis weight for computing point estimates of population parameters, plus a set of 35 replicate weights for computation of sampling variances using the Jackknife replication method of variance estimation. All weight adjustments were implemented independently for each set of replicate weights. (See “Sampling Error” in section 5 below for further detail on replicate variance estimation.)

For the second BPS cohort, four sets of weights were also constructed: (1) 1998 analysis weights for point estimates of population parameters for students in the first follow-up (BPS:96/98); (2) 2001 cross-sectional weights for analyzing respondents to the second follow-up (BPS:96/01); (3) longitudinal weights for analyzing respondents to NPSAS:96 and both BPS follow-ups; and (4) longitudinal weights for analyzing respondents only to NPSAS:96 and BPS:96/01.

Analysis weights were also developed for the first follow-up of the third BPS cohort (BPS:04/06). These weights were derived from the NPSAS:04 weights. Three types of weights were developed for the analysis of data from the second follow-up (BPS:04/09): (1) cross-sectional weights for cases that were BPS:04/09 study respondents (i.e., had data from either the student interview or enrollment data from other external sources), (2) longitudinal or panel weights for cases who were study respondents for NPSAS:04, BPS:04/06, and BPS:04/09, and (3) weights for analyzing BPS:04/09 sample members with any transcript data.

Imputation. Imputation was performed on a small number of variables for the earlier cohorts of BPS. These variables relate to the student’s dependency status and family income in each survey round. For example, the variable containing dependency status for aid in academic year 1989–90 was derived by examining all applicable variables used in the federal definition of dependency for the purpose of applying for financial aid. If information was not available for all variables, dependency status was imputed based on age, marital status, and graduate enrollment. Similarly, the variable containing the 1988 family adjusted gross income used imputed values if responses were not available.

In the follow-ups for the second BPS cohort, logical imputations were performed where items were missing but their values could be implicitly determined, such as the amount earned by a respondent who did not work in 2000 (imputed to \$0).

With the third BPS cohort, imputation was performed for all variables on the data file with missing data,

including questionnaire items and derived variables. In addition, nonrespondents to the BPS:04/06 interview appear in the analysis file with imputed data. Response rates and estimated bias in BPS:04/06 are reported both with nonimputed data (prior to item imputation) and after imputation. For BPS:04/09, imputation was also performed for questionnaire items with missing data, including cases who did not complete the interview but had enrollment data from other sources.

Future Plans

The fourth BPS cohort (representing the 2011–12 academic year) will be selected in 2012 from the NPSAS:12 sample after the study’s student interview has been completed.

5. DATA QUALITY AND COMPARABILITY

Sampling Error

Because the NPSAS sample design involves stratification, disproportionate sampling of certain strata, and clustered (i.e., multistage) probability sampling, the standard errors, design effects, and related percentage distributions for a number of key variables in BPS have been calculated with the software package SUDAAN. These variables include sex, race/ethnicity, age in the base year, socioeconomic status, income/dependency in the base year, number of risk factors in the base year, level and control of the first institution, and aid package at the first institution in the base year. These estimates provide an approximate characterization of the precision with which BPS survey statistics can be estimated.

Several specific procedures are available for calculating precise estimates of sampling errors for complex samples. Taylor Series approximations, Jackknife repeated replications, and balanced repeated replications produce similar results.

Nonsampling Error

Nonsampling error in BPS is largely related to nonresponse bias caused by unit and item nonresponse and to measurement error.

Coverage Error. The BPS sample is drawn from NPSAS. Consequently, any coverage error in the NPSAS sample will be reflected in BPS. (Refer to chapter 14 for coverage issues in NPSAS.)

Nonresponse Error. Unit nonresponse is reported in BPS in terms of *contact rates* (the proportion of sample members who were located for an interview) and

interview rates (the proportion of sample members who fully or partially completed the interview). Item nonresponse has not been fully evaluated, although the numbers of nonrespondents are in the electronic codebook on an item-by-item basis.

Unit Nonresponse. The results for the second follow-up of the first BPS cohort (BPS:90/94) show a *contact rate* of 92 percent. The rate was substantially lower for individuals who did not respond to the first follow-up (75 percent) than for those who did respond (95 percent). Contact rates also varied by institution type. The rate was highest for sample members who attended 4-year colleges (95 percent); in contrast, contact was made with only 81 percent of sample members attending private for-profit institutions with programs of less than 2 years.

For the second BPS cohort, the contact rate for the first follow-up (BPS:96/98) was 91 percent. The overall unweighted response rate was 84 percent. Full respondents to NPSAS:96 had a contact rate almost 33 percentage points higher than NPSAS:96 nonrespondents (94 vs. 61 percent). Students from private, for-profit institutions had the lowest contact rates (79 percent for 2-year institutions and 82 percent for less-than-2-year institutions), while students from public 4-year institutions (94 percent) and private, not-for-profit 4-year institutions (94 percent) had the highest contact rates.

In the second follow-up of the second BPS cohort (BPS:96/01), the contact rate was 92 percent. The overall unweighted response rate was 88 percent. Students who had not participated in the first follow-up had a lower contact rate (81 percent) than those who had been interviewed both in NPSAS:96 and BPS:96/98 (93 percent) and those who had only been interviewed in BPS:96/98 (92 percent). Contact rates were similar across institutions, with a high of 96 percent for private not-for-profit 4-year doctorate-granting institutions and a low of 86 percent for private, for-profit less-than-2-year institutions.

The first follow-up to the third BPS cohort (BPS:04/06) reported locating 89 percent of the sample members. Of these, 81 percent were considered eligible for BPS. Among all eligible sample members (including both located and not located), the overall unweighted response rate was 80 percent; among eligible cases that were successfully located, the response rate was 90 percent. For the second follow-up, 91 percent of the sample members were located. Eligibility did not need to be evaluated as part of BPS:04/09. The overall unweighted response rate was

82 percent; among eligible cases that were successfully located, the response rate was 90 percent.

Among those students in the first BPS cohort who were contacted for the second follow-up, the *interview rate* was 95 percent. The rate was higher for respondents to the first follow-up than for nonrespondents (96 vs. 89 percent). Interview rates were fairly similar across institutions, ranging from 91 percent for students attending private, not-for-profit less-than-2-year institutions to 96 percent for students attending private, not-for-profit 4-year institutions.

The interview rate for those contacted in the first follow-up of the second BPS cohort was 92 percent. This rate was lower for NPSAS:96 nonrespondents than for full or partial respondents (71 percent vs. 94 and 82 percent). Interview rates were much more consistent across institutions; private, for-profit 2-year institutions were the lowest at 88 percent, and private, for-profit 4-year institutions were the highest at 95 percent.

With the second follow-up to the second BPS cohort, the interview rate was 96 percent of those contacted. As with the contact rates, the interview rates varied across groups of participants. Specifically, interview rates were lower for those not interviewed in the first follow-up than for those interviewed both in the base-year study and the first follow-up and those interviewed only in the base-year study (81 percent vs. 96 and 91 percent). Interview rates varied across institutional sectors from 93 to 97 percent.

Among located eligible students, interview rates for those contacted in the first follow-up were higher for NPSAS:04 respondents (90 percent) than nonrespondents (52 percent). Similarly, BPS:04/09 interview rates were higher among first follow-up respondents (93 percent) than nonrespondents (77 percent). Across institution types, interview rates varied from 87 to 94 percent for the first follow-up and from 70 to 88 percent for the second follow-up. Of the completed interviews, 58 percent completed on the web and 42 percent were interviewer-administered (39 percent CATI and 3 percent CAPI). For the second follow-up, 64 percent of interviews were completed by web with 36 percent administered by an interviewer (32 percent CATI and 4 percent CAPI). Table 9 summarizes the unit-level weighted response rates across three BPS administrations.

Item Nonresponse. Overall item nonresponse rates have been low across surveys (only 10 of the 363 items in BPS:96/98 and 9 of the 363 items in BPS:96/01 contained over 10 percent missing data, 7 of the more

than 400 items in BPS:04/06 and 19 of 385 items in BPS:04/09 had a total nonresponse over 5 percent). Items with the highest nonresponse rates were those for income and student loans. Many respondents were reluctant to provide information about personal and family finances or simply did not know this information.

Measurement Error. While comprehensive psychometric evaluations of BPS data have not been conducted, issues of data quality are addressed during data collection.

Cross-Interview Data Verification. During data collection, information from a prior interview (or from base-year NPSAS data) is verified or updated to ensure compatibility across survey waves. In the first follow-up of the first BPS cohort (i.e., BPS:90/92), demographic information covered in NPSAS (e.g., sex, race, and ethnicity) was verified or updated. The results

indicated high reliability of these items. Prior to the full-scale second follow-up, another set of items covered in earlier rounds was verified or updated, including high school graduation status, schools attended prior to the base year, and jobs held prior to the base year. These data were also found to be reliable across survey waves. Agreement approached 100 percent on high school graduation status, 99 percent on previous attendance at postsecondary schools, and 96 percent on previous jobs.

A minimal amount of replacement was conducted on the follow-ups of the second BPS cohort. No replacement of data was conducted on the 2006 follow-up (BPS:04/06) of the third cohort because data were swapped. No replacement of data was conducted on the 2009 follow-up (BPS:04/09) because missing values were imputed from the 2006 data and data were swapped.

Table 9. Unit-level weighted response rates for BPS student surveys, by cohort: 1990–2009

Cohort	Base year Inst. level ^{1,2}	Base year Student level ¹	1 st follow-up	2 nd follow-up
1 st cohort	86	84	86 ³	91
2 nd cohort	91	96	80	84
3 rd cohort	80	91	80 ^{3,4}	71

¹ Base year NPSAS (analysis file) response rates.

² Institutional response rates for student sampling lists.

³ Student interview response rate.

⁴ Unweighted response rate.

NOTE: Follow-up response rates are overall response rates, except where noted.

SOURCE: Cominole, M., Siegel, P., Dudley, K., Roe, D., and Gilligan, T. (2006). *2004 National Postsecondary Student Aid Study (NPSAS:04) Full-Scale Methodology Report* (NCES 2006-180). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Cominole, M., Wheelless, S., Dudley, K., Franklin, J., and Wine, J. (2007). *2004/06 Beginning Postsecondary Students Longitudinal Study (BPS:04/06) Methodology Report* (NCES 2008-184). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Fitzgerald, R., Berkner, L., Horn, L.J., Choy, S.P., and Hoachlander, G. (1994). *Descriptive Summary of 1989-90 Beginning Postsecondary Students: Two Years Later: 90-92* (NCES 94-386). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Malizio A.G. (1992). *Methodology Report for the 1990 National Postsecondary Student Aid Study (NPSAS:90) Contractor Report* (NCES 92-080). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Pratt, D.J., Whitmore, R.W., Wine, J.S., Blackwell, K.M., Forsyth, B.H., Smith, T.K., Becker, E.A., Veith, K.J., Mitchell, M., and Borman, G.D. (1996). *Beginning Postsecondary Students Longitudinal Study Second Follow-up (BPS:90/94) Final Technical Report* (NCES 96-153). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Riccobono, J.A., Whitmore R.W., Gabel T.J., Traccarella M.A., Pratt D.J., Berkner L.K., and Malizio A.G. (1997). *National Postsecondary Student Aid Study (NPSAS:96) Methodology Report* (NCES 98-073). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Wine, J.S., Heuer, R.E., Wheelless, S.C., Francis, T.L., and Dudley, K.M. (2002). *Beginning Postsecondary Students Longitudinal Study: 1996-2001 (BPS:1996/2001) Methodology Report* (NCES 2002-171). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Wine, J.S., Whitmore, R.W., Heuer, R.E., Biber, M., and Pratt, D.J. (2000). *Beginning Postsecondary Students Longitudinal Study First Follow-up 1996–98 (BPS:96/98) Methodology Report* (NCES 2000-157). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Reinterview. All BPS field test interview activities have involved a reinterview of a subsample of respondents to the main interview to evaluate the consistency of responses to the two interviews. The

interval between the initial interview and the reinterview has ranged from 3 to 14 weeks.

Across BPS data collections, each new reinterview is designed to build on previous analyses by targeting

revised items, new items, and items not previously evaluated. Reinterview analyses focus on data items that were expected to be stable for the time period between the initial interview and the reinterview. These items cover education experience; work experience (e.g., employee's primary role, future career plans, principal job's relation to education, satisfaction with principal job, and factors affecting employment goals); education finances; and living arrangements. Across cohorts and surveys, the reliability of survey items has varied in ways that are typical of the types of questions being asked and answered. Rates of agreement have tended to be high among factual questions, such as those related to enrollment history, employment, and background characteristics. Reliability has been lower among numeric responses, such as income for a calendar year and parents' income. Adjustments in question design, wording, and response options were made from field test to full-scale administration to address problems in item reliability.

When there continued to be concern for the reliability of an item, it was reevaluated in the next field test interview.

Across cohorts and surveys, the reliability of survey items has varied in ways that are typical of the types of questions being asked and answered. Rates of agreement have tended to be high among factual questions, such as those related to enrollment history, employment, and background characteristics. Reliability has been lower among numeric responses, such as income for a calendar year and parents' income. Adjustments in question design, wording, and response options were made from field test to full-scale administration to address problems in item reliability. When there continued to be concern for the reliability of an item, it was reevaluated in the next field test interview.

Item Order Effects. As needed, analyses are conducted to evaluate order effects, that is, the sequence in which questionnaire items are presented to respondents and the resulting response patterns. Discrepancies are examined and adjustments made, as needed, for the full-scale data collection. Order effects are controlled through the randomization of response options that is possible with computer-assisted interviews. Also analyzed are discrepancies of online coding procedures for postsecondary institutions, fields of study, and combined and separate industry and occupations. To achieve high data quality, expert coding personnel recode items that have been identified as inconsistent.

6. CONTACT INFORMATION

For content information about the BPS project, contact:

Matthew Soldner
Project Officer
Phone: (202) 219-7025
E-mail: matthew.soldner@ed.gov

Mailing Address:

National Center for Education Statistics
Institute of Education Sciences
U.S. Department of Education
Statistics 1990 K Street NW
Washington, DC 20006-5651

7. METHODOLOGY AND EVALUATION REPORTS

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Chapter 16: Baccalaureate and Beyond (B&B) Longitudinal Study

1. OVERVIEW

The Baccalaureate and Beyond (B&B) Longitudinal Study provides information concerning education and work experiences following completion of the bachelor's degree. It provides both cross-sectional profiles of the enrollment, persistence, and financial aid receipt of bachelor's degree recipients in their final year of undergraduate education and longitudinal data on their entry into and progress through graduate-level education and the workforce. Special emphasis is placed on those graduates entering public service areas, particularly teaching, and the provision of information on their entry into the job market and career path.

B&B draws the base-year data for its cohorts from the National Postsecondary Student Aid Study (NPSAS, see chapter 14). The first B&B cohort consisted of individuals who received a bachelor's degree in the 1992–93 academic year; the second cohort was formed from baccalaureate recipients in the 1999–2000 academic year; and, the third cohort consists of graduating seniors from the 2007–08 academic year (B&B:93, B&B:2000, and B&B:08, respectively). B&B expands on the efforts of the former Recent College Graduates Survey to provide unique information on educational and employment-related experiences of these degree recipients over a longer period of time. The 1992–93 cohort was followed three times over a 10-year period, in 1994, 1997, and 2003 (B&B:93/94, B&B:93/97, and B&B:93/03, respectively), so that most respondents who attended graduate or professional schools have completed (or nearly completed) their education and are established in their careers. The 1999–2000 cohort was followed only in 2001 (B&B:2000/01). The 2007–08 cohort was followed for the first time in 2009 (B&B:08/09). Eligible sample members will be interviewed again in 2012. B&B can address issues concerning delayed entry into graduate school, the progress and completion of graduate-level education, and the impact of undergraduate and graduate debt on choices related to career and family.

Purpose

To provide information on (1) college graduates' entry into, persistence and progress through, and completion of graduate-level education in the years following receipt of the bachelor's degree; and (2) the career paths of new teachers: retention, attrition, delayed entry, and movement within the educational system.

Components

B&B consists of base-year data collected from NPSAS: the 1992–93 NPSAS for the first B&B cohort; the 1999–2000 NPSAS for the second B&B cohort; and the 2007–08 NPSAS for the third B&B cohort (NPSAS:93, NPSAS:2000, and NPSAS:08, respectively). NPSAS data are collected in many components, including institutional records from postsecondary institutions, student interviews, and administrative federal financial aid record systems. For the first B&B cohort (consisting of 1992–93 baccalaureate recipients), the first follow-up, conducted in 1994, collected data from a student interview as well as from undergraduate

LONGITUDINAL SAMPLE SURVEY OF BACHELOR'S DEGREE RECIPIENTS; THREE FOLLOW- UPS OVER A 10-YEAR PERIOD:

B&B collects data from:

- Base-year NPSAS Data
- Student interviews
- Undergraduate transcripts
- Federal financial aid and loan records
- Identified newly qualified teachers

college transcripts. The second follow-up, conducted in 1997, combined a Student Interview with Department Aid Application/Loan Records data. The third follow-up, conducted in 2003, collected data on topics related to continuing education, degree attainment, employment, career choice, family formation, and finances. A second B&B cohort, consisting of 1999–2000 baccalaureate recipients, went to the field in 2000, and was followed in 2001. The first and only planned follow-up survey, it focused on time to degree completion, participation in post-baccalaureate education and employment, and the activities of newly qualified teachers. A third B&B cohort, consisting of 2007–08 baccalaureate recipients, was followed for the first time in 2009. When they are released in early 2011, the data for this follow-up will combine student interviews, undergraduate college transcript, and other administrative records. The research topics include the relationship between college graduates' coursetaking while in college and their subsequent paths into the labor market and/or through graduate school; accumulated educational debt burden of college graduates; and preparations graduates have made for elementary and secondary school teaching, particularly as compared to those of college graduates in other occupations.

Base-Year Data (from NPSAS). B&B obtains its base-year information from NPSAS. The NPSAS Student Record Abstracts (institutional records) provide major field of study; type and control of institution; attendance status; tuition and fees; admission test scores; financial aid awards; cost of attendance; student budget information and expected family contribution for aided students; grade point average; age; and date first enrolled. The base-year data also include information from NPSAS Student Interviews regarding educational level; major field of study; financial aid at other schools attended during the year; other sources of financial support; monthly expenses; reasons for selecting the school attended; current marital status; age; race/ethnicity; sex; highest degree expected; employment and income; community service; expectations for employment after graduation; expectations for graduate school; and plans to enter the teaching profession. For NPSAS:08, parental data previously collected from the Parent Interviews were captured in the Student Interview. These topics include marital status; age; highest level of education achieved; income; amount of financial support provided to the student; types of financing used to pay student educational expenses; and current employment (including occupation and industry).

B&B First Follow-up Survey. The first follow-up is conducted 1 year after the bachelor's degree is received

(e.g., 1994 for the 1992–93 cohort and 2001 for the 1999–2000 cohort). No other follow-up is being conducted of the 1999–2000 cohort. Data were collected in 2009 for the first follow-up of the 2007–08 cohort.

In the Student Interview portion of the survey, recent graduates provide information regarding employment after degree completion; job search activities; expectations for and entry into teaching; teacher certification status; job training and responsibilities; expectations/entry into graduate school; enrollment after degree; financial aid; loan repayment/status; income; family formation and responsibilities; and participation in community service. As part of the first follow-up of both the 1992–93 B&B and 2007–08 B&B cohorts, an undergraduate transcript study component collected transcripts providing information on undergraduate coursework; institutions attended; grades; credits attempted and earned; and academic honors earned. All transcript information is as reported by the institutions, converted to semester credits and a 4.0 grade scale for comparability.

B&B Second Follow-up Survey. The second follow-up of the 1992–93 B&B cohort was conducted in 1997, 4 years after the bachelor's degree was received. Participants provided information in the Student Interview regarding their employment history; enrollment history; job search strategies at degree completion; career progress; current status in graduate school; nonfederal aid received; additional job training; entry into/persistence in/resignation from teaching career; teacher certification status; teacher career path; income; family formation and responsibilities; and participation in community service.

The second follow-up of the 1992–93 B&B cohort also included a Department Aid Application/Loan Records component to collect information on the types and amounts of federal financial aid received, total federal debt accrued, and students' loan repayment status. One of the goals of B&B is to understand the effect that education-related debt has on graduates' choices concerning their careers and further schooling. Data will be collected in 2012 for the second follow-up of the 2007–08 cohort.

B&B Third Follow-up Survey. The 1992–93 cohort was followed for a third time in 2003. This final interview, which was conducted 10 years following degree completion, allowed further study of the issues already addressed by the preceding follow-up studies. The 2003 interview covered topics related to continuing education, degree attainment, employment, career choice, family formation, and finances.

Additionally, respondents were asked to reflect on the value that their undergraduate education and any other education obtained since receiving the bachelor's degree added to their lives now. It also contained a separate set of questions directed at new entrants into the teacher pipeline, as well as those who were continuing in or who had left teaching since the last interview.

Periodicity

The three B&B cohorts each have their own follow-up schedule,¹ as described above. B&B cohorts alternate with Beginning Postsecondary Students (BPS) Longitudinal Study cohorts in using NPSAS surveys as their base.

2. USES OF DATA

B&B covers many topics of interest to policymakers, educators, and researchers. For example, B&B allows analysis of the participation and progress of recent degree completers in the workforce, relationship of employment to degree, income and the ability to repay debt, and willingness to enter public service-related fields. B&B also allows analysis of issues related to access into and choice of graduate education programs. Here the emphasis is on the ability, ease, and timing of entrance into graduate school, and attendance/employment patterns, progress, and completion timing once entered.

The unique features of B&B allow it to be used to address issues related to undergraduate education as well as post-baccalaureate experiences. This information has been used to investigate the relationship between undergraduate debt burden and early labor force experiences, and between undergraduate academic experiences and entry into teaching. These and other relationships can be investigated both in the short term and over longer periods.

Because B&B places special emphasis on new teachers at the elementary and secondary levels, it can be used to address many issues related to teacher preparation, entry into the profession (e.g., timing, ease of entry), persistence in or defection from teaching, and career movement within the education system.

Major issues that B&B attempts to address include:

- length of time following receipt of degree after which college graduates enter the workforce;
- type of job which graduates obtain, compared with major field of undergraduate study;
- length of time to complete degree;
- length of time to obtain a job related to respondents' field of study;
- extent to which jobs obtained relate to educational level attained by respondent;
- extent to which level of debt incurred to pay for education influences decisions concerning graduate school, employment, and family formation;
- extent to which level of debt incurred influences decisions to enter public service professions;
- rates of graduate school enrollment, retention, and completion;
- extent to which delaying graduate school enrollment influences respondent's access to and progression through advanced degree programs;
- factors influencing the decision to enroll in graduate education;
- extent to which attaining an advanced degree influences short-term and long-term earnings;
- number of graduates qualified to teach;
- extent to which degree level/profession influences rate of advancement; and
- extent to which respondents change jobs or careers.

3. KEY CONCEPTS

Some of the concepts and terms used in the B&B data collection and analysis are defined below. For more information on these and other terms used in B&B, refer to *A Descriptive Summary of 1999–2000 Bachelor's Degree Recipients, 1 Year Later, With an Analysis of Time to Degree* (Bradburn et al 2003).

¹ B&B:08 follow-up studies beyond 2009 will be conducted as funding permits.

Degree-granting Institution. Any institution offering an associate's, bachelor's, master's, doctor's, or first-professional degree. Institutions that grant only certificates or awards of any length (less than 2 years, or 2 years or more) are categorized as nondegree-granting institutions.

First Postsecondary Institution. The first institution attended by the respondent following high school and in which the respondent was enrolled for a minimum of 3 months. Institutions attended before high school graduation are included if enrollment continued after high school graduation. The first institution may or may not be the institution that granted the bachelor's degree.

Status in Teacher Pipeline. This variable measures the extent of involvement with teaching, using variables from 1994 and 1997 interviews and composites. Respondents who taught were classified as having taught (1) with certification, (2) with student teaching experience, (3) without training, or (4) with training unknown. Respondents who did not teach were classified as (1) certified, (2) having student taught, (3) having applied for teaching jobs, (4) having considered teaching, or (5) having no interest in or taken no action toward teaching. An additional category of respondents who had become certified but whose teaching status was unknown was identified. All of these categories are combined in various ways throughout reports, depending on the context of the particular analysis.

Dependency Level. If a student is considered financially dependent, the parents' assets and income are considered in determining aid eligibility. If the student is financially independent, only the student's assets are considered, regardless of the relationship between student and parent. The specific definition of dependency status has varied across surveys. In the 1999-2000 NPSAS, a student is considered independent if (1) the institution reports that the student is independent or (2) the student meets one of the following criteria: (a) is age 24 or older as of 12/31/1999; (b) is a veteran of the U.S. Armed Forces; (c) is an orphan or ward of the court; (d) is enrolled in a graduate or professional program beyond a bachelor's degree; (e) is married; or (f) has legal dependents other than a spouse.

4. SURVEY DESIGN

Target Population

All postsecondary students in the 50 states, the District of Columbia, and Puerto Rico who completed a

bachelor's degree in the 1992-93 academic year, spanning July 1, 1992, to June 30, 1993 (first B&B cohort); in the 1999-2000 academic year, spanning July 1, 1999, to June 30, 2000 (second B&B cohort) or in the 2007-08 academic year, spanning July 1, 2007, to June 30, 2008 (third B&B cohort). Students from U.S. Service Academies are excluded because they are not part of NPSAS, from which B&B draws its samples.

Sample Design

Members of the B&B cohort are identified during the NPSAS year that serves as the base year for the longitudinal study: NPSAS:93 for the first B&B cohort, NPSAS:2000 for the second B&B cohort, and NPSAS:08 for the third B&B cohort. (See chapter 14 for a description of the NPSAS sample design.) The B&B cohorts consist of students who have completed the NPSAS interview and have been identified as baccalaureate recipients. The B&B:93 and B&B:08 cohorts also consist of those NPSAS:93 and NPSAS:08 nonrespondents, respectively, who are potentially eligible for B&B and for whom there are at least some data (either from institutional records or computer-assisted telephone interviewing [CATI]). The NPSAS sampling design is a two-stage design in which eligible institutions are selected first and then eligible students are selected from the eligible participating institutions.

Selection of Institutions

The institution-level sampling frames for NPSAS:93, NPSAS:2000, and NPSAS:08 were constructed from the 1990-91 Integrated Postsecondary Education Data System (IPEDS) file, the 1998-99 IPEDS file, and the 2005-06 IPEDS file, respectively. The resulting sampling frames contained 10,140 potentially eligible institutions for NPSAS:93, 6,420 institutions for NPSAS:2000, and 6,780 institutions for NPSAS:08.

Geographic areas defined by three-digit postal zip codes were used as the basis for creating primary sampling units (PSUs) of nearly equal sizes to ensure statistical efficiency (the three-digit code comes from the first three digits of a zip code, and designates either a sectional center facility or a main post office). All institutions within the sample PSUs were then combined into a single frame, stratified by 22 strata. The variables used to define the strata were institutional control, highest level of offering, and the percentage of baccalaureate degrees awarded in education.

For the NPSAS:93 sample, a sample of 1,360 institutions (720 from the certainty PSUs and 640 from the noncertainty PSUs) was selected for the primary sample from the IPEDS frame. For the NPSAS:2000

sample, a sample of 1,080 institutions (290 from the certainty PSUs and 800 from the noncertainty PSUs) was selected for the primary sample from the IPEDS frame. For the NPSAS:08 sample, the final sample included 1,960 institutions, and of those, about 1,960 were selected to participate in NPSAS:08.²

Selection of Students

Base-Year Survey. To create the NPSAS student sampling frame, each sample institution was asked to provide a list of all students enrolled during the NPSAS year (July 1, 1992 to June 30, 1993 for the first B&B cohort; July 1, 1999 to June 30, 2000 for the second B&B cohort; and July 1, 2007 to June 30, 2008 for the third B&B cohort) and those eligible to receive a baccalaureate degree at some point during that year, according to criteria provided to the institutions. Stratified systematic sampling was used to facilitate sampling from lists. For each sample institution, student sampling rates were determined for each of five student sampling strata:

- business major baccalaureates;
- other baccalaureate recipients;
- other undergraduates, including enrollees at less-than-4-year institutions;
- graduate students; and
- first-professional students.

The sampling rates depended on the overall population sampling rates for the five types of students, the probability of selecting the institution, and a requirement for a minimum of 40 sample students per institution whenever possible. Sample institutions identified those students eligible to receive the bachelor's degree during the academic year for inclusion in each B&B cohort. In addition, those students who indicated in the CATI that they had received a baccalaureate degree during the 1992–93 academic year were also included in the B&B:93 cohort. From the NPSAS:93 sample, 16,320 baccalaureate degree recipients were identified for participation in B&B:93. From the NPSAS:2000 sample, 16,620 baccalaureate degree recipients were identified for participation in B&B:2000.³

² Additional details on the NPSAS:08 sample will become available upon release of the relevant study data.

³ The final number of students in the B&B:08 sampling frame will be determined upon release of the relevant NPSAS:08 study data.

*First Follow-up Survey.*⁴ About 16,320 baccalaureate degree recipients were identified for inclusion in the B&B:93 cohort from institutionally-provided lists of students who were eligible for graduation or who indicated in the CATI interview that they had graduated in the 1992–93 academic year. All 11,810 of the identified students who completed the NPSAS:93 interview were retained for the B&B:93/94 sample. Also retained were 370 student nonrespondents for whom NPSAS parent data were available that indicated that the student received the bachelor's degree during 1992–93. Additionally, a 10 percent subsample of the remaining eligible cases with at least some data was included, for a total of 12,730 eligible cases. It became apparent during data collection that many of the nonrespondents and potentially eligible cases were actually ineligible. Because of the costs associated with the ineligible students, only a subsample of the nonrespondents and potentially eligible students was selected, reducing the sample size to 12,480 in B&B:93/94.

The respondent universe for the B&B:2000/01 follow-up survey consisted of all students who attended postsecondary educational institutions between July 1, 1999, and June 30, 2000, in the United States and Puerto Rico, and who received or expected to receive bachelor's degrees during this time frame. Approximately 11,700 confirmed and potentially eligible bachelor's degree recipients were selected for participation in B&B:2000/01. Of these, about 70 were determined during the follow-up survey to be ineligible. From the remaining nearly 11,630 eligible sample members, about 10,030 were located and interviewed in the follow-up survey.

Second Follow-up Survey. B&B:93/94 included a transcript component, which was used to determine eligibility of the base-year nonrespondents for the B&B:93/97 follow up. After data collection was complete for the first follow-up, additional ineligible cases were found in the cohort based on information obtained from the transcript data. Sample members were retained for follow-up in later rounds if they were found to be eligible in either the CATI or the transcript component. In total, 11,190 cases were retained for the second follow-up (B&B:93/97). Specifically, B&B:93/97 included 10,080 CATI-eligible cases, 1,090 transcript-eligible cases, and 20 cases for which eligibility was unknown for both components.

Third Follow-up Survey. All 10,090 B&B:93/97 respondents were included in the B&B:93/03 sample.

⁴ The discussion of the follow-up surveys pertains to the first two B&B cohorts only; the first follow-up of B&B:08 took place in 2009.

However, because it is more difficult and expensive to locate and interview prior nonrespondents, a subsample of only about one-third, or 360, of B&B:93/97 nonrespondents was included. After removing 10 cases identified as deceased, the final sample for B&B:93/03 was 10,440.

Data Collection and Processing

B&B surveyed its first cohort—1992–93 bachelor’s degree recipients—in 1994, approximately 1 year after graduation, and again in 1997. Both of these follow-up surveys were administered by the National Opinion Research Center (NORC) at the University of Chicago. The third follow-up was conducted in 2003 by Research Triangle Institute (RTI).

The first follow-up of the 1999–2000 cohort (B&B:2000/01) was conducted in 2001 by RTI. This cohort of students was first interviewed in NPSAS:2000, the base-year study for this cohort. B&B:2000/01 is the only planned follow-up of this cohort.

The first follow-up of the third cohort (B&B:2008/09) was conducted in 2009 by RTI. This cohort of students was first interviewed in NPSAS:08, the base-year study for this cohort.

Reference dates. In the first follow-up of the 1992–93 cohort, respondents were asked to provide their current enrollment status, employment status, and marital status as of April 1994. Similarly, respondents to the second and third follow-ups reported their status as of April 1997 and April 2003. For the follow-up of the 2000–01 cohort, respondents were asked to provide their current enrollment status, employment status, and marital status as of April 2001.

Data collection. Data are collected through student interviews and college transcripts. The data collection procedures for the follow-ups of the first and second B&B cohorts are described below.

Student interview. The first follow-up student interview (B&B:93/94) was administered between June and December 1994. Sample members were initially mailed a letter containing information about the survey and a toll-free number they could call to schedule interviews. CATI began approximately 1 week later and was conducted in two waves. Wave 1 consisted of students who were respondents in the 1992–93 NPSAS or for whom parent data were available. Wave 2 consisted of students who were nonrespondents in the 1992–93 NPSAS and for whom no parent data were available. NPSAS respondents who were identified as potentially

eligible for B&B during the NPSAS data processing phase were also included in Wave 2.

Telephone interviewing continued for a period of 16 weeks. All cases still pending after this time were sent to field interviewers to gather in-person information. A 14-call maximum was set, with a call defined as contact with the sample member, another person in the sample member’s household, or an answering machine. After 14 calls, attempts to contact the sample member by telephone were terminated and the case was sent to field interviewers.

Methods of refusal conversion were tailored to address the reasons each member had given for nonparticipation, as determined by reviewing the call notes. Letters were sent to sample members addressing the specific reasons for their refusal (too busy, not interested, confidentiality issues, etc.). Following these mailings, a final phone interview was attempted from the central CATI site. Continuing refusals were forwarded to the field to be contacted in person by a field interviewer. The field staff was successful in completing 3,050 (82 percent) of these cases.

The data collection procedures for the first (and only) follow-up of the second B&B cohort were similar to those for the first cohort, consisting almost exclusively of CATI interviews, and concluding with refusal conversion procedures to gain cooperation from telephone nonrespondents.

The second follow-up student interview (B&B:93/97) was administered between April and December 1997. Sample members were initially mailed a letter and informational leaflet containing information about the survey and a toll-free number and/or e-mail address through which they could obtain further information, schedule an interview, or provide an updated phone number. CATI began approximately 1 week later and continued for 16 weeks. Cases pending at the end of this time were sent to field interviewers and worked from July through December 1997. Phone interviewers made 13, rather than 14, attempts to contact sample members. If phone interviewers were not successful after 13 attempts, the case was forwarded to telephone case management specialists before being sent to field interviewers.

Slight modifications were also made to the methods used to locate sample members. Prior to the beginning of CATI, all cases had been sent to a credit bureau database service to obtain updated phone and address information about each sample member. Telephone numbers were also available from the previous interview (B&B:93/94 or NPSAS:93) and the National

Change of Address (NCOA)/Telematch update service that NORC had used for all main survey respondent data in February 1996, prior to the start of the field test. The “best” phone number was assumed to be the number most recently obtained.

Additional information used by locating specialists (in order of use) was as follows: (1) all respondent-generated information (e-mails, address corrections from the U.S. Post Office, any previously acquired respondent phone numbers); (2) the last known telephone number of the parent(s); (3) graduate schools (if applicable); (4) undergraduate institutions/alumni associations; (5) the other two credit bureau updating services; (6) a military locating service, if applicable; and (7) the Department of Motor Vehicles in the state that issued the respondent’s last known driver’s license.

A total of 1,680 respondents (15 percent of the total eligible sample) refused to complete the B&B:93/97 interview at some point in the process. After a 2-week “cooling off” period, these cases were contacted by trained interviewers experienced in refusal conversion. The CATI refusal converters were able to complete 340 of the refusal cases. Continuing refusals were forwarded to the field to be contacted in person by a field interviewer. A total of 3,990 cases (36 percent of the total sample) were sent to the field staff, which was successful in completing 2,950 (74 percent) of these cases.

The third follow-up interview (B&B:93/03) started in February 2003. For the first time, respondents were offered the opportunity to conduct their own interview via the Internet. A single, web-based interview was designed and programmed for use as a self-administered interview, a telephone interview, and an in-person interview. In addition, a website was developed to launch the self-administered interview, to provide additional study information, and to collect updated student locating information.

Three weeks after the self-administered interview was made available to sample members in February 2003, telephone interviewing began with those sample members who had not yet completed the self-administered interview. About 3 months after the start of telephone interviewing, field interviewers began tracing and interviewing nonrespondents whose last known address was in one of 30 geographic clusters. From the starting sample of 10,440, about 40 individuals were found to be deceased and another 10 were determined to be ineligible. The unweighted locating rate among the remaining sample members was 93 percent. Of those located, 92 percent completed

the interview, for an overall unweighted response rate of 86 percent. Among respondents, 38 percent completed the self-administered interview on the Internet, 57 percent completed a telephone interview, and the remaining 5 percent were interviewed in person.

Incentives were offered to sample members at two different points during data collection. First, sample members were offered a \$20 cash incentive for completing the self-administered interview within the first 3 weeks of data collection, prior to the start of telephone interviewing. Of those who completed the self-administered interview, 47 percent did so during the incentive period. Additionally, an incentive was used to reduce nonresponse among four groups: those who refused to be interviewed, those who could not be reached by telephone, those for whom only a contact person could be reached, and those who started but did not finish the self-administered interview. Overall, 55 percent of sample members falling into one of the four groups completed the interview following the offer of a nonresponse incentive.

Among the telephone interviewers was a group of refusal conversion specialists trained in converting sample members who have refused to complete the interview. From the point when a sample member refused, the case was handled only by these conversion specialists. In B&B:93/03, slightly less than 10 percent of sample members ever refused to participate in the interview. Of these sample members, 49 percent eventually completed the interview.

Transcript component. In addition to data gathered from sample members, the first B&B follow-up included a transcript component that attempted to capture student-level coursetaking and grades for eligible sample members. Transcripts were requested for all sample members from the NPSAS schools that awarded them their bachelor’s degrees.

Data collection for the transcript component began in August 1994, when request packets were mailed to all 720 NPSAS sample schools from which B&B sample members had graduated. In addition to student transcripts, schools were asked to provide a course catalog and information on their grading and credit-granting systems and their school term. A transcript was requested for all 12,480 students in the B&B sample, although not all transcripts were coded due to sample member ineligibility. Prompting of nonresponding schools began in September 1994 by the telephone center, and attempts were made to address any concerns of school staff regarding confidentiality or the release of transcripts.

The design of the transcript processing system capitalized on work done in previous NORC studies. The process and flow system, however, was changed in four significant areas. First, since the sample of schools from which transcripts were collected was known, the system was designed around the school as the primary unit rather than around the student. Second, transcripts were entered after all school-level information about schedule, grading, and credit-granting systems had been collected and verified. The system enforced these parameters and ensured that the transcripts were internally consistent within the school. Third, the transcript coders worked with the full transcript when entering and coding courses. This allowed the coders to view each entry in context and make intelligent, informed decisions when they encountered difficult situations. Finally, the system was designed so that course-level information within schools was entered only once; subsequent duplicate course entries were selected by the coder from a dynamic school-level list of all courses entered from previous transcripts. If a course failed to match a preexisting entry, the coder searched the school-level table to see if other courses existed for the abbreviation. If a course was not in the table, the coder entered the full course title, the number of credits, and the grade.

Editing. Various edit checks, including CATI edits, have been used in processing B&B data; however, they have not been documented in B&B methodology reports for the base year and first two follow-ups of the B&B:93 cohort.

The coding and editing procedures for the B&B:93 cohort's third follow-up (B&B:93/03) fell into two categories: (1) online coding and editing performed during data collection and (2) post-data collection editing. All data collection for B&B:93/03 used one major system—a web instrument—that included edit checks to ensure that the data collected were within valid ranges. To the extent feasible, this system incorporated across-item consistency edits. Whereas more extensive consistency checks would have been technically possible, the use of such edits was limited to prevent excessive respondent burden.

Both during and after data collection, edit checks were performed on the B&B:93/03 data file to confirm that the intended skip patterns were implemented during the interview. Special codes were added after data collection, as needed, to indicate the reason for missing data. In addition, skip-pattern relationships in the database were examined by methodically running cross-tabulations between gate items and their associated nested items.

For the B&B:2000/01 data, the coding and editing procedures fell under the same two categories as above. During data collection, online coding and editing were performed, requiring CATI range and consistency checks. After data collection, edit checks were performed to verify that the database reflected appropriate skip patterns.

Estimation Methods

Weighting is used in B&B to adjust for sampling and unit nonresponse. Imputation is used to estimate baseline weights from NPSAS when these data are missing and to estimate values when the value is missing; however, no imputation was performed on data collected in the first and second follow-ups of B&B:93. Weighting procedures for the first and second cohorts are described below.

Weighting. For the first B&B cohort's first follow-up, the final weights were calculated by modifying baseline weights in NPSAS:93 to adjust for nonresponse in the B&B:93/94 survey and for tighter eligibility criteria in the B&B sample. NPSAS:93 sample development and weights calculation documentation can be found in the *Sampling Design and Weighting Report for the 1993 National Postsecondary Student Aid Study* (Whitmore, Traccarella, and Iannacchione 1995).

After verifying sample eligibility against transcript data, B&B sample members were stratified according to institutional type and student type. These strata reflected the categories used in NPSAS:93, with some modifications. NPSAS:93 categorized schools into 22 institutional strata based on highest degree offered, control (public or private), for-profit status, and the number of degrees the institution awarded in the field of education (with schools subsequently designated “high ed” or “low ed”). For weighting purposes, these 22 institutional strata were collapsed in B&B into the 16 that granted baccalaureate degrees. The six NPSAS strata representing 2-year or less-than-2-year institutions were reclassified in B&B according to control and included in the correlative “4-year, bachelor's, low ed” stratum. This affected a total of 19 cases. The five student types originally identified in the NPSAS were collapsed in B&B into three types: baccalaureate business majors, baccalaureate other majors, and baccalaureate field unknown, resulting in 48 total cells.

Baseline weights for all B&B-eligible students were adjusted for final degree totals. Control totals for baccalaureate degrees awarded were calculated based on the IPEDS Completions file for academic year 1992–93. The NPSAS institution sample frame was matched to the IPEDS file, and the total number of

baccalaureate degrees awarded was calculated by institutional stratum. An adjusted weight was calculated for each case by multiplying the NPSAS base weight by the ratio of the sum of degrees awarded to the sum of the base weights for the appropriate institutional stratum. This weight became the B&B base weight.

In order to make nonresponse adjustments for weights, adjustment cells were created by cross-classifying cases by institutional stratum and student type. Each cell was checked to verify that it met two conditions: (1) the cell contained at least 15 students; and (2) the weighted response rate for the cell was at least two-thirds (67 percent) of the overall weighted response rate. Any cells that did not meet both conditions were combined into larger cells by combining two student-type cells (baccalaureate business majors and “all other degrees”) within the same institutional stratum. If this larger cell still did not meet the criteria specified above, all three student types from that institutional stratum were combined. Once all cells were defined, the B&B base weight variable (derived above) was multiplied by the inverse of the weighted response rate for the cell.

Final weights for the second follow-up (B&B:93/97) were calculated using a two-step process. First, the base weight calculated for the B&B:93/94 sample was adjusted for non-response to the B&B:93/97 survey. Next, the panel weight was calculated for respondents who participated in all three of the B&B surveys (NPSAS:93, B&B:93/94, and B&B:93/97). The 16 institutional-type and 3 student-type strata were used again, with the same process described previously.

The base weights for the third follow-up (B&B:93/03) were calculated adjusting for the subsample of nonresponding students from B&B:93/97 that were included in the B&B:93/03 survey. The cross-sectional weights for the third follow-up were developed by analyzing 8,970 respondents to the B&B:93/03 interview, using three steps of nonresponse adjustment: inability to locate the student, refusal to be interviewed, and other noninterview adjustments. All nonresponse adjustments were fitted using RTI’s proprietary generalized exponential modeling (GEM) procedure. To detect important interactions for the logistic models, a Chi-squared automatic interaction detection (CHAID) analysis was performed on the predictor variables. In addition, a longitudinal weight was constructed for analyzing students who participated in all four interviews—NPSAS:93, B&B:93/94, B&B:93/97, and B&B:93/03. This weight was constructed by applying an additional nonresponse adjustment to the final B&B:93/03 cross-sectional weight. As for the other

models, CHAID was used to determine the interaction segments, and GEM was used to determine the adjustment factor.

For the second B&B cohort’s first follow-up (B&B:2000/01), weights were obtained in the following manner: the sample design included the first two stages of NPSAS:2000 sample design and an additional B&B:2000/01-specific stage in which a subsample was selected from confirmed and potential baccalaureate recipients identified at the end of the NPSAS:2000 sample. All confirmed baccalaureate recipients were selected into the B&B:2000/01 sample, while nonresponding potential baccalaureate recipients were randomly selected according to probabilities based on a measure of size, which was the estimate of the NPSAS:2000 study weight at the time of sample selection. Once the B&B:2000/01 sample had been selected, initial weights were obtained by adjusting the NPSAS:2000 study weights for both the B&B subsample design and the presence of study-ineligible individuals in the B&B sampling frame. Similar to the first cohort, obtaining the final weights involved using CHAID to determine the interaction segments and GEM to determine the adjustment factor.

For the third B&B cohort’s first follow-up (B&B:08/09), weights were obtained in the following manner: the sample design included the first two stages of NPSAS:08 sample design and an additional B&B:08/09-specific stage in which a subsample was selected from confirmed and potential baccalaureate recipients identified at the end of the NPSAS:08 sample and the B&B transcript collection. All confirmed baccalaureate recipients were selected into the B&B:08/09 sample, while nonresponding potential baccalaureate recipients were randomly selected according to probabilities based on a measure of size, which was the estimate of the NPSAS:08 study weight at the time of sample selection. Once the B&B:08/09 sample had been selected, initial weights were obtained by adjusting the NPSAS:08 study weights for both the B&B subsample design and the presence of study-ineligible individuals in the B&B sampling frame. Obtaining the final weights involved using CHAID to determine the interaction segments and GEM to determine the nonresponse and calibration (poststratification) adjustment factors.

Imputation. The sample for the first B&B cohort (B&B:93) included 23 eligible cases in which the baseline weight from the 1992–93 NPSAS was equal to zero. Weights for these cases were imputed using the average of all nonzero baseline weights within the same institution at which the baccalaureate degree was attained. One of the cases with a missing weight

happened to be the only representative of that institution. The baseline weight was imputed for this case by using the average across all nonzero weights within the same institutional stratum and student type cell.

There was no other imputation of data items in the base-year and first two follow-ups of B&B:93.

In the third follow-up (B&B:93/03), key variables to be used in cross-sectional estimates were imputed. The imputations were performed in three steps. In the first step, the interview variables were imputed. Then, using the interview variables, including the newly imputed variable values, the set of derived variables was constructed. In the final step, the derived variables were imputed again. Only one continuous variable was imputed. Income from work in 2002 had a weighted mean of \$50,846 ($n = 8,540$) prior to imputation and a weighted mean of \$50,961 ($n = 8,810$) after imputation.

Weighted sequential hot deck imputation was selected for B&B:93/03 in part because it has the advantage of controlling the number of times a respondent record can be used for imputation and gives each respondent record the chance to be selected for use as a hot deck donor. To implement the procedure, imputation classes and sorting variables relevant to each item being imputed were defined. If more than one sorting variable was used, a serpentine sort was performed in which the direction of the sort (ascending or descending) changed each time the value of the previous sorting variable changed. The serpentine sort minimized the change in student characteristics every time one of the sorting variables changed its value.

Imputation classes for the B&B:93/03 interview variables, and some of the derived variables, were developed using a CHAID analysis where only respondent data were modeled. The CHAID segmentation process first divided the data into groups based on categories of the most significant predictor of the item being imputed, and then split each of the groups into smaller subgroups based on the other predictor variables. The CHAID process also merged categories for variables found not to be significantly different. This splitting and merging process continued until no additional statistically significant predictors were found. Imputation classes for B&B:93/03 were then defined from the final CHAID segments.

No imputations were performed for the second B&B cohort.

Imputations will be done for the third B&B cohort for the interview variables. The imputed values will then

be used to form derived variables. Similar to B&B:93/03, weighted sequential hot deck will be used with imputation classes and serpentine sorting. SAS Enterprise Miner will be used to form the imputation classes using a tree algorithm similar to CHAID.

5. DATA QUALITY AND COMPARABILITY

Sampling Error

Taylor Series approximations and Balanced Repeated Replication (BRR) are used to estimate standard errors in the first and second cohorts of B&B and Taylor series approximations and bootstrap replication will be used for the third cohort.

Nonsampling Error

The majority of nonsampling errors in B&B can be attributed to nonresponse. Other sources of nonsampling error include the use of ambiguous definitions; differences in interpreting questions; an inability or unwillingness to give correct information; mistakes in recording or coding data; and other instances of human error that occur during the multiple stages of a survey cycle. Different types of nonsampling errors are described below.

Coverage error. The B&B sample is drawn from NPSAS. Consequently, any coverage error in the NPSAS sample will be reflected in B&B. (Refer to chapter 14 for coverage issues in NPSAS.)

Nonresponse error. Overall response rates were generally high for the follow-up surveys. Unit and item nonresponse data are broken down below.

Unit nonresponse. Of the 12,480 cases originally included in the first B&B sample, 1,520 were determined during the interview process to be ineligible or out of scope (primarily because their date of graduation fell outside the July 1–June 30 window). A total of 10,960 cases were considered to be eligible during the interviewing period of the first B&B follow-up, and interviews were completed with 10,080 of these respondents, representing a 92 percent unweighted response rate.

Response rates were even higher for transcript collection. In all, 630 of 640 eligible schools complied with the request for transcripts, providing transcripts for 10,970 of the 12,480 cases—a 98 percent response rate.

In the second follow-up, of the 11,190 cases identified as eligible B&B sample members, 30 were subsequently found to be out of scope or ineligible (29 were sample members who had died since 1993, and one case was identified as ineligible when it was determined the respondent had never received a baccalaureate degree). Interviews were completed with 10,970 of the 11,220 in-scope cases, for a final unweighted response rate of 90 percent. While response rates were similar across many demographic subgroups, some distinctive differences exist. Response rates decreased slightly with age (93 percent of those under 26 compared to 91 percent of those over 30 participated), but participation among males and females was approximately equal. Response rates were also similar among Whites, Blacks, and American Indians (ranging from 90 percent to 92 percent), but substantially lower for Asians/Pacific Islanders (only 82 percent) and those identifying themselves as “other” (74 percent).

In the third follow-up, about 40 individuals from the starting sample of 10,440 were found to be deceased and another 10 were determined to be ineligible. Of the B&B:93/03 sample members who were eligible to participate, 8,970 were interviewed, for an overall unweighted response rate of 87 percent (83 percent weighted). The rate of population coverage varies by type of institution: the rate is higher for public institutions than for private institutions, and higher for institutions offering a master’s or doctoral degree than for those offering a bachelor’s or less or a first-professional degree.

In the second B&B cohort’s follow-up (B&B:2000/01), about 760 individuals from the starting sample of about 11,700 were not located, about 190 were considered “exclusions,” and about 70 were deemed ineligible. A total of about 10,030 (of the approximately 11,520 remaining cases after removing the exclusions) were interviewed. An unweighted CATI response rate for B&B:2000/01 was 86 percent. The weighted overall CATI response rate was 75 percent.

Table 10 summarizes the unit-level (respondent-level) and overall-level (school-level) weighted response rates across B&B administrations.

Item nonresponse. Of the more than 1,000 variables included in the final dataset for the first cohort, 68 contain a response rate of less than 90 percent. The highest nonresponse rate was for items involving recollection of test scores and dates. Respondents also had difficulty recalling detailed information about undergraduate loans and loan payments when they had more than three loans. The two primary sections of the

survey, concerning postbaccalaureate education and employment, had very low rates of nonresponse.

For the second cohort, efforts were made to encourage responses to all interview questions and to limit indeterminates, defined as a “don’t know” response or a refusal to answer a question. As a result of these efforts, item nonresponse throughout the interview was low, with only 6 of 556 items having indeterminate response rates above 10 percent.

Measurement error. Three sources of measurement error identified in B&B are respondent error, interviewer error, and error in the coding of course data from transfer schools where no school-level data were available.

Respondent error. Several weeks after the first follow-up interview of the 1992–93 cohort (B&B:93/94), a group of 100 respondents was contacted again for a reinterview. These respondents were asked a subset of the items included in the initial interview to help assess the quality of these data. The results indicate that the questions elicited similar information in both interviews. Ninety-two percent of respondents gave consistent responses when asked if they had taken any courses for credit since graduating from college. Among the 8 percent with inconsistent responses, most had a short enrollment spell that they mentioned in the initial interview but not in the reinterview.

Ninety-six percent of respondents gave consistent information in both interviews when asked whether they had worked since graduation. Almost three-quarters of respondents gave the same number in both interviews when asked about the number of jobs they held since graduation; 26 percent gave inconsistent responses. Upon scrutiny, many of these discrepancies resulted from jobs held around the time of graduation that were reported in just one of the interviews. Although respondents were asked to include jobs that began before graduation if they ended after graduation, confusion over whether to include such jobs accounted for many of the inconsistencies noted in the reinterview. The 1993–94 B&B field test also included a reinterview study (see *Measurement Error Studies at the National Center for Education Statistics* [Salvucci et al. 1997]).

Interviewer error. The monitoring procedure for statistical quality control used in B&B extends the traditional monitoring criteria (which focus specifically on interviewer performance) to an evaluation of the data collection process in its entirety. This improved monitoring system randomly selects active work stations and segments of time to be monitored, determines what behaviors will be monitored and

precisely how they will be coded, and allows for real-time performance audits, thereby improving the timeliness and applicability of corrective feedback and enhancing data quality. Results for the first follow-up of the 1992–93 B&B cohort revealed a low rate of interviewer error, about three errors for every 100 minutes monitored.

Quality control procedures are also established for field interviewing. The first two interviewer-administered completed questionnaires are sent to a field manager for editing. These cases are edited, logged, and reported weekly, and appropriate feedback is given to the interviewer. Additionally, 10 percent of these cases, whether administered over the phone or in person, are validated by field managers. When deemed necessary, the field managers continue to edit additional cases to monitor data quality. The need for additional monitoring is based on the field manager's subjective

judgment of the field interviewer's skill level. As with the edited cases, validated cases are logged and reported weekly.

Transfer school course coding. The first follow-up of the 1992–93 B&B cohort included a transcript data collection. Although transcripts were requested only from the institution awarding the baccalaureate degree, transcripts from previous transfer schools were often attached. Course data from these transfer school transcripts were coded, but no attempt was made to collect additional information from these schools. Due to the lack of school-level information on the 1,938 transfer schools involved, data from these transcripts are not of the same quality as data coded from the baccalaureate institution's transcripts.

Table 10. Unit-level and overall-level weighted response rates for selected B&B surveys, by data collection wave and cohort

	Unit-level weighted response rate				
	Base year Inst. level ¹	Base year Student level	1st follow- up	2nd follow- up	3rd follow- up
1992–93 student cohort	88	76	92 ²	90 ²	83
1999–2000 student cohort	91 ³	72 ³	82	†	†
2007-08 student cohort	90	64	†	†	†
	Overall-level weighted response rate				
	Base year Inst. level ¹	Base year Student level	1st follow- up	2nd follow- up	3rd follow- up
1992–93 student cohort	88	67	81 ²	80 ²	74
1999–2000 student cohort	91 ³	66 ³	74	†	†
2007-08 student cohort	90	86 ⁴	†	†	†

†Not applicable.

¹ Base year institutional response rates for student sampling lists.

² Unweighted response rate.

³ NPSAS:2000 response rate (includes less-than 4-year institutions).

⁴ Response rates calculated for study respondents as defined for NPSAS:08

NOTE: Follow-up response rates are for student interviews.

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6. CONTACT INFORMATION

For content information on B&B, contact:

Ted Socha
Phone: (202) 502-7383
E-mail: ted.socha@ed.gov

Mailing Address:

National Center for Education Statistics
Institute of Education Sciences
U.S. Department of Education
1990 K Street NW
Washington, DC 20006-5651

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Chapter 17: Survey of Earned Doctorates (SED)

1. OVERVIEW

The Survey of Earned Doctorates (SED) is an annual census of new doctorate recipients from accredited colleges and universities in the United States. The SED is conducted by the National Opinion Research Center (NORC) at the University of Chicago and is funded by six federal agencies: the National Science Foundation (NSF), the lead sponsor; the Department of Education; the Department of Agriculture (USDA); the National Institutes of Health (NIH); the National Endowment for the Humanities; and the National Aeronautics and Space Administration.

Only research doctorates—primarily the Ph.D., Ed.D., and D.Sc.—are counted in the SED. Professional doctorates (e.g., M.D., J.D., Psy.D.) are excluded. While graduate schools are responsible for distributing the survey forms to students, the surveys are completed by the doctorate recipients themselves. The surveys collect information on recipients’ demographic characteristics, educational history (from high school to doctorate), sources of graduate school support, debt level, and postgraduation plans.

The first SED was conducted during the 1957–58 academic year. In addition to housing the results of all surveys, the Doctorate Records File (DRF)—the survey database—contains public information on earlier doctorate recipients back to 1920. Thus, the DRF is a virtually complete data bank on more than 1.7 million doctorate recipients. The DRF also serves as the sampling frame for the biennial Survey of Doctorate Recipients (SDR), a longitudinal survey of science, engineering, and humanities doctorate recipients employed in the United States.

Purpose

To obtain consistent, annual data on individuals receiving research doctorates from U.S. institutions for the purpose of assessing trends in Ph.D. production.

Components

There is one component to the SED.

Survey of Earned Doctorates. The doctorate institution is responsible for administering the surveys to research doctoral candidates and, for the hard-copy version of the survey, collecting the completed questionnaires for mailback to the survey contractor. The doctorate recipients themselves complete the surveys. The following information is collected in the SED: all postsecondary degrees received and years awarded (although only the *first* baccalaureate, master’s, first-professional, and doctoral degrees are entered in the database); years spent as a full-time student in graduate school; specialty field of doctorate; type of financial support received in graduate school; level of debt incurred in undergraduate and graduate school; employment/study status in the year preceding doctoral award; postgraduation plans (how definite, study vs. employment, type of employer, location, and basic annual salary); high school location and year of graduation;

ANNUAL CENSUS OF NEW RESEARCH DOCTORATE RECIPIENTS:

SED collects self-reported data on:

- Demographic characteristics
- Educational history from high school to doctorate
- Mechanisms of financial support in graduate school
- Debt related to education
- Postgraduation plans

demographic characteristics (sex, race/ethnicity, date and place of birth, citizenship status, country of citizenship for non-U.S. citizens, marital status, number of dependents, disability status, educational attainment of parents); and personal identifiers (name, last four digits of the Social Security Number, and permanent address). Dissertation field is keyed both as verbatim text and as a numeric code.

Periodicity

Annual since inception of the SED in the 1957–58 academic year. The database also includes basic information (obtained from public sources) on doctorates for the years 1920 to 1957.

2. USES OF DATA

The results from the SED are used by government agencies, academic institutions, and industry to address a variety of policy, education, and human resource issues. The survey is invaluable for assessing trends in doctorate production and the characteristics of Ph.D. recipients. The SED data are used to monitor the educational attainment of women and minorities, particularly in science and engineering. The increasing numbers of foreign citizens earning doctorates in the United States are studied by country of origin, field of concentration, sources of graduate school support, and the U.S. “stay” rate after graduation. Trends in time-to-doctorate are also analyzed by field, type of support received, and personal characteristics (such as marital status). Data on postdoctoral plans provide insight into the labor market for new Ph.D. recipients, whose careers can be followed in the longitudinal Survey of Doctorate Recipients, whose sample is drawn from the SED.

There is also substantial interest in the institutions attended by Ph.D. recipients. Doctorate-granting institutions frequently compare their survey results with peer institutions, and undergraduate institutions want to know their contribution to doctorate production. The availability of Carnegie Classifications in the DRF facilitates meaningful comparisons of the institutions attended by different demographic groups (e.g., men vs. women). Separate indicators for Historically Black Colleges and Universities (HBCUs) can allow researchers to examine the roles these institutions play in the educational attainment of Blacks.

3. KEY CONCEPTS

Some of the key terms and analytic variables in the SED are described below.

Research Doctorate. Any doctoral degree that (1) requires the completion of a dissertation or equivalent project of original work (e.g., musical composition); and (2) is not primarily intended as a degree for the practice of a profession. While the most typical research doctorate is the Ph.D., there are more than 20 other degree types (e.g., Ed.D., D.Sc., D.B.A.). Not included in this definition are professional doctorates: M.D., D.D.S., D.V.M., O.D., D.Pharm., Psy.D., J.D., and other similar degrees.

Doctorate-Granting Institution. Any postsecondary institution in the United States that awards research doctorates (as defined above) and is accredited at the higher education level by an agency recognized by the Secretary of the U.S. Department of Education. There are over 420 research doctorate-granting institutions.

Field of Doctorate. Specialty field of doctoral degree, as reported by the doctorate recipient. There are over 290 fields in the SED Specialties List, grouped under the following umbrellas: agricultural sciences/natural resources; biological/biomedical sciences; health sciences; engineering; computer and information sciences; mathematics; physical sciences (subdivided into astronomy, atmospheric science and meteorology, chemistry, geological and earth sciences, physics, and ocean/marine sciences); psychology; social sciences; humanities (subdivided into history, letters, foreign languages and literature, and other humanities); education (subdivided into research and administration, teacher education, teaching fields, and other education); and professional fields (subdivided into business management/administration, communication, and other professional fields). Because field of doctorate is designated by the doctorate recipient, the classification in the SED may differ from that reported by the institution in the NCES Integrated Postsecondary Education Data System (IPEDS) Completions Survey (see chapter 12).

Time-to-Doctorate. There are two standard, published measures of time-to-doctorate. The first measures the total elapsed time between bachelor’s degree receipt and doctorate degree receipt and can only be computed if baccalaureate year is known. The second time-to-doctorate variable gauges the time between entry into graduate school (in any program or capacity, and in any university) and doctoral award. Both of these

measures are computed from items in the educational history section of the questionnaire.

Source of Support. Any source of financial support received during graduate school. Doctorate recipients are asked to mark all types of support received and to indicate the primary and secondary sources of support. For most SED years, sources are categorized as own/family resources; university related (teaching and research assistantships, university fellowships, college work-study); federal research assistantships (by agency); other federal support (by mechanism and agency); nonfederal U.S. nationally competitive fellowships (by funding organization); student loans (Stafford, Perkins); and other sources (business/employer, foreign government, state government).

In 1997–98, the number of source options was reduced from 35 to 13. Sources are no longer identified by the specific provider (e.g., federal agency, foundation, loan provider) since students do not always have that knowledge. Only the mechanism of support (e.g., fellowship, research assistantship, loan) is now requested. Most current categories are aggregates of multiple categories in previous questionnaires. For example, the new category “research assistantship” (RA) combines five earlier categories: university-related RA, NIH RA, NSF RA, USDA RA, and other federal RA. The following three categories are new as of 1997–98: grant, internship or clinical residency, and personal savings.

4. SURVEY DESIGN

Target Population

All individuals awarded research doctorates from accredited colleges and universities in the United States between July 1 of one year and June 30 of the following year. Currently, about 49,000 research doctorates are awarded annually by over 420 institutions located in the United States and Puerto Rico. Institutions in other U.S. jurisdictions do not grant research doctorates.

Sample Design

The SED is a census of all recipients of research doctorates in the United States and Puerto Rico.

Data Collection and Processing

The data collection and editing process spans a 21-month period ending 9 months after the last possible graduation date (i.e., June 30). The update of the database and preparation of tables for the first data

release generally require another 4 to 6 months. From the inception of the SED in 1957–58 through the 1995–96 cycle, the survey was conducted by the National Research Council (NRC) of the National Academy of Sciences. In 1996–97, the SED was conducted by the NRC and processed by the new survey contractor, NORC. NORC has conducted all administrations since. The 1996–97 and 1997–98 administrations are considered a transition period. Not all NRC procedures were implemented in this period, and NORC continues to develop and test new procedures.

Reference Dates. The data are collected for an academic year, which includes all graduations from July 1 of one year through June 30 of the following year.

Data Collection. In advance of each administration of the survey, the contractor staff reviews the listings of accredited U.S. institutions in the Higher Education Directory to confirm that past participants are still doctorate granting and identify accredited institutions that are newly doctorate granting. As further confirmation of doctorate-granting status, the degree levels offered are checked in the IPEDS Institutional Characteristics data file (see chapter 12). By May of each year, questionnaires are mailed to the institutions for distribution to doctoral candidates who expect to receive their degree between July 1 of that year and June 30 of the following year. Institutional Coordinators are responsible for the distribution, collection, and return of the surveys. They are asked to provide official graduation lists or commencement programs along with the questionnaires and to provide addresses for students who did not complete questionnaires.

The vast majority of completed questionnaires (87 percent in 2008) are hard-copy versions of the SED survey instrument. A web-based SED option was implemented in 2001. Institutions distribute a link to the SED survey registration web page when students apply for graduation. Upon registering, students receive a PIN and password information via e-mail as well as the URL to the web survey instrument. This process enables coordinators to track the SED completion status of students who choose the web option. Utilization of the web option has grown over time, and accounted for 11 percent of the completed SED surveys in 2008. A third mode of data collection, an abbreviated questionnaire administered through computer-assisted telephone interviewing (CATI) that was initiated in 2005, accounted for the remaining 2 percent of completed surveys in 2008.

Upon receipt of a graduation batch, the contractor staff compares the names of students on completed questionnaires (“self-reports”) with the names in the commencement program or official graduation list. Any discrepancies are followed up with the institution for confirmation of graduation. If an address for a nonrespondent is provided by the institution or found through other means, a letter and questionnaire are mailed (or e-mailed) to the individual to request completion of the survey. A second mail/e-mail attempt is made to elicit participation if a response is not received within a month. Telephone solicitations using the CATI SED data collection mode follow the mail/e-mail efforts. In recent years, these follow-up efforts have yielded enough completed surveys to increase the survey’s overall self-report rate by 5 to 7 percentage points.

For doctorate recipients whose survey returns are still missing after these mailings, “skeleton” records are created from information contained in commencement programs or graduation lists: name; doctorate institution, field, and year; similar information for baccalaureate and master’s degrees; and sex (if it can be positively assumed from the name). Skeleton records have accounted for 7.3 to 8.8 percent of the records each year during the 2000s. In addition, a small percentage of surveys every year (usually less than 1 percent) are classified as “institutional” returns, having been completed by the institutions with whatever information was available to them. While institutional returns may contain more information than is available from commencement programs, their information is minimal compared to that in the self-reported surveys.

Survey contractor staff undergoes intensive training in the complexities of coding and checking procedures and is monitored throughout the collection cycle.

Data Processing. The SED processing includes two special efforts to increase response rates for key items. First, the data entry procedures used by both the NRC and NORC include triggers if any of eight “critical” items is missing: date of birth, sex, citizenship status, country of citizenship (if foreign), race/ethnicity, baccalaureate institution, baccalaureate year, and postdoctoral location. If any of these items is absent, a “missing information letter” (MIL) is generated and sent to the respondent. For these cases, five noncritical items (if missing) are also requested: birthplace, high school graduation year, high school location, master’s institution, and year of master’s degree.

Then, a second follow-up effort requests the same critical items from the doctorate-granting institutions, both for individuals who never completed a survey

(skeletons) and for individuals who completed a survey (self-reports) but did not return the MIL. Because of the lower MIL yield during the transition period, more information was requested from institutions in 1996–97 and 1997–98. Respondents are now asked to provide the name and contact information of a person who is likely to know where they can be reached.

Editing. Records are processed through a multilayered edit routine that checks all variables for valid ranges of values and reviews the interrelationships among variables. The NRC performed these edits and the correction of errors online during data entry; then the full data file was processed a second time through selected edits after survey closure. NORC’s computer-assisted data entry (CADE) system also includes built-in range edits, but the interrelationship (consistency) edits are done after CADE is completed and after derived variables are created. There are more than 130 edit tests for the SED: about 20 range edits (all hard, mandatory edits that cannot be overridden) and nearly 120 interrelationship edits. About two-thirds of the interrelationship edits are hard edits. The remaining third are soft edits, which can be overridden after the responses are double-checked and verified as accurate.

The entire battery of edit tests was reviewed during the 1994–95 SED cycle. A large set of interrelationship tests was developed at this time to verify the accuracy of foreign-country coding for the various time frames covered in the survey. Other interrelationship tests check for reasonable time frames in the doctorate recipient’s chronology, from date of birth through date of doctoral award. Still others verify that the appropriate items are answered in a skip pattern (e.g., study vs. employment postdoctoral plans).

Estimation Methods

No weighting is performed since the SED is a census. Some logical assumptions are made during coding and updating of the database. For example, U.S. citizenship is assumed for Ph.D. recipients who designate their ethnicity as Puerto Rican since, legally, Puerto Ricans are U.S. citizens. Entries of “China” in country of citizenship may be recoded to either Taiwan or the People’s Republic of China, based on the locations of birthplace, high school, baccalaureate institution, and master’s degree institution. Postdoctoral plans are assumed to be employment if items in the employment section are answered and the postdoctoral study section is blank. Postdoctoral study is assumed if the opposite scenario is indicated.

Recent Changes

During the 1990s, the National Science Foundation asked the NRC to implement several new procedures in

an effort to improve both the quantity and quality of the SED data. Since the 1989–90 SED, there has been rigorous follow-up of complete nonrespondents and respondents who do not answer key data items. Race/ethnicity, postdoctoral location, and country of citizenship (if foreign) were first followed up in the 1989–90 cycle, increasing the completeness of these items from that time forward. In the mid-1990s, more than 100 new edit tests were implemented to check the coding of certain foreign countries for specific time frames. In recent years, the survey instrument has been reformatted a number of times to make it more respondent-friendly. Although the content has remained the same, the survey form was expanded from 4 to 12 pages in 1996, reduced to 8 pages in 2001, expanded to 10 pages in 2007, and expanded again to 12 pages in 2010.

During the 1996–97 cycle, the contract for conducting the SED was transferred from the NRC to NORC; this has brought some changes in procedures, as documented in earlier sections. In addition, the 1997–98 questionnaire included a major revision to the source of support question; the response set was changed from specific providers and mechanisms of support to only mechanisms. The marital status question was also changed in 1997–98 to (1) separate “widowed” from “separated/divorced” and (2) add a new category for “living in a marriage-like relationship.”

Future Plans

Additional changes to the SED are under consideration, both to capture new data relevant to current issues in graduate education and to collect better data through existing questions.

5. DATA QUALITY AND COMPARABILITY

The 1990s brought a reexamination of all operational processes, introduction of state-of-the-art technologies, evaluations of data completeness and accuracy, and renewed efforts to attain even higher response rates for every item in the survey. A Technical Advisory Committee was established to guide the conduct of the SED with a look toward the future. A Validation Study was conducted to assess the limitations of the SED data, and data user groups were convened to advise on survey content. The survey instrument was reformatted to make it more respondent-friendly, and questions were revised in 2004 to collect more complete and accurate information. Beginning with the SED 2004, some Federal sponsor-approved changes were made to

the standard questionnaire; questions were added to gather data on additional postsecondary degrees, master’s degree as a prerequisite (formerly a check box and not a separate item), and postdoctoral position. In addition, the Education History items were redesigned and reformatted to ask only for information on completed degrees. Response codes for various items were also modified.

Sampling Error

The SED is a census and, thus, is not subject to sampling error.

Nonsampling Error

The main source of nonsampling error in the SED is measurement error. Coverage error is believed to be very limited. Unit and item response rates have been very high and relatively stable since the first survey in 1957–58 (although they were somewhat lower during the transfer of the SED administration to the new contractor).

Coverage Error. The SED is administered to a universe of research doctorate recipients identified by the universe of research doctorate-granting institutions. Therefore, undercoverage might result from (1) an incomplete institution universe; and/or (2) an incomplete enumeration of research doctorate recipients. The SED coverage has been evaluated and the undercoverage rate has been found to be less than 1 percent, due to the high visibility of doctorate-granting institutions and a comprehensive approach to data collection.

Every year, the universe of institutions is reviewed and compared to the institutional listings in the *Higher Education Directory* and other sources to determine the current list of doctorate-granting institutions. Any institutions newly determined to be doctorate granting are contacted for verification of doctorate-granting status and then invited to participate in the SED. A few qualifying institutions refuse to participate, but it is known from the IPEDS Completions Survey that these institutions contribute minimally to the overall doctorate population.

Individual doctorate recipients are enumerated through (1) survey forms completed by the new Ph.D. recipients and returned by the institution; (2) transmittal rosters that provide the official count of doctorates, the number of surveys completed and returned, and the names of individuals who did not complete surveys; and (3) commencement programs covering every graduation at an institution over the course of a year. Comparisons of the number of research doctorates in the SED with the total number of

doctorates reported by institutions in the IPEDS Completions Survey show that SED's coverage typically differs from IPED's by less than 1 percent.

Nonresponse Error. Targets have been set for both unit and item response in the SED. While the target rates are not always attained, response has been unusually high for a mail survey throughout the 40-plus years of the SED.

Unit Nonresponse. Basic information on non-respondents can be obtained from institutions or commencement programs, so records exist for all recipients of research doctorates. However, response to the SED is measured by the percentage of doctorate recipients who complete the surveys themselves (*self-report rate*), thus providing details that are not available from any other source. SED's goal is a stable self-report rate of 95 percent. This rate has been achieved or surpassed in all but 21 of the 51 surveys processed to date (through the 2008 SED). Response first fell below the target rate in 1986 and stayed low throughout the rest of the 1980s, at which time site visits and intensive follow-up procedures were initiated in an effort to increase the percentage of self-reported questionnaires. Response achieved the target level from 1990 to 1995 but has remained below target from 1996 to 2008 (ranging from 91.2 to 92.9 percent).

Because the SED is administered through doctorate-granting institutions, the self-report rate is dependent upon their overall cooperation and survey practices. Nonresponse tends to be concentrated in a small group of institutions. In the 2008 SED, 1 percent of the 421 doctorate-granting institutions accounted for 13 percent of the total nonrespondents, and the 19 percent of institutions with the highest nonresponse accounted for 65 percent of the total nonrespondents.

To improve tracking of institution response rates, NORC has devised an "early warning system" to identify institutions whose self-report rates lag behind the goal of 90 percent. Estimates for each seasonal graduation are developed based on the numbers for an institution's graduations in previous years. This system also allows monitoring of institutions with specific substantive interest for the SED (e.g., engineering schools, institutions awarding doctorates to large numbers of racial/ethnic minorities).

Item Nonresponse. Certain items are available for all doctorate recipients, whether or not they complete a questionnaire: name, doctorate institution, field of doctorate, month and year of doctoral award, and type of doctorate. This information is always provided by

the institution in its commencement program or graduation list.

A 95 percent target is set for eight "critical" items: date of birth, sex, citizenship, country of citizenship (if foreign), race/ethnicity, baccalaureate institution, baccalaureate year, and postdoctoral location. From the 1989–90 SED (when rigorous follow-up of these items began) to the 1995–96 SED, all items but postdoctoral location achieved response rates above 95 percent. Rates for all critical items except sex and foreign country of citizenship fell below this goal in the 1996–97 and 1997–98 SED administrations, the transition period between contractors. In the 2008 administration, all of the critical items except sex achieved response rates below 95 percent.

Critical items are followed up through letters to self-reporting survey respondents and through requests to institutions for Ph.D. recipients who did not complete questionnaires. Thus, the response rates for these items often exceed the overall self-reporting rate for the survey. Because information can be obtained from sources other than the doctorate recipients, item response rates for the SED are computed on the universe of recipients, whether or not they responded to the survey.

Measurement Error. Most measurement error in the SED results from respondents' misinterpretation of questions or limited recall of past events. The 1994 Validation Study sought to determine the limitations of the SED data. Think-aloud interviews were conducted with recent Ph.D. recipients, who were asked to complete a second survey form within a few months of their original survey submission. The question on sources of support caused the most difficulty; few Ph.D. recipients responded exactly as they did in the initial survey. Problems with this item were confirmed by focus group discussions and comparisons of the SED results with raw data obtained from organizations that fund the various types of support. The source of support question was revised in the 1997–98 SED to request only the mechanism of support (e.g., research assistantship, fellowship, loan) rather than the actual source of funding (e.g., NSF, NIH), which some students do not know.

Interviewees were sometimes confused about the educational history section of the survey, thinking that information on short-term attendance at a school or attendance not leading to a degree was not required. Others were unsure about whether or not to include the time spent working on their dissertations. Such inconsistencies have an impact on time-to-doctorate computations. To address these issues, several new

questions on time to degree were added to the 2001 SED.

Several interviewees also had difficulty responding to the questions on postgraduation plans because, although they currently had a job, they wanted to indicate that they were still seeking a position that would satisfy their aspirations. These comments led to discussions among sponsors and other data users about the intent of the postdoctoral questions and what information is most relevant for policymaking.

Data Comparability

Because a prime use of the SED data is trend analysis, tremendous efforts have been made to maintain continuity of survey content. Five new items have been added since 2001: the basic annual salary for graduates with definite employment plans in the coming year, the level of tuition remission/waiver received during doctoral study, past enrollment in community college, master's degree as prerequisite for doctoral degree, and past or pending D.D.S. or M.D. degree. Occasional changes have been made to item response categories, sometimes affecting the comparability of data over time. For example, in 2001 the racial background question was changed to allow respondents to choose more than one option. In 2004 the education history questions were reformatted to ask specifically for information about the Ph.D., most recent master's degree, and first baccalaureate degree, and an additional question now asks about degrees earned beyond those three. For the items on disability status and debt level, format changes have occurred frequently enough to make comparisons with earlier years unreliable.

An additional modification was made to the 1997–98 questionnaire, affecting the sources of support item. The response set was overhauled to request information on only the mechanism of support (e.g., research assistantship, fellowship, loan) rather than mechanism *and* funder (e.g., NIH RA, NSF RA, university fellowship, NSF fellowship, Ford Foundation fellowship, Stafford loan, Perkins loan). As noted under Measurement Error above, focus groups and comparisons of the SED results with raw data obtained from organizations that fund the various types of support revealed that students do not always know the actual source of their support. The 1997–98 response set for the item on sources of support also includes three new categories: dissertation grant, internship/residency, and personal savings.

This major change has broken the time series for the sources of support item except for selected sources. NORC mapped the pre-1998 response categories to the

new response set and then compared the 1997–98 distribution of responses to earlier distributions back to 1990. Significant shifts were observed in the proportions for some categories, raising concerns about whether the new code frame accurately captures the desired information on sources of support and suggesting the need for more cognitive work in this area. Therefore, users should be cautious about making generalizations regarding the financing of doctoral education over time.

Another comparability issue for the SED involves changes (generally, additions) made over the years to the survey's Specialties List, which is used to code fields for degrees, postdoctoral study, and employment. Because any specialties added to the list would have been coded into an "other" category (e.g., other biological sciences) in previous surveys, users should be careful in their interpretation of time-series field data at the most disaggregated level. The historical changes in the Specialties List are documented in *Science and Engineering Doctorates: 1960–91* (National Science Foundation 1993) and the subsequent series, *Science and Engineering Doctorate Awards* (Hill 2000).

While both unit and item response rates in the SED have been relatively stable through the years, fluctuations can affect data comparability. This is especially important to consider when analyzing data by citizenship and race/ethnicity, where very small fluctuations in response may result in increases or decreases in counts that do not reflect real trends. New procedures implemented in the early 1990s had a significant positive impact on response to these two items as well as to the items on foreign country of citizenship and postdoctoral location, making the data from 1990 to 1996 better in both quantity and quality than data from the late 1980s. Item response for citizenship and race/ethnicity has since fallen to the level of 1990 and earlier years, and item response for postdoctoral location is lower than in most years in the 1990s. Response to country of citizenship among non-U.S. citizens fell 3 percentage points (to 94.3 percent) in the first transition year (the 1997 SED) and has failed to return to pretransition levels.

The reformat of the questionnaire in 1995–96, described in earlier sections, resulted in substantial increases in response to primary source of support, postdoctoral work activity, and postdoctoral employment field. Users should take these changes into account when analyzing trends.

Comparisons with IPEDS. The IPEDS Completions Survey also collects data on doctoral degrees, but the

information is provided by institutions rather than by doctorate recipients. The number of doctorates reported in the IPEDS Completions Survey is slightly higher than in the SED. This difference is largely attributable to the inclusion in the IPEDS Completions Survey of nonresearch doctorates, primarily in the fields of theology and education. The differences in counts have been generally consistent since 1960, with ratios of IPEDS-to-SED counts ranging from 1.01 to 1.06. Because a respondent to the SED may not classify his or her specialty identically to the way the institution reports the field in the IPEDS Completions Survey, differences between the two surveys in the number of doctorates for a given field may be greater than the difference for all fields combined.

6. CONTACT INFORMATION

The National Science Foundation is the Systems Manager of Record for the Survey of Earned Doctorates. The micro-data can be used by institutions that enter into licensing agreements with NSF. The persons to contact concerning this are:

Mark K. Fiegener
Survey of Earned Doctorates
Division of Science Resources Statistics
National Science Foundation
Phone: (703) 292-4622
E-mail: mfigene@nsf.gov

Stephen Cohen
Division of Science Resources Statistics
National Science Foundation
Phone: (703) 292-7769
E-mail: scohen@nsf.gov

For content information about the SED, contact:

NCES Contact:

Nancy Borkow
Phone: (202) 502-7311
E-mail: nancy.borkow@ed.gov

Mailing Address:

National Center for Education Statistics
Institute of Education Sciences
U.S. Department of Education
1990 K Street NW
Washington, DC 20006-5651

NSF Contact:

Mark K. Fiegener
Phone: (703) 292-4622
E-mail: mfigene@nsf.gov

Mailing Address:

Human Resources Statistics Program
Division of Science Resources Statistics, Room 965
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

NORC Contact:

Vince Welch
Phone: (312) 759-4085
E-mail: welch-vince@norc.org

Mailing Address:

SED Project
National Opinion Research Center (NORC)
55 East Monroe Street, 20th Floor
Chicago, IL 60603

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