



Examining the Relationship between Educational Attainment and Career Pathways for U.S. College Graduates

Emilda B. Rivers
Deputy Director

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Measuring the Outcomes of Higher Education –
International Trends in National Surveys of College Graduates

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National Center for Science and Engineering Statistics (NCSES)
www.nsf.gov/statistics

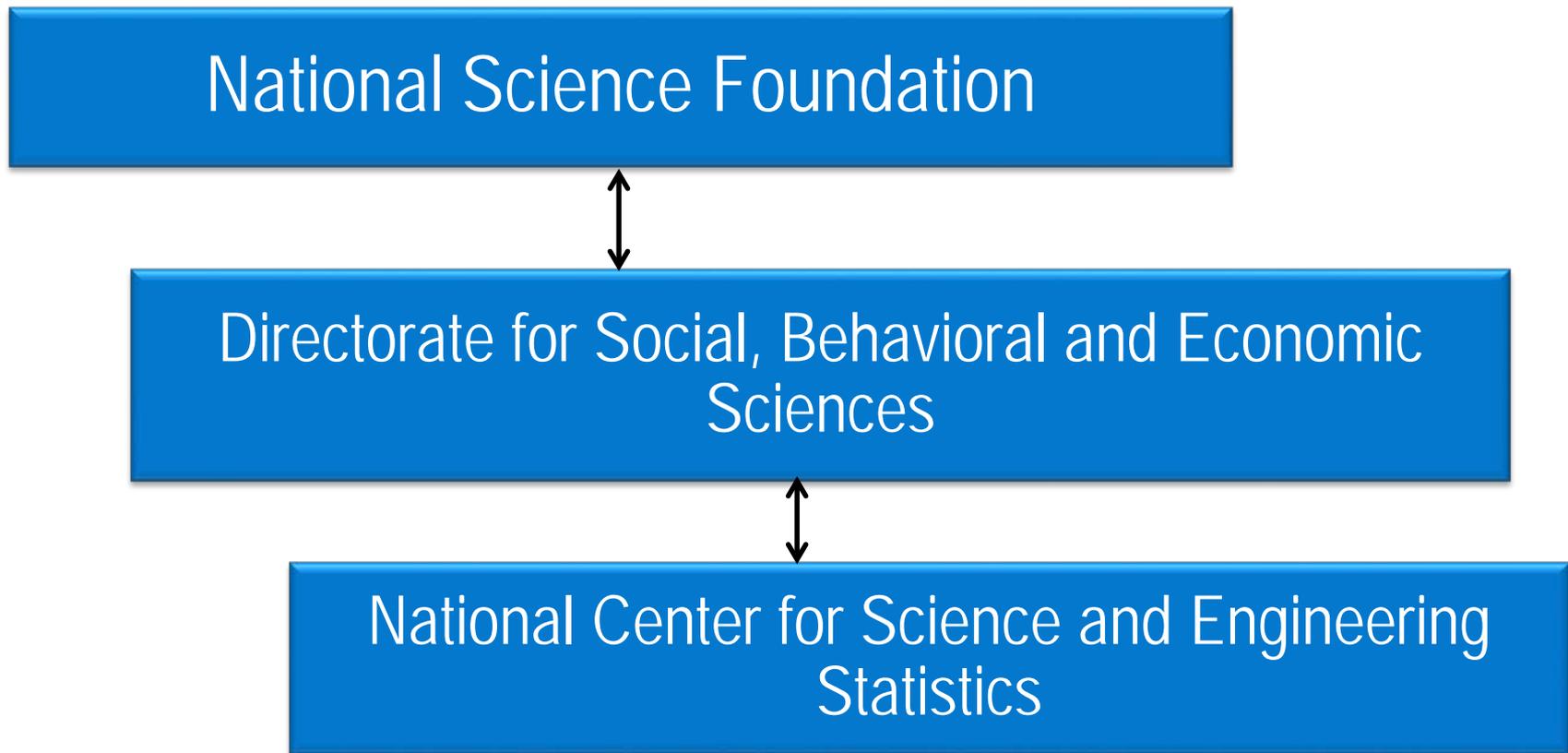


Today's Discussion

- National Center for Science and Engineering Statistics (NCSES) Background
- U.S. Surveys of College Graduates
- NCSES National Survey of College Graduates (NSCG)
 - Purpose and Historical Background
 - Design
 - Resources
 - Data Usage
- National Center for Education Statistics (NCES) Baccalaureate and Beyond Survey



Organizational Placement of the National Center for Science and Engineering Statistics (NCSES)





NSF Mission:

*"to promote the progress of science;
to advance the national health, prosperity, and welfare;
to secure the national defense"*

[NSF Act of 1950 (Public Law 81-507)]



NCSES Mission:

Responsible for *statistical data* on:
research and development (R&D);
the science and engineering (S&E) workforce;
U.S. competitiveness in science, engineering, technology, and R&D;
the condition and progress of science, technology, engineering and mathematics (STEM) education in
the United States.

[America COMPETES Reauthorization Act of 2012 (Section 505)]



NCSES: A Federal Statistical Agency

Mission

Responsible for statistical data on:

- Research and development (R&D)
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- U.S. competitiveness in science and engineering
- The condition and progress of science, technology, engineering and mathematics (STEM) education in the United States

Publications and Products

- Special analytic reports
- InfoBriefs
- Detailed statistical tables
- Working papers designed to further exploration and discussion of a topic



InfoBrief

NCSES National Center for Science and Engineering Statistics

May 2016 ■ NSF 16-312

Federal Science and Engineering Obligations to Universities and Colleges Increase by 6% in FY 2014

by Michael Yamaner¹

In FY 2014, federal agencies obligated \$30.8 billion to 996 academic institutions for science and engineering (S&E) activities, a 6% increase in current dollars from the \$29.1 billion obligated to 995 academic institutions in FY 2013. This is the first increase in S&E funding to academic institutions since FY 2009. These statistics are from the Survey of Federal Science and

facilities and equipment for instruction in S&E; fellowships, traineeships, and training grants; general support for S&E; and other S&E activities (table 1).

Federal academic R&D obligations increased by \$1.5 billion (6%) between FY 2013 and FY 2014. Four of the five remaining categories showed increased

showing the second largest increase (\$0.4 billion) and R&D plant the third largest (\$89 million). Other S&E activities decreased 17% (\$0.3 billion in FY 2014) (table 1).

Agency Sources for Academic S&E Support
Collectively, the Department of Health and Human Services (HHS), NSF, and



Science and Engineering Doctorates

DATA REPORT TECHNICAL NOTES SURVEY DESCRIPTION RELATED RESOURCES HOW DO I...?

Report Home prev next

What influences the path to the doctorate?

Chart | Data | Download

Highest parental educational attainment: 1994–2014

Percent doctorate recipients

At least one parent with advanced degree

Neither parent with more than high school diploma

At least one parent with bachelor's degree

Parental education: Overview

The parents of recent doctorate recipients are better educated than the parents of earlier cohorts of doctorate recipients. The share of doctorate recipients from families in which neither parent has earned more than a high school degree is declining, and the proportion of families in which at least one parent has earned a bachelor's degree or higher continues to climb, rising from 55% of doctorate recipients in 1994 to 69% in 2014.

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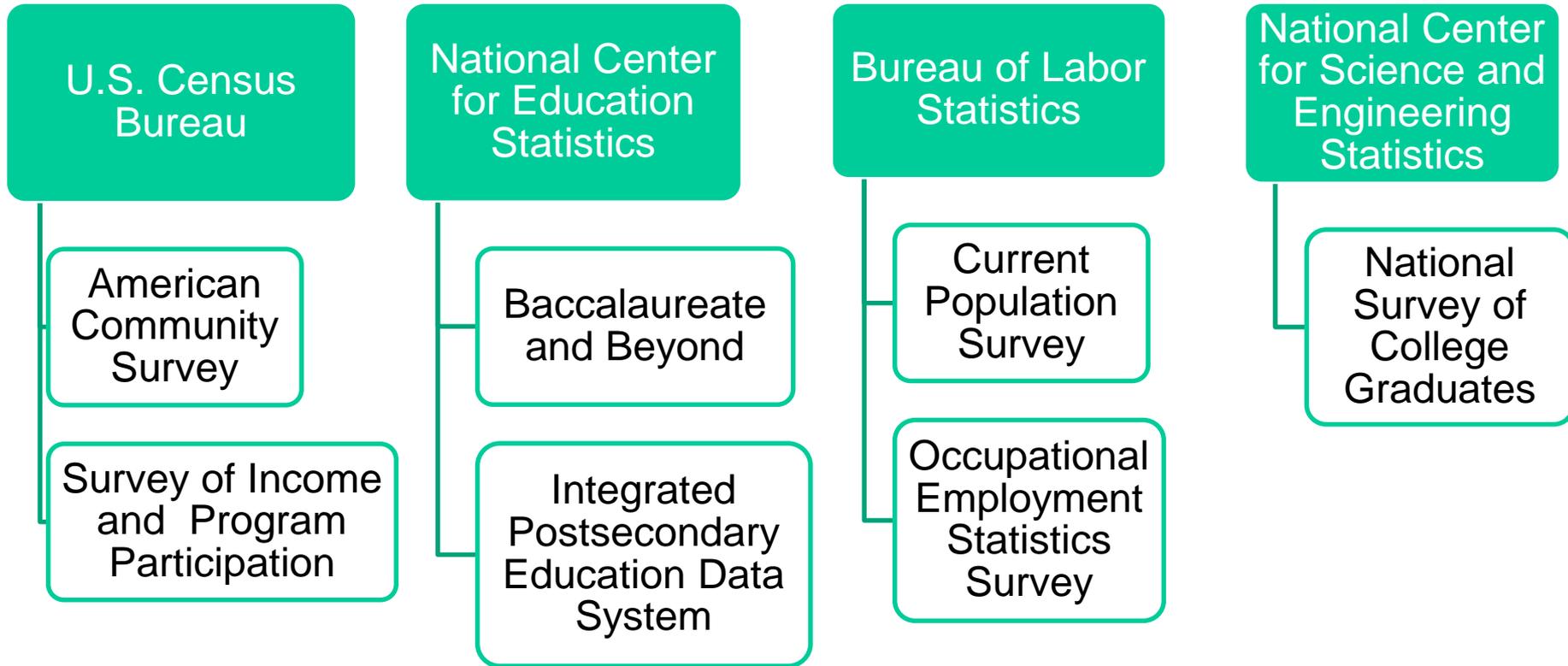


NCSES: A Federal Statistical Agency

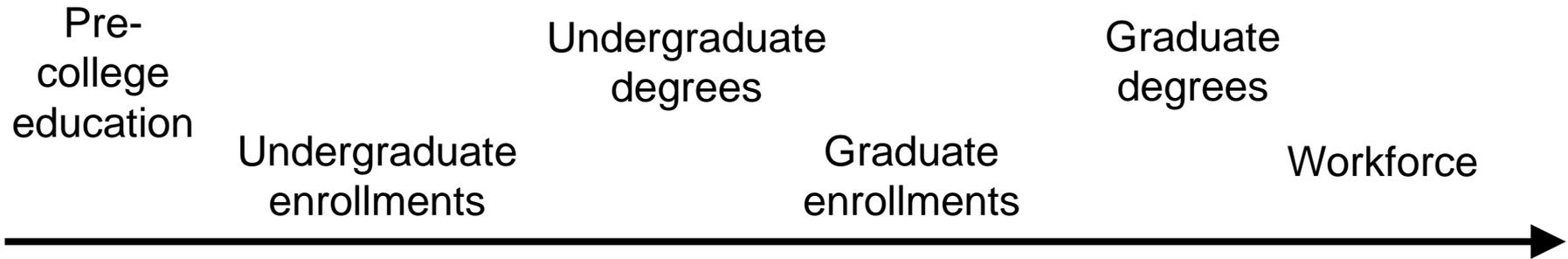
- Design and conduct 13 major national surveys
- Gather science and technology (S&T) -relevant data from other agencies and organizations
- Develop and maintain databases on R&D, S&E education, the S&E workforce, and related areas
- Provide global context for U.S. data and enable comparisons and benchmarking through national and international collaborations
- Prepare and publish periodic reports for a broad clientele



U.S. Federal Statistical Agencies with National Surveys on College Graduates



Scope of Human Resources Data

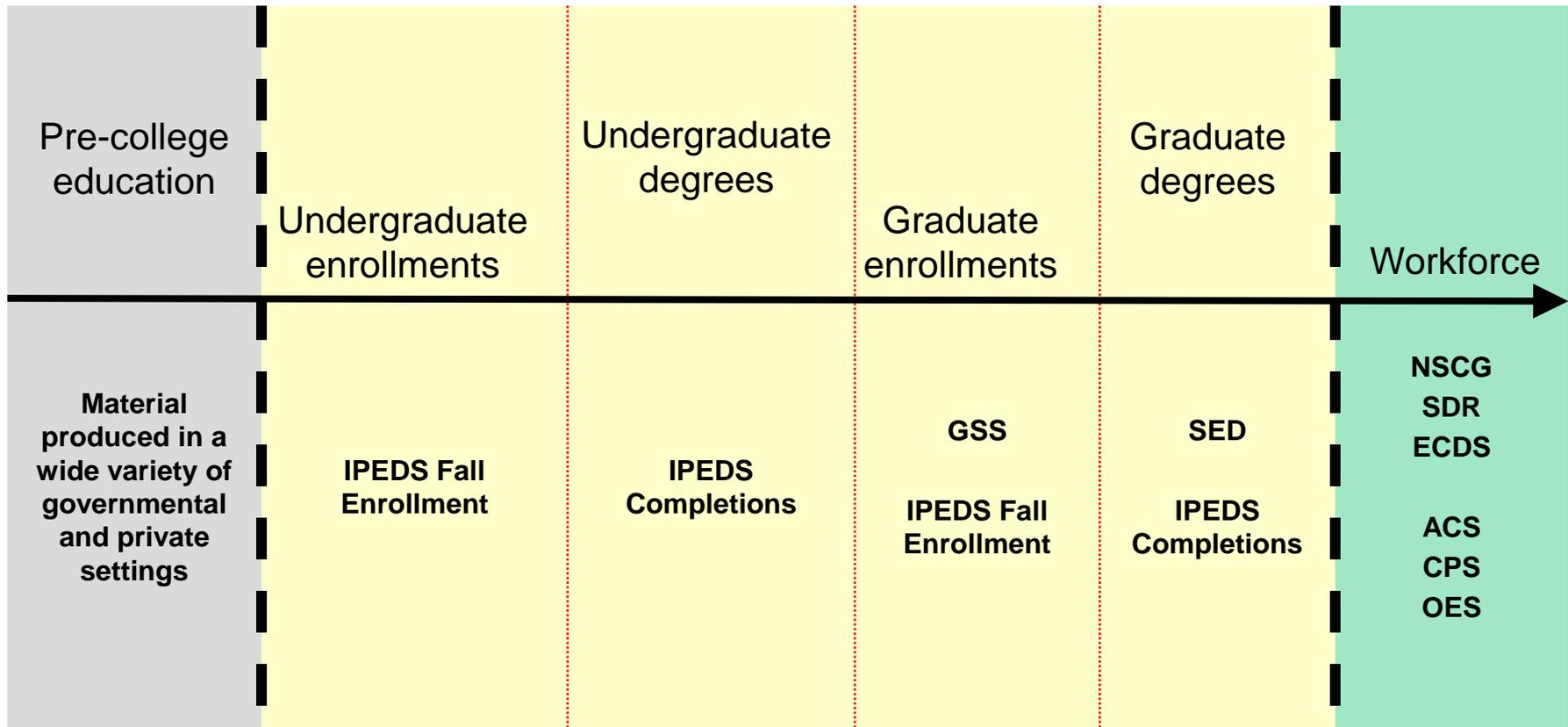


With the current approach, at each stage, we are trying to understand:

- How many people are in this stage?
- What are their demographic characteristics?
- What are the short-term and long-term trends at that stage?
- How does performance at one stage relate to subsequent stages?



Availability of Human Resources Data

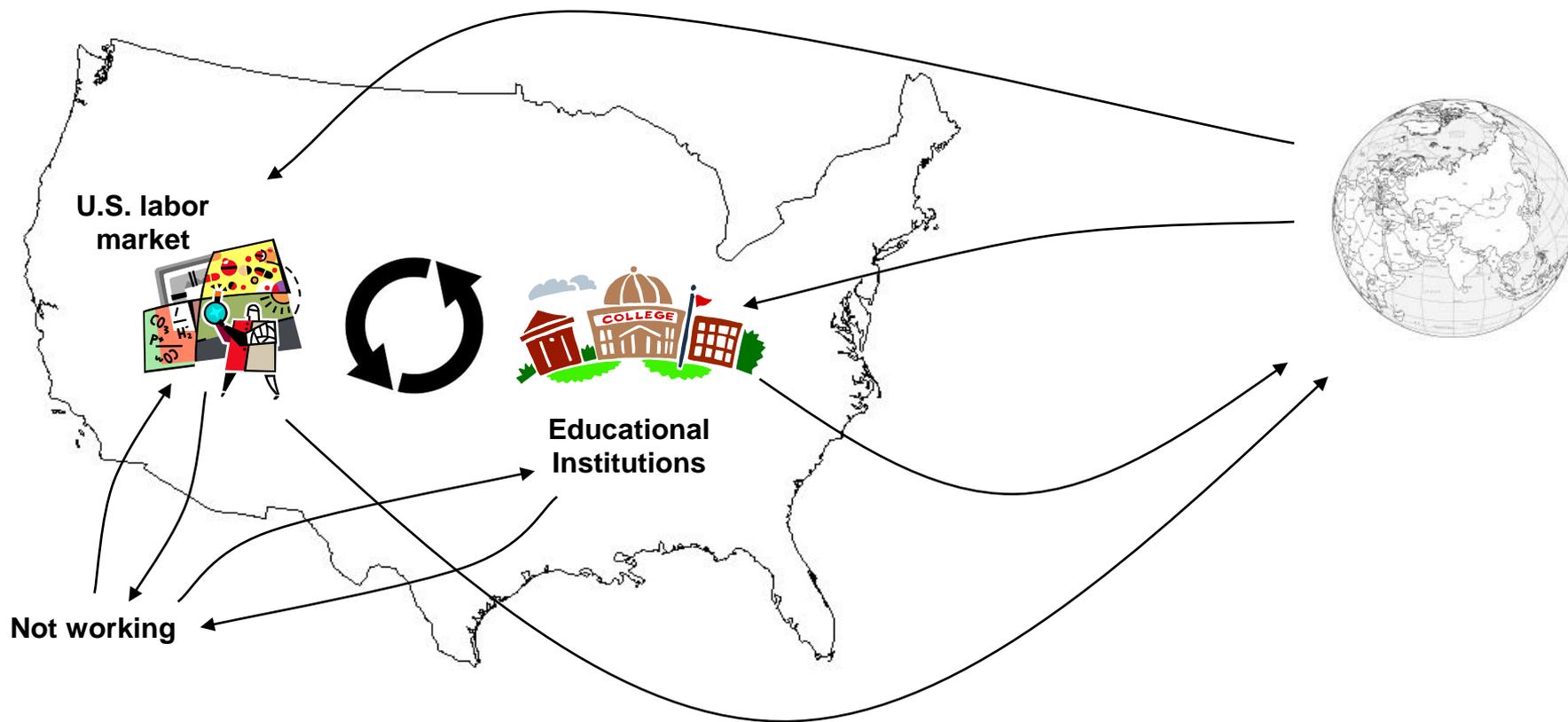


Legend

- ACS: American Community Survey
- CPS: Current Population Survey
- ECDS: Early Career Doctorates Survey
- GSS: Survey of Graduate Students and Postdoctorates in Science and Engineering
- IPEDS: Integrated Postsecondary Education Data System
- NSCG: National Survey of College Graduates
- OES: Occupational Employment Statistics Survey
- SDR: Survey of Doctorate Recipients
- SED: Survey of Earned Doctorates

Flows and Pathways

There is no distinct pipeline that individuals follow – education and career movement is better described as flows and pathways.





NCSES National Survey of College Graduates



- A biennial survey of the college graduate population residing in the United States, designed to provide national-level estimates
- Historically, sample selected from the once-a-decade decennial census long form
- Beginning with the 2010 NSCG, sample selected from the U.S. Census Bureau's American Community Survey (ACS)
- Information from individuals educated or employed in S&E fields as well as those educated or employed in non-S&E fields
- Data on the “stock” of scientists and engineers, including immigrants

NCSES National Survey of College Graduates: Design



- Complex sample design includes the following features:
 - 6-year rotating panel design (baseline + 3 biennial follow-ups)
 - Young graduate oversample (18,000)
 - Cross-sectional and longitudinal analyses capability
- Stratified sample selection based on ACS information
 - Degree level
 - Field of degree
 - Occupation
 - Demographic group
- Sample allocation based on reliability requirements for key analytical domains

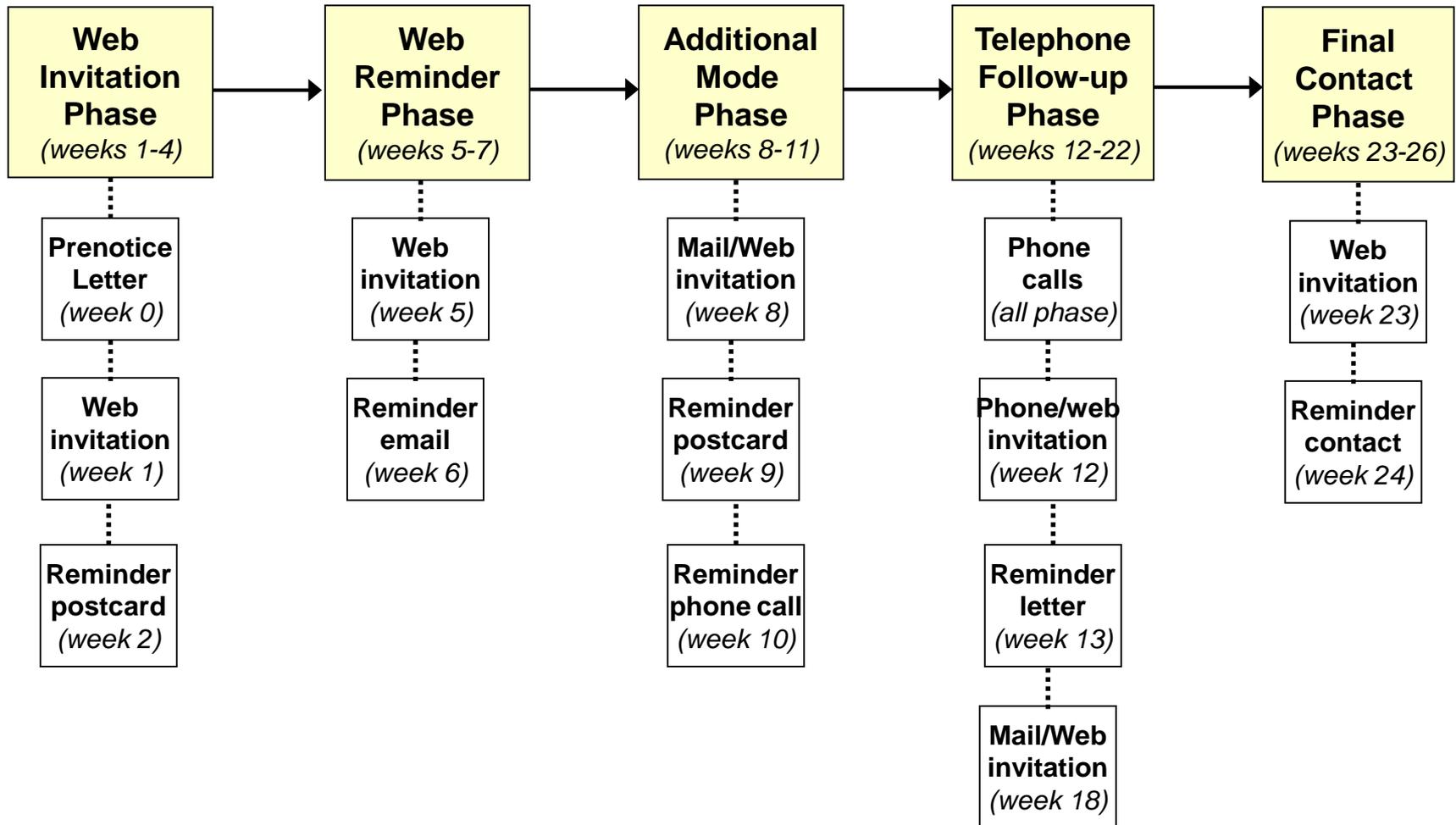


NCSES National Survey of College Graduates: Methodology



- Most recent cycle: 2017 NSCG (reference date of February 1st)
- Contact types: letter, postcard, email, and telephone call
- Response modes: web, mail, and telephone
- Response rate: 70%
- Response distribution by mode
 - 79% respond by web
 - 12% respond by mail
 - 9% respond by telephone

NCSES National Survey of College Graduates: Contact Strategy



NCSES National Survey of College Graduates: Topics



Core Topics: Collected every survey round to produce basic labor force information

- Employment
 - Labor force status
 - Characteristics of job and employer
 - Work activities
 - Relationship of education and occupation
- Education
 - Complete degree history
 - Community college enrollment
 - Financial assistance for education
 - Continuing education activities
- Demographics
 - Sex
 - Race/ethnicity
 - Marital status
 - Citizenship status
 - Disability status
 - Number of children

NCSES National Survey of College Graduates: Topics



Module Topics: Periodically collected data to probe policy issues or to understand a subpopulation

- Professional certifications: 2015
- Community college enrollment: 2013, 2015
- Education debt (amount borrowed/owed): 2013, 2015
- Job satisfaction and attributes: 2003, 2010, 2013, 2015
- Federal support of work: 2003, 2010, 2013, 2015
- Immigration information: 2003, 2010, 2013, 2015
- Organization of work: 2006
- International collaboration: 2006
- Academic positions: 2003
- Productivity measures (publications, patenting): 1995, 2003

NCSES National Survey of College Graduates: Recent Changes



- Sample Design and Survey Methodology
 - 2010: Initial implementation of rotating panel sample design in response to the 2008 CNSTAT recommendation
 - 2013: “Web first” data collection strategy resulted in dramatic increase in response by web (35% in 2010; 79% in 2017)
 - 2013: Implementation of adaptive design data collection strategies
 - 2013: Implementation of young graduates oversample designed to replace the National Survey of Recent College Graduates (NSRCG) as coverage source for this important population
- Survey Content
 - 2013: Inclusion of module questions on community college enrollment and education debt
 - 2015: Inclusion of module questions on professional certifications



NCSES National Survey of College Graduates: Staffing & Budget



- Staff are all permanent federal employees
- Interagency agreement with the U.S. Census Bureau to conduct the survey
- Agreement period: 3 years (1 survey cycle)
- Survey cost: \$13.4 million per cycle
- Survey manager: Lynn Milan (l Milan@nsf.gov)



NCSES National Survey of College Graduates: Strengths & Challenges



- Strengths
 - Reliable estimation of
 - the S&E workforce by demographic, occupation, and degree characteristics
 - foreign-earned degree holders
 - Ability to measure inflow of new graduates into S&E workforce
 - Comparison of S&E and non-S&E estimates
- Challenges
 - Frame, current dependency on U.S. Census Bureau
 - Increasing nonresponse in recent years
 - Granularity limitations (e.g., geography, race/ethnicity, detailed occupation)



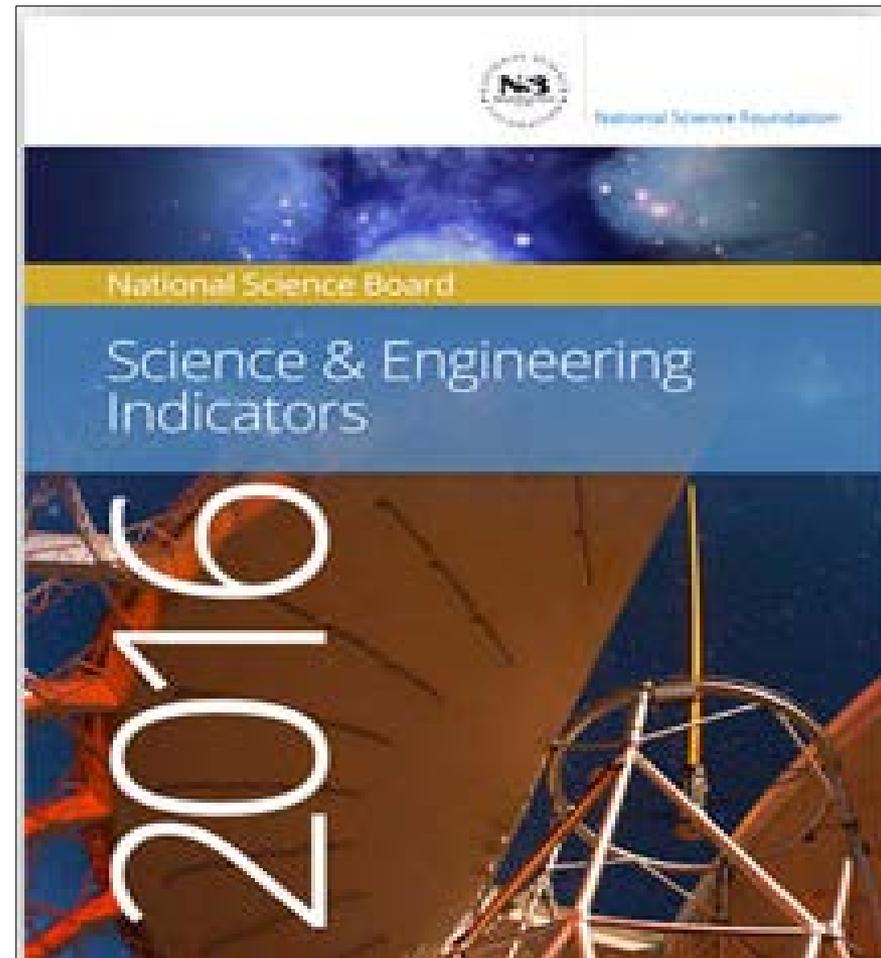
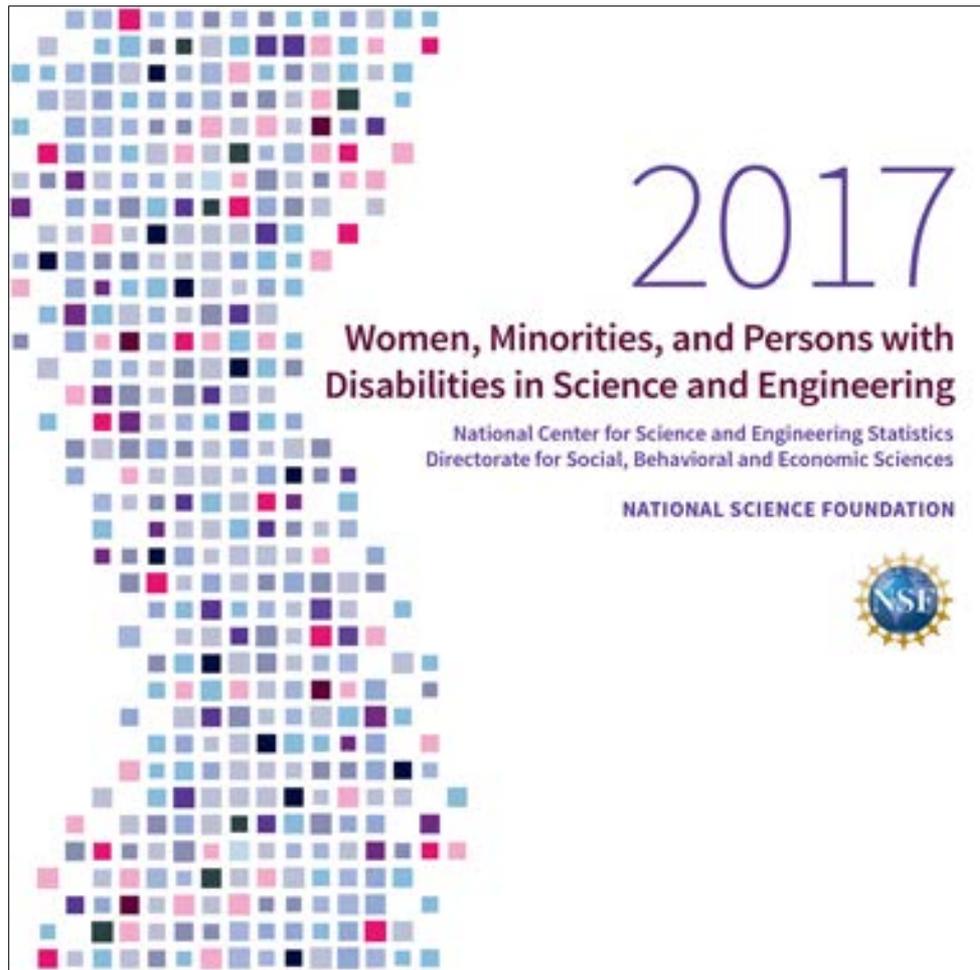
NCSES National Survey of College Graduates: Data Usage



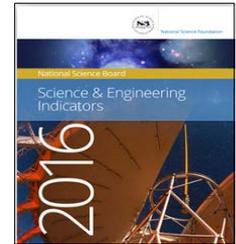
- Evaluation of factors that influence exiting the science and engineering occupational field including the role of degree field, family characteristics, and demographics
- Examination of labor market outcomes for foreign-earned degree recipients
- Gender wage comparisons among the college-educated population

Congressionally mandated biennial reports

- *Women, Minorities, and Persons With Disabilities in Science and Engineering* (odd numbered years)
- *Science and Engineering Indicators* (even numbered years)



Science and Engineering Indicators (SEI)



- Prepared by NCSES for the National Science Board
- Depicts the state of the U.S. and world S&E enterprise at a particular point in time
- Includes data from NSCG and other NCSES surveys, but also includes data from other high quality U.S. and international sources
- Provides
 - policy relevant policy neutral, does not evaluate or recommend policy options
 - descriptive text that does not go beyond the data to provide explanations or interpretations

NCES Baccalaureate and Beyond Survey



Examines students' education and work experiences after they complete a bachelor's degree, with a special emphasis on the experiences of new elementary and secondary teachers

Following several cohorts of students over time, B&B

- Looks at bachelor's degree recipients' workforce participation, income and debt repayment, and entry into and persistence through graduate school programs, among other indicators
- Addresses several issues specifically related to teaching, including teacher preparation, entry into and persistence in the profession, and teacher career paths
- Gathers extensive information on bachelor's degree recipients' undergraduate experience, demographic backgrounds, expectations regarding graduate study and work, and participation in community service

NCES Baccalaureate and Beyond Survey

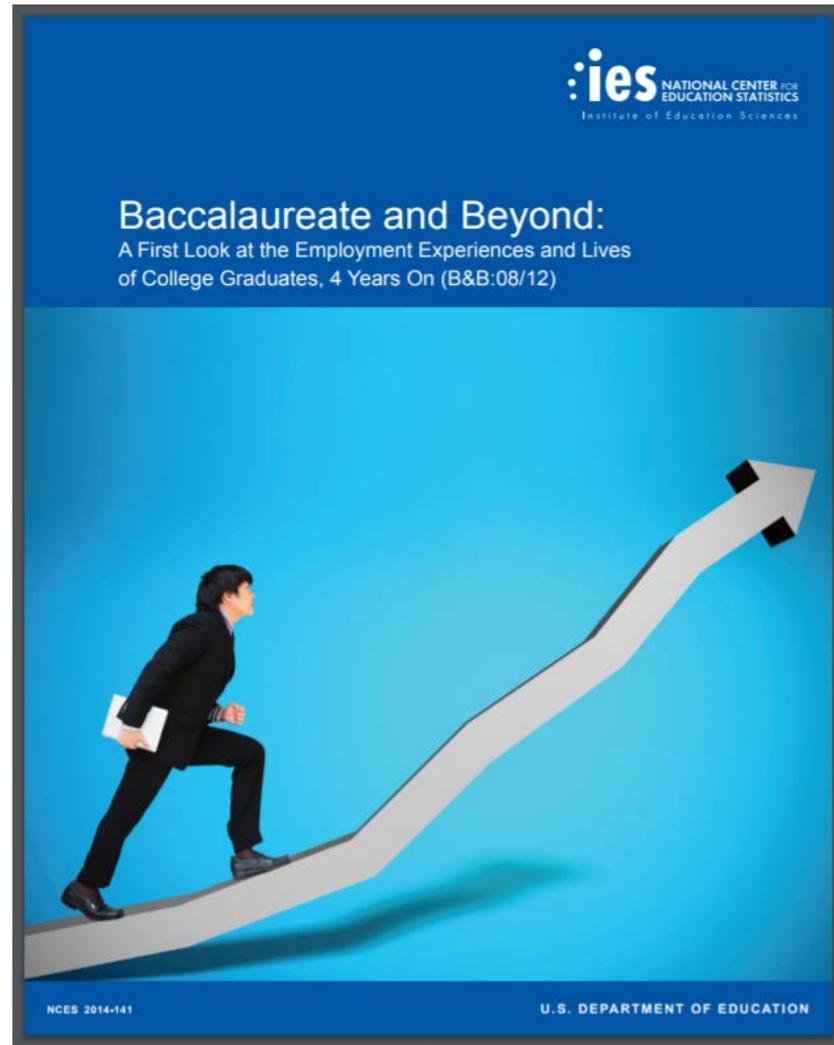


The study includes two follow-ups

- The first follow-up, which was conducted 1 year after graduation, explored both undergraduate education experiences and early post-baccalaureate employment and enrollment
- The second follow-up, conducted in 2012, examined bachelor's degree recipients' labor market experiences and enrollment in additional postsecondary degree programs through the 4th year after graduation



NCES Baccalaureate and Beyond Survey





Thank you for your interest

Emilda B. Rivers, Deputy Director,
National Center for Science and Engineering Statistics
National Science Foundation
erivers@nsf.gov (703) 292-7773