



National Center for Science and
Engineering Statistics

Survey

Survey of Earned Doctorates | 2021

The SED is an annual census of research doctorate recipients from U.S. academic institutions that collects information on educational history, demographic characteristics, graduate funding source and educational debts, and postgraduation plans.

Survey Description

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Survey Overview (2021 survey cycle)

Purpose

The SED collects data on the number and characteristics of individuals receiving research doctoral degrees from U.S. academic institutions.

Data collection authority

The information collected by the SED is solicited under the authority of the National Science Foundation Act of 1950, as amended, and the America COMPETES Reauthorization Act of 2010. The Office of Management and Budget control number is 3145-0019, expiration date 30 April 2022.

Survey contractor

RTI International.

Major changes to recent survey cycle

Changed the SED field of study taxonomy to the modified 2020 Curriculum of Instructional Program (CIP).

Key Survey Information

Frequency	Annual.
Initial survey year	Academic year 1957–58.
Reference period	Academic year 2020–21 (1 July 2020 to 30 June 2021).
Response unit	Individuals.
Sample or census	Census.
Population size	52,250.
Sample size	Not applicable.
Key variables	<p>Key variables of interest are listed below.</p> <ul style="list-style-type: none">• Academic institution of doctorate• Baccalaureate-origin institution (U.S. and foreign)• Birth year• Citizenship status at graduation• Country of birth and citizenship• Disability status

- Educational attainment of parents
- Educational history in college
- Field of each degree earned
- Graduate and undergraduate educational debt
- Marital status, as well as the number and age of dependents
- Postgraduation plans (e.g., work, postdoc, other study or training)
 - Primary and secondary work activities
 - Source and type of financial support for postdoctoral study or research
 - Type and location of employer
 - Basic annual salary
- Race and ethnicity
- Sex
- Sources of financial support during graduate school
- Type of academic institution (e.g., historically Black colleges and universities, Carnegie codes, public or private) awarding the doctorate

Survey Design

Target population

The population for the 2021 SED consists of all individuals receiving a research doctorate from a U.S. academic institution in the 12-month period beginning 1 July 2020 and ending 30 June 2021. A research doctorate is a doctoral degree that (1) requires completion of an original intellectual contribution in the form of a dissertation or an equivalent culminating project (e.g., musical composition) and (2) is not primarily intended as a degree for the practice of a profession. The most common research doctoral degree is the PhD. Recipients of professional doctoral degrees, such as MD, DDS, DVM, JD, DPharm, DMin, and PsyD, are not included in the SED.

Sampling frame

The sampling frame of doctorate recipients is created by first identifying all institutions that confer research doctorates and then identifying all individuals receiving a research doctorate from those institutions in the 12-month period ending 30 June 2021. The list of institutions is based principally on the institutions in the prior survey cycle augmented by any new institutions on the Integrated Postsecondary Education Data System (IPEDS) and other higher education resource databases. The list of doctorate recipients is created from administrative sources such as commencement lists from the institutions and commercial databases of doctorate dissertations. The total universe in 2021 included 52,250 persons from 448 institutions that conferred research doctorates.

Sample design

The SED is a census.

Data Collection and Processing

Data collection

Two modes of data collection are used in the SED: self-administered Web survey and computer-assisted telephone interviewing (CATI). The self-administered Web survey is the primary mode of SED completion. The proportion of SED completions using the Web has increased each year since it was introduced in 2001, and it reached 97.6% in 2021.

Nonrespondents are contacted by e-mail and mail to complete the Web survey. If the series of follow-up e-mails and mailings is unsuccessful, the survey contractor attempts to reach nonrespondents to complete an abbreviated survey by CATI. Approximately 2.4% of SED completions were from CATI in 2021. At the end of data collection phase, institutional coordinators are contacted to obtain information on a small number of critical SED data items for nonrespondents from their institution.

Data processing

The data collected in the SED are subject to automated editing and coding procedures. Imputation is not performed for missing survey data items except for the month value used in calculation of the age at doctorate and time to degree variables.

Estimation techniques

The survey is a census, which does not require any sampling; weighting is not used to adjust for nonresponse.

Survey Quality Measures

Sampling error

Not applicable because the SED is a census.

Coverage error

Due to the availability of comprehensive lists of doctorate-granting institutions and the institutions' high levels of participation in the survey, coverage error of institutions is minimal. Because the graduate schools collect the survey data from degree recipients at the time of doctorate completion, coverage error for the universe of doctorate recipients is also minimal. Comparisons of the institutions and the number of research doctorate recipients covered by the SED with the total number of doctorate recipients (including non-research doctoral degree recipients) reported by institutions to the [National Center for Education Statistics](#) confirm that there is minimal coverage error of doctorate recipients. In 2021, 12 doctorate-granting institutions declined to fully enumerate their doctorate recipients for academic year 2021. Information on the graduates for all of these institutions were found from other sources, such as ProQuest.

Nonresponse error

Unit nonresponse

Of the 52,250 individuals granted a research doctorate in 2021, 91.5% completed the survey. A limited number of SED critical data items (doctoral institution, year of doctorate, field of doctorate, type of doctorate, and, if available, baccalaureate institution, master's degree institution, and sex) are constructed for nonrespondents from commencement programs, graduation lists, and other similar public records. Nonresponse was concentrated in a small number of institutions, with 22 institutions accounting for 50% of the total unit nonresponse.

Item nonresponse

Among the 52,250 individuals who received a research doctorate in 2021, item nonresponse rates for the five key SED demographic variables—sex, citizenship, country of citizenship, race and ethnicity, and location after graduation—range from 0.0% for sex to 7.9% for location after graduation.

Measurement error

Measurement error in the SED is attributable to several sources, including errors in respondent reporting and errors that occur during data processing. Data reported by respondents about their educational history, including degree institutions and field of study, that are not self-coded within the survey instrument are reviewed and coded by trained coders. Generally, the percentage of responses that require manual coding is low. In 2021, 1.6% of doctorate fields of study were manually coded, as well as 1.8% of associate's degree fields, 0.7% of bachelor's degree fields, and 1.3% of master's degree fields.

Data Comparability

Data availability

Each year's survey data are compiled into the Doctorate Records File (DRF) and trend data are available back to 1958; more limited information (sex, institution, field, and year of doctorate) is contained on the DRF for PhDs who graduated in 1920–56.

Data comparability

Because of procedural changes implemented during the 1990 survey cycle to improve the completeness of race, ethnicity, and citizenship data, the data from 1990 and later years are not directly comparable to data before 1990.

In 2021, the education history section was changed to a table format in which respondents can select all the postsecondary degrees received, up to nine degrees. Based on the degrees reported, follow-up questions asked about each type of degree, including any professional doctorate being earned.

Beginning in 2021, field of study and doctorate dissertation field data are collected using a modified version of the 2020 [Classification of Instructional Programs](#) (CIP) codes. Therefore, the field of study data in 2021 may not be comparable to prior survey cycle data; see the 2021 survey cycle "Technical Notes" at <https://nces.nsf.gov/sed> for more information.

Data Products

Publications

The data from this survey are published annually in the series [Doctorate Recipients from U.S. Universities](#). Other survey data products are also available at <https://www.nsf.gov/statistics/srwydoctorates/#tabs-3>.

Information from the survey is also included in the series [Science and Engineering Degrees by Race/Ethnicity of Recipients](#), in [Science and Engineering Indicators](#), and in [Women, Minorities, and Persons with Disabilities in Science and Engineering](#).

Electronic access

Access to tabular data on selected variables from 1958 onward is available in an [interactive data tool](#) from the National Center for Science and Engineering Statistics (NCSES). Users can create custom tables of the number of doctorate recipients by academic discipline and institutional characteristics of either the doctorate-granting institution or the baccalaureate-granting institution of doctorate recipients. A limited set of demographic characteristics are available to create custom tables by academic discipline. A more comprehensive set of analysis variables are available in the [SED Restricted Data Analysis System \(RDAS\)](#) for the data user to generate custom data tables in a secured platform.

Restricted access

Access to restricted data for researchers interested in analyzing microdata can be arranged through a licensing agreement. For more information, see the [NCSES Licensing Page](#).