

SF-83-1 SUPPORTING STATEMENT

for

Survey of Doctorate Recipients

for 2015 SDR Survey Cycle

TABLE OF CONTENTS

A. JUSTIFICATION	1
A.1 Necessity for Information Collection.....	2
A.2 Uses of Information	2
A.3 Consideration of Using Improved Technology.....	6
A.4 Efforts to Identify Duplication.....	6
A.5 Efforts to Minimize Burden on Small Business	7
A.6 Consequences of Less Frequent Data Collection.....	7
A.7 Special Circumstances	7
A.8 Federal Register Announcement and Consultations Outside the Agency	7
A.9 Payment or Gifts to Respondents.....	11
A.10 Assurance of Confidentiality	13
A.11 Justification for Sensitive Questions.....	14
A.12 Estimate of Respondent Burden.....	14
A.13 Cost Burden to Respondents	14
A.14 Cost Burden to the Federal Government	14
A.15 Reason for Change in Burden	14
A.16 Schedule for Information Collection and Publication	15
A.17 Display of OMB Expiration Date	15
A.18 Exception to the Certification Statement	15
B. COLLECTION OF INFORMATION EMPLOYING STATISTICAL METHODS	16
B.1 Respondent Universe and Sampling Methods	16
B.2 Statistical Procedures	18
B.3 Methods to Maximize Response	20
B.4 Testing of Procedures.....	27
B.5 Responsive Design and Nonresponse Error Assessment.....	29
B.6 Contacts for Statistical Aspects of Data Collection	30

LIST OF ATTACHMENTS

Attachment A – NSF Act of 1950; America COMPETES Reauthorization Act of 2010	A-1
Attachment B – First Federal Register Announcement	B-1
Attachment C – Draft 2015 SDR Questionnaire.....	C-1
Attachment D – Draft 2015 SDR Survey Mailing Materials.....	D-1
Attachment E – 2013 Survey of Doctorate Recipients: Sample Design and Implementation Report	E-1
Attachment F – 2015 SDR Sample Allocation and Selection Tables.....	F-1
Attachment G – 2015 SDR Contacting Protocol Experiments Results	G-1

A. JUSTIFICATION

This request is for a three-year reinstatement of the previously approved OMB clearance for the Survey of Doctorate Recipients (SDR). The SDR was last conducted in 2013 and the OMB clearance for the 2013 SDR expired November 30, 2014 (OMB No 3145-0020). While the data collection instruments for the 2015 SDR are largely unchanged from the prior round, the sample has been greatly enlarged from 47,000 to 120,000 individuals to support new and expanded analytical objectives. Additionally, data collection procedures have been modified to accommodate the change in sample composition.

SDR Background

The SDR provides information on scientists and engineers who were awarded doctoral degrees from U.S. institutions. The 2015 SDR is comprised of three components: 1) a longitudinal panel that tracks doctorate recipients throughout their careers until age 76, 2) a new sample of doctorate recipients awarded their degrees from 1959 to 2011, and 3) a new cohort component that adds new doctorate recipients after they receive their degree. The panel portion of the SDR provides information on the experienced stock of doctorate recipients. The new sample of graduates from 1959 to 2011 represents an expansion to the SDR sample to allow for estimation at a finer degree level. The new cohort from the two most recent doctorate award years provides important data on the early career experiences of new doctorate recipients with science, engineering, and health (SEH) degrees entering the labor force.

The SDR contributes to the National Center for Science and Engineering Statistics' (NCSES) Scientists and Engineers Statistical Data System (SESTAT). The purpose of SESTAT is to provide information on the entire U.S. population of scientists and engineers with at least a bachelor's degree. SESTAT is produced by combining data from the SDR with data from NCSES's National Survey of College Graduates (NSCG). The NSCG represents all individuals in the U.S. with a bachelor's or higher degree in an SEH or related field, or those with a bachelor's or higher degree in another field, but in an SEH or related occupation. The NSCG includes individuals who received degrees from foreign institutions. The integrated database derived from these surveys contains data on the demographic, educational, and employment characteristics of college-educated scientists and engineers in the United States. These surveys are usually conducted every two years.

Since 2003 and continuing with the 2006, 2008, 2010, and 2013 SDR, NCSES tested and reaffirmed the feasibility of developing an international panel study of U.S.-trained doctorate recipients. Initially, this sub-sample was comprised primarily of non-U.S. citizens who emigrated after degree award.

For 2015, the SDR will no longer make a distinction, and will include sample members predicted to reside either in or outside of the U.S. Currently, 36% of U.S. SEH doctorates are awarded to temporary visa holders, and nearly 24% of them plan to leave the U.S. upon graduation. The 2015 SDR will yield information about the educational and demographic characteristics of U.S.-trained SEH doctorate recipients both living and working in the U.S. and abroad on the reference date, 1 February 2015.

The 2015 SDR introduces a major sample size expansion to support employment outcome estimates by fine field of degree (FFOD). The expansion increases the sample from approximately 47,000 to 120,000 sample members. The objective of the new sample design is to meet both the traditional (historic) domain-level estimation goals plus new fine field estimation goals. The SDR was originally designed to produce estimates by various analytical domains defined by aggregated field of degree, gender, race, ethnicity, citizenship at birth, and disability status. The new sample approach stratifies by FFOD, featuring a combination of equal and proportional sample allocation to strata, and systematic probability proportional to size (PPS) sampling within strata. See Section B.1 for details.

A.1 Necessity for Information Collection

The National Science Foundation Act of 1950, as amended by Title 42, United States Code, Section 1862, required the Foundation to:

...“provide a central clearinghouse for the collection, interpretation, and analysis of data on scientific and engineering and to provide a source of information for policy formulation by other agencies of the Federal Government...” (See Attachment A – NSF Act of 1950 and America COMPETES Reauthorization Act of 2010.)

In meeting its responsibilities under the NSF Act, the Foundation relied on the National Register of Scientific and Technical Personnel from 1954 through 1970 to provide names, location, and characteristics of U.S. scientists and engineers. Acting in response to a Fiscal Year 1970 request of the House of Representatives Committee on Science and Astronautics (see U.S. Congress, House of Representatives, 91st Congress, 1st Session, Report No. 91-288), the Foundation, in cooperation with the Office of Management and Budget and eight other agencies, undertook a study of alternative methods of acquiring personnel data on individual scientists and engineers.

The President’s budget for Fiscal Year 1972, as submitted to the Congress, recommended the “discontinuation of the National Register of Scientific and Technical Personnel in its present form” and that funds be appropriated “to allow for the development of alternative mechanisms for obtaining required information on scientists and engineers.” The House of Representatives Committee on Science and Astronautics, in its report on Authorizations for Fiscal Year 1972, states that “...it has no objection to this recommendation...” (see U.S. Congress, House of Representatives, 92nd Congress, 1st Session, Report No. 92-204).

Subsequently, NSF established and continues to maintain the SESTAT system, the successor to the Scientific and Technical Personnel Data System of the 1980s which was the successor to the National Register. The Science and Technology Equal Opportunities Act of 1980 directs NSF to provide to Congress and the Executive Branch an “accounting and comparison by sex, race, and ethnic group and by discipline, of the participation of women and men in scientific and engineering positions.”

The America COMPETES Reauthorization Act of 2010 established within NSF a National Center for Science and Engineering Statistics, and reaffirmed that it serve as “...a central Federal clearinghouse for the collection, interpretation, analysis, and dissemination of objective data on science, engineering, technology, and research and development.” The SDR provides information on the training, career, and educational development of the nation’s U.S.-trained doctorate recipients with SEH degrees, an important component of the U.S. science and engineering workforce. These reports enable NSF to fulfill the legislative requirement to act as a clearinghouse for current information on the SEH workforce.

A.2 Uses of Information

SDR data are used in assessing the quality and supply of the nation’s SEH personnel resources for educational institutions, private industry, and professional organizations, as well as federal, state, and local governments. NSF uses the information to prepare congressionally mandated biennial reports, such as *Women, Minorities and Persons with Disabilities in Science and Engineering* and *Science and Engineering Indicators*.

The SDR data have been used extensively in the policy and planning activities of NSF and the National Institutes of Health. Other federal agencies, such as the Departments of Commerce, Agriculture, Energy, and the National Aeronautics and Space Administration, request and make use of the SDR data for a variety of informational purposes.

Educational institutions use SDR data in establishing and modifying scientific and technical curricula, while various industries use the information to develop recruitment and remuneration policies.

Researchers, policymakers, and others use information from the SDR to answer questions about the doctoral SEH workforce. SDR data are used to address topics such as: the role of foreign-born scientists and engineers; the transition from higher education to the workforce; the role and importance of postdoctoral appointments; diversity in education and employment; and the implications of an aging cohort of scientists and engineers as baby boomers reach retirement age. The SDR data on those living outside the U.S. allows economists and policy analysts to better understand the migration patterns, productivity, and employment concerns of the most highly trained individuals potentially able to return to the U.S. workforce.

Findings from the 2015 SDR will enable NCSES to continue reporting employment patterns of recent SEH doctorate recipients, as well as more experienced doctorate recipients in the labor market. The expanded sample size will allow NCSES for the first time to produce reliable estimates of employment outcomes by the fine field of degree taxonomy used in the Survey of Earned Doctorates (SED). The SED gathers information yearly from all new research doctorates awarded by U.S. institutions. Detailed information about the SED can be found at <http://www.nsf.gov/statistics/srvydoctorates/>.

The National Science Board reports SDR data on the state of SEH doctorates in *Science and Engineering Indicators*. NSF's Education and Human Resources Directorate uses SDR data in the evaluation and development of programs, and other NSF research directorates use SDR to analyze SEH employment pathways.

Without these data, those at the NSF, as well as researchers and policymakers, would be less informed in attempts to carry out their responsibilities. The SDR data are made available through published reports; the SESTAT online data system, through public use files and restricted licenses.

The Committee for Equal Opportunity in Science and Engineering (CEOSE), an advisory committee to NSF and other government agencies, established under 42 U.S.C. §1885c, has been charged by the U.S. Congress with advising NSF in assuring that all individuals are empowered and enabled to participate fully in science, mathematics, engineering and technology. Every two years CEOSE prepares a congressionally mandated report that makes extensive use of the SESTAT data to highlight key areas of concerns relating to students, educators and technical professionals. Similarly, ad hoc committees convened by the National Research Council of the National Academies (advisors to the nation on Science, Engineering, and Medicine) have used SDR and SESTAT data in Committee reports such as the Committee on Gender Differences in Careers of Science, Engineering, and Mathematics Faculty's 2009 report "*Gender Differences at Critical Transitions in the Careers of Science, Engineering, and Mathematics Faculty*."

Information from the SDR was presented at the Organisation for Economic Co-operation and Development conference in December 2012, "Understanding and improving the contribution of doctoral graduates to innovation and the economy: Developing the statistical evidence.

(<http://www.oecd.org/sti/inno/CDH%20final%20conference%20report.pdf>)

NSF publications using SDR data (all NSF publications can be accessed on the NCSES website at <http://www.nsf.gov/statistics>) include: _

Congressionally mandated reports –

Science & Engineering Indicators 2014

Women, Minorities, and Persons with Disabilities in Science and Engineering 2015

Other NCSES publications –

Biennial report series: *Characteristics of Doctoral Scientists and Engineers in the United States*

Annual report series: *Science and Engineering State Profiles*

Unemployment among Doctoral Scientists and Engineers Increased but Remained Below the National Average (April 2014)

Employment and Educational Characteristics of Scientists and Engineers (January 2013)

International Mobility and Employment Characteristics among Recent Recipients of U.S. Doctorates (October 2012)

Racial and Ethnic Diversity among U.S.-Educated Science, Engineering, and Health Doctorate Recipients: Methods of Reporting Diversity (January 2012)

Academic Institutions of Minority Faculty with Science, Engineering, and Health Doctorates (October 2011)

The End of Mandatory Retirement for Doctoral Scientists and Engineers in Postsecondary Institutions: Retirement Patterns 10 Years Later (December 2010)

A.2.1 Data Dissemination and Access

Since 1993, the SDR data have been incorporated into SESTAT. The data are available as separate stand-alone public-use files, as a component of the SESTAT public-use data files, and as restricted use files licensed by NCSES. The SESTAT data tool allows users to create customized data tabulations in subject areas of their interest. The SESTAT Home Page can be accessed at <http://www.nsf.gov/statistics/sestat>.

SDR and SESTAT data are presented at conferences and professional meetings, such as the annual meetings of the Association for Institutional Research, the American Association for Public Opinion Research, and the American Educational Research Association.

Since 2007, NCSES has distributed more than 2,000 copies of SDR public-use files (2003, 2006, 2008, 2010, and 2013 survey cycles), as well as over 4,700 copies of the SESTAT public-use files (1993-2010 survey cycles). There are currently 50 restricted-use licenses active for the SDR. Additional licensing requests for the SDR are pending review and approval by NCSES.

Recent examples of use of the SDR data include the following:

Selected Presentations:

Balancing Timeliness, Data Quality and Cost – by Optimizing Data Collection Strategies, Joint Statistical Meetings, August 2014 .

Belt and Suspenders: Evaluating the Efficacy of Sending Initial Contacts via Email Only vs. Letter-Plus-Email to Online Responders in the Survey of Doctorate Recipients, American Association for Public Opinion Research, May 2014.

A “Green” Appeal: *Efficacy Evaluation of Assigning Sample Members that Prefer the USPS Mail Mode to the Online Mode in the 2013 Survey of Doctorate Recipients*, American Association for Public Opinion Research, May 2014.

Preparing Graduate Students for Non-Academic Careers, American Association of Physics Teachers Meeting, January 2014.

OECD/UNESCO Institute for Statistics/Eurostat Careers of Doctorate Holders (CDH) Project, The Organisation for Economic Co-operation and Development, December 2012

Integration of the National and International 2008 SDR: Bridging Effects and Expected Improvements to the Time Series Data, Joint Statistical Meetings, August 2012.

Development of the Sample Design for the International Survey of Doctorate Recipients, Joint Statistical Meetings, August 2012.

Migration Patterns of U.S. Trained Doctorate Holders (A Longitudinal Study), Joint Statistical Meetings, August 2012.

Utilizing a Logistic Regression Approach for Weighting Adjustment in a Longitudinal Dataset, Joint Statistical Meetings, August 2012.

Coping with Missing Data: Assessing Methods for Logically Assigning Race and Ethnicity, American Association for Public Opinion Research, May 2012.

Science and Engineering Doctorate Recipients as Adjunct Faculty: New Findings from the Survey of Doctorate Recipients, American Educational Research Association, April 2012.

An investment in Goodwill or Encouraging Delays? Examining the Effects of Incentives in a Longitudinal Study, Federal Committee on Statistical Methodology Annual Meeting, January 2012.

Selected Citations of SDR data in other sources:

Interdisciplinary Research and the Early Career: The Effect of Interdisciplinary Dissertation Research on Career Placement and Publication Productivity of Doctoral Graduates in the Sciences, *Research Policy* 42(5):1152-1164, June 2013.

Comparing Research Productivity across Disciplines and Career Stages, *Journal of Comparative Policy Analysis* 15(2):141-163, April 2013.

Increasing the Visibility of Women of Color in Academic Science and Engineering: Professional Society Data. *New Directions for Higher Education*, 2013(163):7-21, 2013.

Contributions of Foreign-Born Faculty to Doctoral Education and Research. *New Directions for Higher Education*, 2013(163):89-98, 2013.

Beyond Anecdotes: A Quantitative Examination of Black Women in Academe. *The Review of Black Political Economy*, July 2012.

Disparities in Publication Patterns by Gender, Race and Ethnicity Based on a Survey of a Random Sample of Authors. *Scientometrics*, 2012 (November):1-20.

Education and Career Outcomes for Women of Color in Academia, National Academies’ Conference Seeking Solutions: Maximizing American Talent by Advancing Women of Color in Academia, 2012.

A.3 Consideration of Using Improved Technology

The 2015 SDR will collect data using three modes of data collection:

- Self-administered online surveys via the Internet (Web or online);
- Paper self-administered questionnaires (mail); and
- Computer-assisted telephone interviews (CATI).

Prior to the 2003 survey cycle, SDR data were collected by first mailing paper questionnaires to sample members, then following up the nonrespondents by telephone. In the 2003 SDR, the tri-mode data collection effort including mail, CATI, and Web was tested and has been fully implemented in all of the rounds since (2006, 2008, 2010, and 2013). The 2015 survey cycle will continue this protocol.

Since 2003, there has been a steady increase of participation via the Web; In 2008, over 57 percent of sample members completed an online survey; in 2010, that number rose to 63 percent; and in 2013, rose again to 75 percent. Of the respondents who answered the 2013 survey mode preference question and selected a specific mode, 80 percent indicated a preference for the online survey in future cycles. Analysis indicates that the online mode results in higher response rates, as well as more complete survey and contacting data, than the mail mode.

For returning sample members, the 2015 SDR will honor mode preferences reported in the 2013 SDR but also emphasize the efficiency of completing via the Web. The majority of cases new to the SDR, which make up the sample in high proportion due to the sample redesign, will be started in the online survey mode. Eighty percent or more of the 2015 survey responses are expected to be in the online mode. The 2015 online instrument will also be configured for use on mobile devices (e.g., smartphones and tablets) to ensure that the respondent experience is optimized regardless of the screen size or browser used to access the survey.

The 2015 data collection effort will also use a comprehensive computerized case management system to track data capture across the three modes (Web, mail, CATI). Optical scanning will be used to capture the digital images of the mail questionnaire after keying. The images will be stored in a database for archival purposes.

A.4 Efforts to Identify Duplication

Some overlap exists with NCSES' Early Career Doctorates Survey (ECDS) (OMB Control # 3145-0235) target population and content. The ECDS builds its sample by obtaining employee lists from U.S. academic institutions, Federally Funded Research and Development Centers, and NIH Intramural Research Programs, and includes individuals that received their first doctorate in the U.S. or abroad within the last ten years. In contrast, the SDR includes sample members up to age 76; SDR sample members potentially received their doctorate degrees 50 years prior. The SDR is a probability sample and surveys sample members regardless of where they currently reside or work, including residing or working outside of the U.S. The SDR surveys individuals working full or part time at any type of employer, and individuals not working due to retirement or other reasons.

Overlap exists in the target populations for the NSCG and the SDR. It is estimated, based on the 2013 overlap, that as many as 600 individuals may be selected for sample in both the 2015 NSCG and the 2015 SDR. Given recent changes to the NSCG questionnaire content, there are notable differences in

the information collected on the NSCG and SDR. Examples of topics planned for collection on the 2015 NSCG, but not on the 2015 SDR include attainment of certifications and licenses, financial support for education, and community college enrollment. Due to the content differences between the surveys, the relatively small number of expected duplicates, and the operational challenges of the deduplication process, NCSSES will not deduplicate individuals selected for sample in both the NSCG and SDR in the 2015 survey cycle.

Data from the Census Bureau's Current Population Survey and the American Community Survey (ACS) are intended to provide occupational estimates, and provide estimates of degree field earned only at the bachelor's level. There is no similar information available on doctorate-holding population that may be used, modified, or made comparable to the SDR.

A.5 Efforts to Minimize Burden on Small Business

Not applicable. The SDR collects information from individuals only.

A.6 Consequences of Less Frequent Data Collection

Conducting the SDR on a less frequent basis would prohibit NSF from meeting its congressional mandate to produce a report that contains an accurate accounting and comparison, by sex, race, and ethnic group and by discipline, of the participation of women and men in scientific and engineering positions. The SDR data are central to the analysis presented in the congressionally mandated report, *Women, Minorities, and Persons with Disabilities in Science and Engineering*. SDR data are used extensively in the National Science Board report, *Science and Engineering Indicators*. Both of these reports are published on a biennial schedule, and rely on the availability of updated data on the science and engineering workforce every two years. In addition to not having recent data for these reports, government, business, industry, and universities would also have less recent data to use as a basis for formulating the nation's science and engineering policies.

A.7 Special Circumstances

Not applicable. This data collection does not require any one of the reporting requirements listed.

A.8 Federal Register Announcement and Consultations Outside the Agency

A.8.1 Federal Register Announcement

The Federal Register Notice for the SDR appeared on August 11, 2014 (See Attachment B). No public comments were received in response to the announcement by the closing date of October 10, 2014.

A.8.2 Consultations Outside the Agency

The Human Resources Experts Panel (HREP) serves as a subcommittee of the NSF Directorate for Social, Behavioral, and Economic Sciences Advisory Committee. HREP advises NCSSES on priorities and strategies for ongoing activities to improve the relevance of current and future statistics produced by NCSSES' Human Resources Statistics (HRS) program. The standing HREP consists of 15 rotating members who serve a 3-year term and are broadly representative of stakeholders with an interest in S&E human resources, such as:

- Current data users, including NCSSES restricted-use data licensees

- Potential data users
- Policy makers from various levels of government
- Professional organizations and foundations, such as the American Institute of Physics (AIP), Council of Graduate Schools (CGS) and the American Association for the Advancement of Science (AAAS)
- Research organizations that use human resources data such as the National Bureau for Economic Research (NBER) and the National Academy of Sciences (NAS)
- Current respondents to the surveys/projects conducted by HRS
- Large and small institutions of higher education, including both public and private institutions
- Industry
- Human resources professionals

HREP accomplishes its mission by: 1) suggesting methods to publicize and promote the data; 2) providing advice on efforts to improve the timeliness and accuracy of SEH labor force data; 3) providing a mechanism for obtaining ongoing input from both researchers and policy analysts interested in SEH personnel data; 4) providing perspectives on the data needs of decision makers; 5) identifying issues and trends that are important for maintaining the relevance of the data; 6) identifying ways in which SEH personnel data could be more useful and relevant for analyses; and 7) proposing ways to enhance the content of the NCSES human resources surveys. HREP has met 7 times since it was convened in 2007.

A.8.3 Meetings and Workshops on Redesign Activities

A series of meetings and workshops on various issues related to a SESTAT redesign and survey methodology have been held since 2013.

For the 2015 survey round:

- Two HREP meetings were held in August 2013 and January 2014 with the following goals:
 - To enrich the HRS understanding of how the education and careers of the S&E workforce are evolving;
 - To identify salient characteristics of the evolving S&E education/career pathways that can be incorporated into HRS surveys;
 - HREP Members attending the August 2013 and January 2014 Workshops were as follows:

Nathan Bell
Associate Director, Education Research & Policy
American Educational Research Association

Brian Hartz
Vice President of Client Services
TORQworks

Roman Czujko
Director, Statistical Research Center
American Institute of Physics

Beverly Karplus Hartline
Vice Chancellor for Research and Graduate Studies
Montana Tech

Ronni Denes
President and Executive Director
New Jersey SEEDS

Cheryl Leggon
Associate Professor, School of Public Policy
Georgia Institute of Technology

Catherine Didion
Senior Program Officer
National Academy of Engineering
Director, Committee on Women in S&E
National Academies

Sharon Levin
Professor of Economics
University of Missouri, St. Louis

Earnestine Psalmonds Easter
Program Director, Division of Graduate Education
National Science Foundation

Duncan McBride
Program Director, Division of Undergrad Ed.
National Science Foundation

Cary Funk
Senior Researcher
Pew Research Center

Catherine Millett
Research Scientist
Educational Testing Service

Donna Ginther
Professor of Economics
University of Kansas

Cathee Johnson Phillips
Executive Director
National Postdoctoral Association

George Wimberly
Director, Professional Development/Social Justice
American Educational Research Association

- A third HREP meeting was held in June 2014. The objectives of this meeting were:
 - To become better informed about:
 - Research questions and policy issues concerning job mobility, occupational change, and career pathways that currently engage researchers and policymakers, particularly as these questions and issues relate to the S&E workforce;
 - How survey data are used to study the research questions and policy issues, and the limitations of these data;
 - Best practices for collecting occupational history data in the context of different longitudinal study designs;
 - To identify other important characteristics of occupational history that can be incorporated into HRS surveys.
 - HREP Members attending the June 2014 Workshop were as follows:

Jake Bartolone
Senior Research Scientist
National Opinion Research Center

Albert Sumell
Associate Professor of Economics
Youngstown State University

Kirk Doran

Omari Swinton

Assistant Professor of Economics
University of Notre Dame

Donna Ginther
Professor of Economics
University of Kansas

Shulamit Kahn
Associate Professor of Public Policy & Law
Boston University

Morris Kleiner
Professor of Public Affairs/Industrial Relations
University of Minnesota

Iouri Manovskii
Associate Professor of Economics
University of Pennsylvania

Erika McEntarfer
Supervisory Economist
U.S. Census Bureau

Donna Rothstein
Research Economist
Bureau of Labor Statistics

Hal Salzman
Professor of Planning and Public Policy
Rutgers, The State University of New Jersey

Marc Scott
Associate Professor of Applied Statistics
New York University

John Skrentny
Professor of Sociology
University of California at San Diego

Assistant Professor of Economics
Howard University

John Bound
Professor of Economics
University of Michigan

Charlie Brown
Professor of Economics
University of Michigan

Pamela Herd
Professor of Public Affairs and Sociology
University of Wisconsin-Madison

Sheila Kirby
Senior Fellow
National Opinion Research Center

Cheryl Leggon
Associate Professor, School of Public Policy
Georgia Institute of Technology

Audrey Light
Professor of Economics
Ohio State University

Mike Pergamit
Senior Fellow
Urban Institute

Jeff Strohl
Senior Research Fellow
Georgetown University

Josh Trapani
Director of Policy Analysis
Association of American Universities

- An Expert Panel of Sampling Statisticians was held in December 2014. The objectives of this meeting were:
 - To discuss sample redesign options for the 2015 SDR.
 - To determine which design approach to implement.
 - The Statistical Experts attending the December 2014 meeting were as follows:

Rachel Harter
Senior Research Statistician
RTI

Frauke Kreuter
Professor in the Joint Program in Survey Methodology
The University of Maryland, USA, and
Professor of Statistics
Ludwig-Maximilians-Universität, Germany

Michael Larsen
Associate Professor in the Department of Statistics and Biostatistics Center
George Washington University

Jill Montaquila
Associate Research Professor in Joint Program in Survey Methodology (JPSM)
The University of Maryland, and
Associate Director of the Statistical Staff and a Senior Statistician
Westat

A.8.4 Consultations for Outreach and Dissemination

To maintain the relevancy of the SESTAT surveys and to obtain ongoing input from the public and researchers, NCSSES engaged in the following activities.

For the 2010 and 2013 survey rounds:

1. NCSSES convened an HREP to help improve data collection on the SEH labor force through review and renewal of the SEH personnel surveys and to promote use of the data for research and policy analysis purposes.
2. ASA/AAPOR invited an NCSSES analyst to present a webinar on science and technology human resources surveys, data and indicators; the SESTAT data are the source for all of the major indicators and trends on this workforce.

A.9 Payment or Gifts to Respondents

Incentives were initially introduced into the SDR data collection protocol during the 2003 cycle, and have been incorporated into the data collection plan for all subsequent cycles. Described below are the proposals to offer both early and late stage incentives. During the early phases of data collection, incentives will be offered to a selected set of the sample described below. During the later phase of data collection, an incentive plan will be implemented similar to the ones used in the 2008, 2010, and 2013 SDR.

A.9.1 Proposed Plan for the 2015 SDR

Early-Stage Incentive. The early-stage incentive will target three types of sample members: 1) those who have only responded after being incentivized in prior rounds, 2) new cohort sample members who are recent graduates (earning their degree in 2012 and 2013), and 3) sample members who are underrepresented minorities (URM) earning their degree in 2011 and earlier, including expansion sample members.

Early incentives will not be offered to all new sample cases; early incentives will be offered to all members of the “new cohort” who do not respond to the initial request to participate in the SDR. However, to clarify, the new cohort does not include all of the sample cases new-to-the-SDR, but is one of three primary sample components in 2015:

- (1) Panel: Individuals included in the 2013 SDR sample and selected for the 2015.
- (2) New cohort: Individuals who received their doctorate in the academic years 2012 and 2013 (new-to-the-SDR).
- (3) Expansion sample: Individuals who were not in the 2013 SDR sample and who received their doctorate in the academic years 1961-2011 (new-to-the-SDR).

Early incentives will be offered to each sample component as described below:

1. Panel:

Two subgroups of the panel will be eligible for an early incentive offer:

- a. Those who only participated in the prior survey rounds after receiving an incentive will receive an incentive with their initial request to participate.
 - b. Underrepresented minorities (URM) who do not respond to the initial request to participate in the survey will receive an incentive offer with the second request.
2. New cohort: Any new cohort sample member who does not respond to the initial request will receive an incentive offer with the second request.
3. Expansion component: URM who do not respond to the initial request will receive an incentive offer with the second request.

Sample members who have historically only responded with an incentive will be offered a monetary incentive in the first contact to encourage a faster response and to reduce the costs associated with follow-up contacts. The rationale for this approach is based on the 2013 SDR data collection experience. An examination of the 2013 response of sample members who consistently only participated after receiving an incentive in the past survey cycles shows 69.7 percent completed the 2013 survey after receiving a late-stage request for survey participation with an incentive offer, and 37.6 percent completed the 2013 survey after receiving just a late-stage request for survey participation without an incentive.

The incentive experiments conducted in 2006 and 2008¹ indicated that offering a prepaid incentive in the second contact was a cost-effective way of encouraging survey response. Further analysis in 2010² indicated that the monetary incentive had a positive conditioning effect on response propensity in the subsequent round. Therefore, the NSF proposes to offer a monetary incentive to all URM sample members who are in the panel or new-to-the-SDR; this incentive will be included in the second contact.

Late-Stage Incentive. The overall strategy for the late-stage incentive is to ensure that all sample members who have been subject to the standard survey data collection protocols and still remain as survey nonrespondents will have a probability of receiving a monetary incentive. In the plan used for the 2008, 2010, and 2013 SDR, and again proposed here, a greater probability of selection for the incentive will be given to cases in those sampling cells with relatively lower response rates, in order to improve the accuracy of survey estimates (given that the sampling cells are aligned with the domains of interest for analysis). This is consistent with an adaptive design data collection strategy.

To allocate its available limited resources for the monetary incentive to late-stage survey nonrespondents most effectively, there will be an analysis of the characteristics of the remaining

¹ “2008 Survey of Doctorate Recipients New Cohort Incentive Experiment” issued to NSF by Karen Grigorian and Shana Brown, NORC, May 28, 2010.

² “2010 Survey of Doctorate Recipients Late-Stage Incentive Program Results” issued to NSF by Karen Grigorian et al., NORC, January 4, 2013.

nonrespondents using a logistic regression model to determine which types of sample members should receive additional inducement to mitigate response bias; the cases with lowest response propensity will be selected for the incentive with certainty. Approximately a third of late-stage nonresponse cases will be incentivized with certainty. From the remaining nonresponding cases (both found and in locating), 15 percent will be selected to receive the incentive. In this way, all late-stage nonresponding sample members will have a chance of receiving the incentive, while resources are strategically targeted to reduce bias according to an adaptive design strategy.

After the 2015 SDR, an analysis of the effectiveness of incentives, particularly on the expansion cohort, will be conducted. This analysis will be the basis for determining whether to keep the incentives in future rounds, modify the incentive plan, or eliminate incentives from the SDR.

A.9.2 Incentive Costs

According to this plan, a \$30 prepaid incentive would be offered for the 2015 SDR, as was done for the 2008, 2010, and 2013 NSDR. The total cost of incentives in the 2013 SDR was \$90,000. In 2015, it is expected to cost \$210,000. The complete incentive plan for 2015 is in section B.3.4.

A.10 Assurance of Confidentiality

NCSES and its contractors are fully committed to protecting the confidentiality of all survey respondents. SDR data will be collected under the authority of America COMPETES Reauthorization Act of 2010 and the Confidential Information Protection and Statistical Efficiency Act (CIPSEA) of 2002. Cover letters and survey questionnaires to each selected respondent will advise them that the information they provide is confidential (see Attachment D – Draft 2015 SDR Survey Mailing Materials and Attachment C – Draft 2015 SDR Questionnaire). The same notice of confidentiality will be used in the introduction to the CATI interview and will be displayed prior to the start of the survey in the online instrument.

Standard data collection procedures incorporate numerous safeguards for the data and must conform to a detailed security plan approved by NCSES. While collecting SDR data, the information that could identify a particular sample member is separated from data about that person. Each sample member is assigned a unique identifier, and this identifier is used to store identifying information (such as name, address, etc.) in a separate, secure database apart from the survey response database. SDR contractors and NCSES staff receive annual CIPSEA training to reinforce their legal obligations to protect the privacy and confidentiality of the SDR data; staff must sign data use agreements annually to acknowledge this legal obligation.

Completed SDR hard copy questionnaires and other contact materials will be housed in a secure storage room at the contractor's production facility. Only authorized staff – and only when necessary for data collection activities – will have access to hard copy materials from the SDR file room. The contractor's electronic systems will be on a secure local area network (LAN), and all contractor systems for storage of electronic survey data will be secure by design and will be protected by passwords available only to authorized study staff.

The contractor will implement systems to make certain that data collected via the online questionnaire are secure. First, access to the online instrument will be allowed only with a valid Personal Identification Number (PIN) and password correctly entered in combination. Second, data will be transmitted by the Secure Sockets Layer (SSL) protocol that employs powerful encryption during transmission through the Internet. If a respondent keeps an online survey open without any activity, the online server will close the

connection after a short period of inactivity, both preserving the data up to the break-off point and preventing unauthorized persons from completing the questionnaire. The online survey system will place authentication information and response data on physically separate servers, a strategy that provides an extra layer of security to protect response data. Both development and production servers will be backed up nightly as required by the contractor's disaster recovery plan.

NCSES and its contractors will analyze and make available SDR data only in aggregate form and will take all measures to assure that the identity of individuals or organizations will not be disclosed.

A.11 Justification for Sensitive Questions

No questions of a sensitive nature are asked in this data collection.

A.12 Estimate of Respondent Burden

A statistical sample of approximately 120,000 persons, identified as having a doctorate in an SEH field from a U.S. academic institution will be selected for the 2015 SDR. This sample will include approximately 106,000 individuals residing in the U.S. and 14,000 residing abroad. The amount of time to complete the questionnaire may vary depending on an individual's circumstances; however, on average it will take approximately 25 minutes to complete the survey. Assuming a 70 percent response rate (84,000 respondents), the total burden for the 2015 SDR is estimated to be 35,000 hours.

The total cost to respondents for the 35,000 burden hours is estimated to be \$1,493,978. This is based on an estimated median annual salary of \$88,785 per full-time employed SDR respondent from the 2013 SDR data. Assuming a 40-hour workweek over 52-weeks of employment, this annual salary corresponds to an hourly rate of \$42.69.

A.13 Cost Burden to Respondents

Not applicable. This survey will not require respondents to purchase equipment or software, nor to contract out services.

A.14 Cost Burden to the Federal Government

The total estimated cost to the Government for the 2015 SDR is \$17.7 million for survey cycle costs and for staff costs to provide oversight and coordination with the other SESTAT survey. The cost estimate for the survey cycle is \$17.1 million, which is based on sample size; length of questionnaire; CATI and online data collection technology; administrative, overhead, design, printing, mail and telephone data collection costs; incentive payments; critical items data retrieval; data keying and editing; data quality control; imputation for missing item responses; weighting and estimating sampling error; file preparation and delivery; preparation of documentation and final reports; analysis, and tabulations. NCSES staff costs are estimated at \$562,500 (\$150,000 annual salary of 1.5 FTE for 2.5 years of the 2015 SDR survey cycle).

A.15 Reason for Change in Burden

The 2015 SDR will include a significantly larger sample size (from 47,078 in 2013 to 120,000 in 2015) to accommodate analyses by SED fine field. The change in burden hours from the 2013 SDR reflects the increase in the total SDR sample size.

A.16 Schedule for Information Collection and Publication

There are no plans to use any complex analytical techniques in NCSSES publications using these data. Normally, SDR data are presented as cross-tabulations of the data in reports and other data releases. The time schedule for 2015 data collection and publication is currently estimated as follows:

Data Collection (Mail, CATI, online)	September 2015 – March 2016
Coding and Data Editing	September 2015 – July 2016
Final Edited/Weighted/Imputed Data File	August 2016
SDR InfoBrief	Spring 2017
SDR Detailed Statistical Tables	Spring 2017
SDR Public Use File	Spring 2017

A.17 Display of OMB Expiration Date

The OMB Expiration Date will be displayed on the 2015 SDR questionnaire; in the online survey version, it will be included on the informed consent page of the online survey and available in a help screen accessible at any point in the online survey; in the telephone interview, it will be read to sample members during the introductory informed consent.

A.18 Exception to the Certification Statement

Not Applicable.