



Methods and Analyses of Surveys of Doctorate Recipients

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Presentation Outline

- NCSES and Human Resources Statistics (HRS) program overview
- Survey of Earned Doctorates (SED)
 - Methodology
 - Data usage
- Survey of Doctorate Recipients (SDR)
 - Methodology
 - Data usage
- Data dissemination
- Future step for the SDR



National Center for Science and Engineering Statistics (NCSES)

- NCSES is responsible for statistical data on the following:
 - The science and engineering workforce
 - Research and development (R&D)
 - 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
- Mission: Provide information useful to practitioners, researchers, policymakers, and the public



Human Resources Statistics Program (HRS): Postsecondary Education & Workforce Data

- Survey of Institutions: Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS)
- Surveys of Individuals
 - **Survey of Earned Doctorates (SED)**
 - **Survey of Doctorate Recipients (SDR)**
 - National Survey of College Graduates (NSCG)
 - National Survey of Recent College Graduates (NSRCG)*
- Scientists and Engineers Statistical Data System (SESTAT)
 - combines SDR, NSCG, and NSRCG
- Project: Early Career Doctorates Project (ECD)

*Now defunct

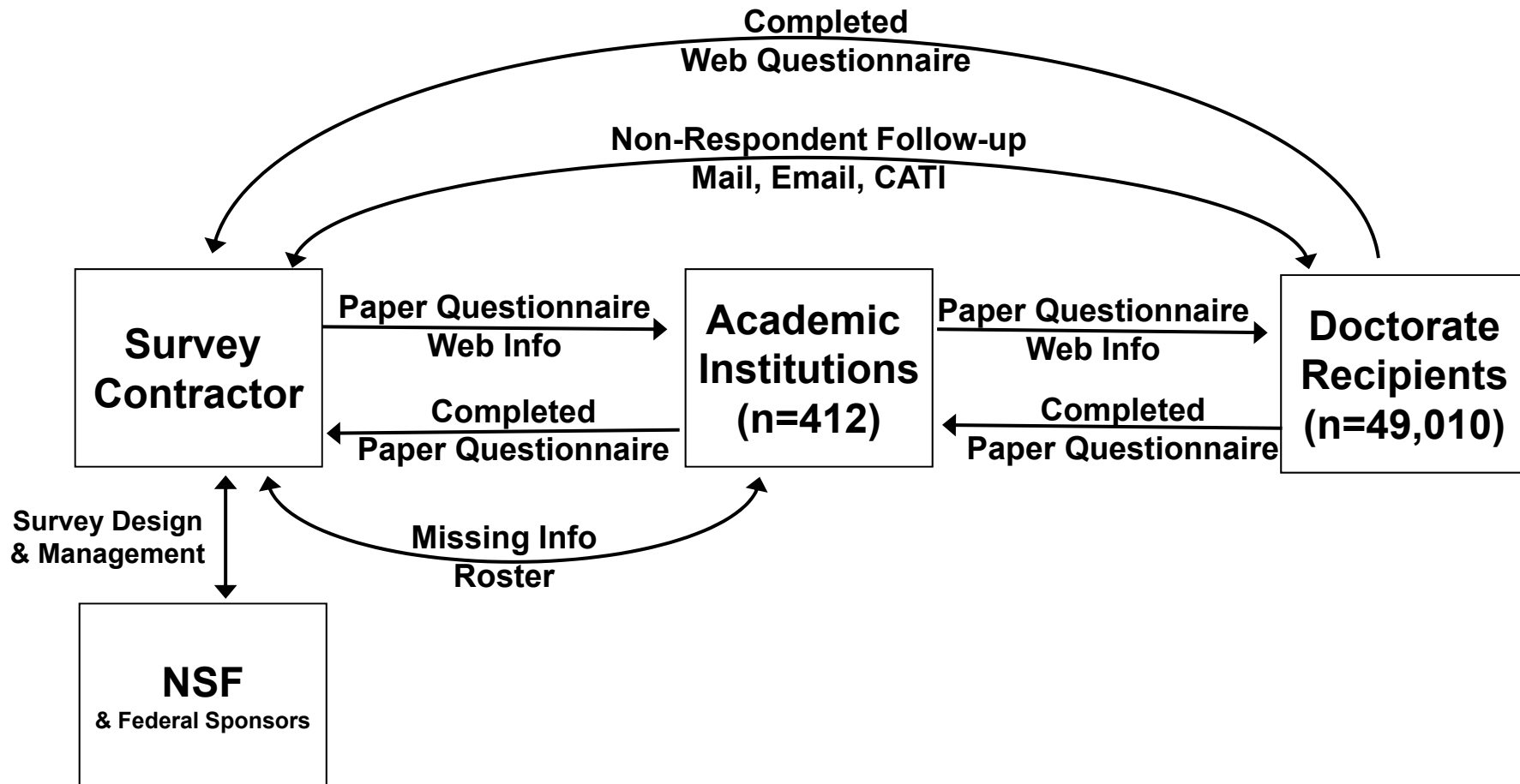


Survey of Earned Doctorates (SED) Background

- Annual census of new recipients of *research* doctorates from accredited U.S. institutions
 - Research doctorates require an original contribution of knowledge to the field (typically a dissertation); not primarily intended for the practice of a profession
- Survey content: demographics, educational history, financial support, postgraduation plans
- Each year SED data are added to the Doctorate Records File (DRF), a virtually complete database of doctorate recipients from 1920 to the present that includes records of nearly 2 million doctorate recipients



SED Data Collection Methodology





2011 SED Response

- 412 institutions conferred ≥ 1 doctorates between 1 July 2010 – 30 June 2011
- 49,010 records of new doctorate recipients
- 45,502 completed SED questionnaires
- Overall response rate = 93%
- Completions by mode

Mode	2010 SED	2011 SED
Paper questionnaire	70.6%	56.5%
Online survey	27.8%	41.5%
Telephone (CATI)	1.5%	2.0%



SED Data Dissemination

- Data tables and reports are available from NCSES
- “Institution Profiles,” which compare each institution’s doctorate recipients to national and peer group profiles, are sent annually to deans at institutions that participated
- Institution data sets, containing all information on requesting institutions’ graduates recorded in the DRF, are distributed upon request
- Special tabulations are produced at cost for external users
- Licensing agreements are made by NSF for detailed analyses

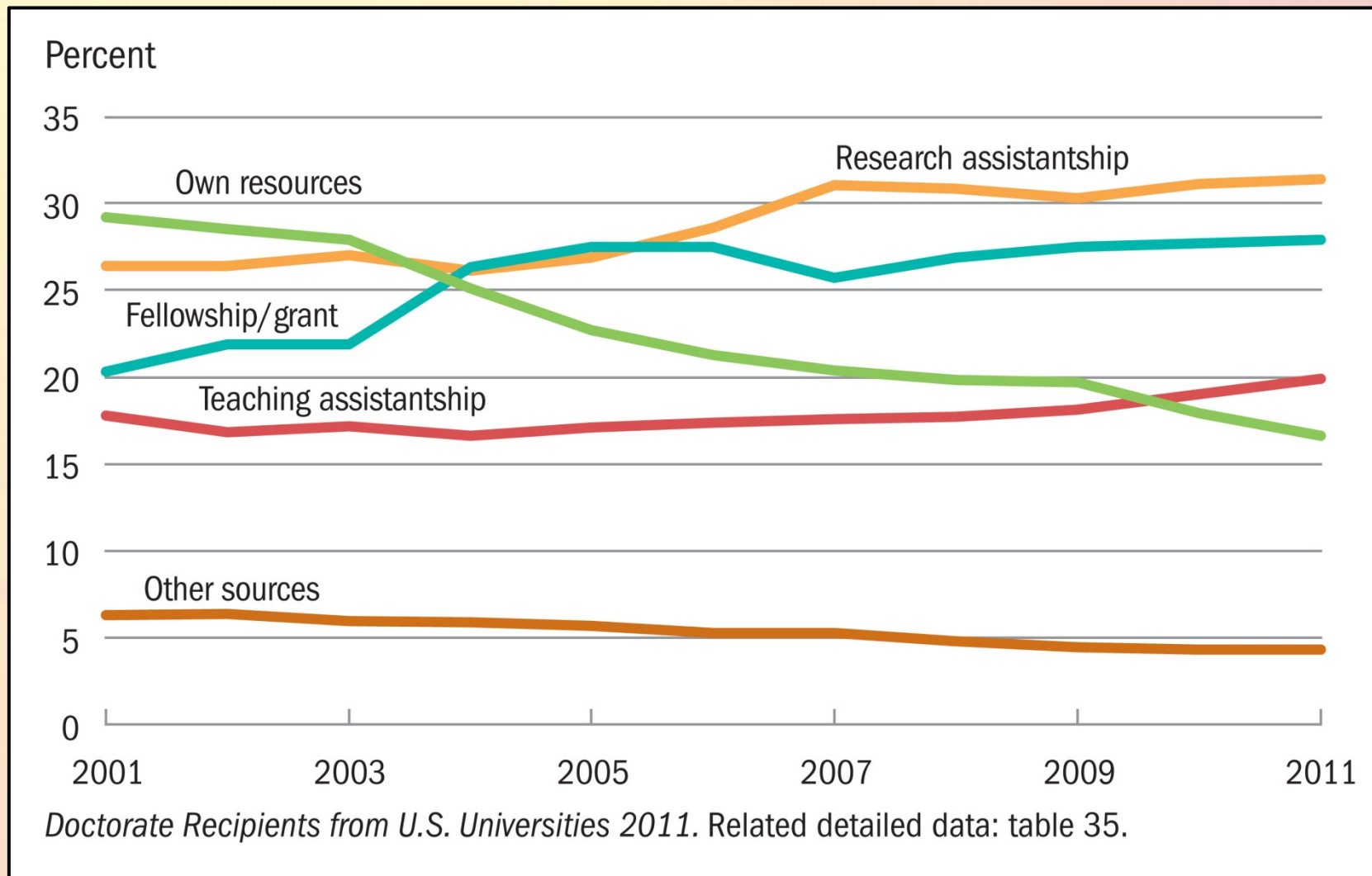


Policy/Program Uses of SED Data

- Policy makers: Evaluation of federal programs
 - Graduate and Undergraduate Fellowship, Scholarship, Traineeship, Dissertation, and other programs administered by federal SED sponsors*
- Associations/organizations: Program development
 - Obtaining grants, planning, measuring & reporting progress
- Universities
 - Program development
 - Program comparison (internal and external)
 - Faculty recruiting, doctoral student placement

* National Science Foundation, National Institutes of Health, US Department of Agriculture, Department of Education, National Endowment for the Humanities, National Aeronautics & Space Administration

Primary source of financial support: 2001–11

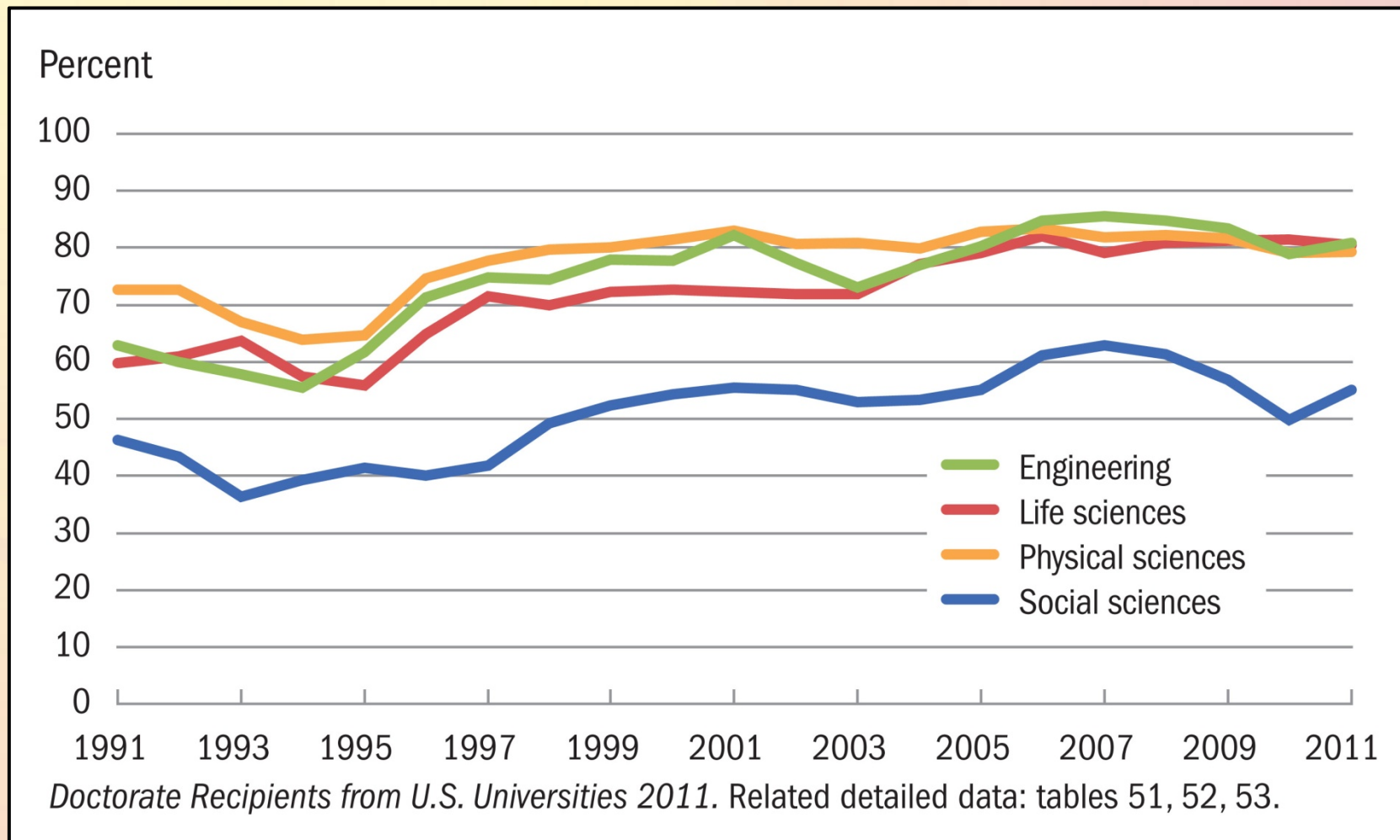




Research Uses of SED Data

SED data items	Recent studies using SED data
<ul style="list-style-type: none">• Demographics• Degree history (type, year, field, institution)• Financial support during graduate school• Debt incurred• Time to degree• “Employment plans” for coming year<ul style="list-style-type: none">– Postgraduation status (e.g., definite commitment, searching for position)– Type of position– Type of employer– Postgraduation location– Primary/secondary work activity– Salary	<ul style="list-style-type: none">• Predictors of characteristics of initial postgraduate position<ul style="list-style-type: none">– Location decision (within U.S.)– Location decision (U.S. vs. foreign)– Employed position vs. postdoc– Employment sector (academe vs. industry)• Predictors of time-to-degree

Stay rate of temporary visa holders with definite U.S. commitments, by science and engineering fields of doctoral study: 1991–2011





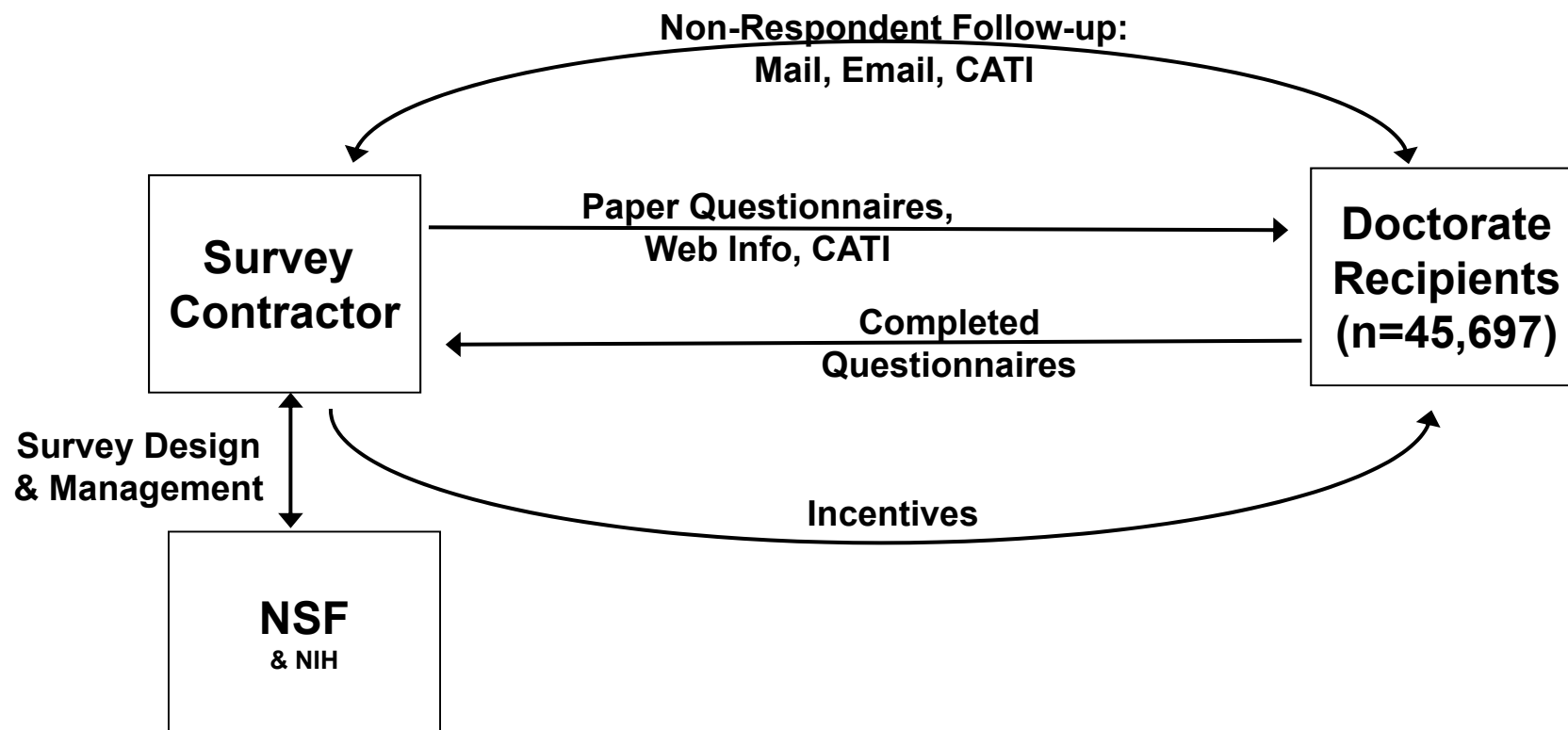
NSF Surveys of Doctorate Holders

	Survey of Earned Doctorates (SED)	Survey of Doctorate Recipients (SDR)
Survey type	Census	Longitudinal sample survey
Target population	<u>New doctorate recipients</u> at U.S. institutions	<u>U.S. degreed doctorate holders</u> in SEH* fields, age 75 or less
Periodicity	Annual	Biennial
Size	49,010 doctorate recipients (2011)	45,697 doctorate holders (2010)
Response Rate	93%	80%
Inception	1957	1973

* SEH = Science, Engineering, and Health



SDR Data Collection Methodology





National/International SDR (NSDR/ISDR)

- 20th-Century NSDR: Exclusion of non-U.S. residents and undercoverage of non-U.S. citizens
- 2003 SDR tested the feasibility of obtaining surveys from sample members who were living outside the U.S.
- ISDR sample size has been increased each cycle
- 2010 response rate – NSDR: 80%; ISDR: 75%
- Completions by mode

Mode	2008 SDR	2010 SDR
Paper questionnaire	30.9%	26.4%
Online survey	57.5%	62.6%
Telephone (CATI)	11.6%	10.9%

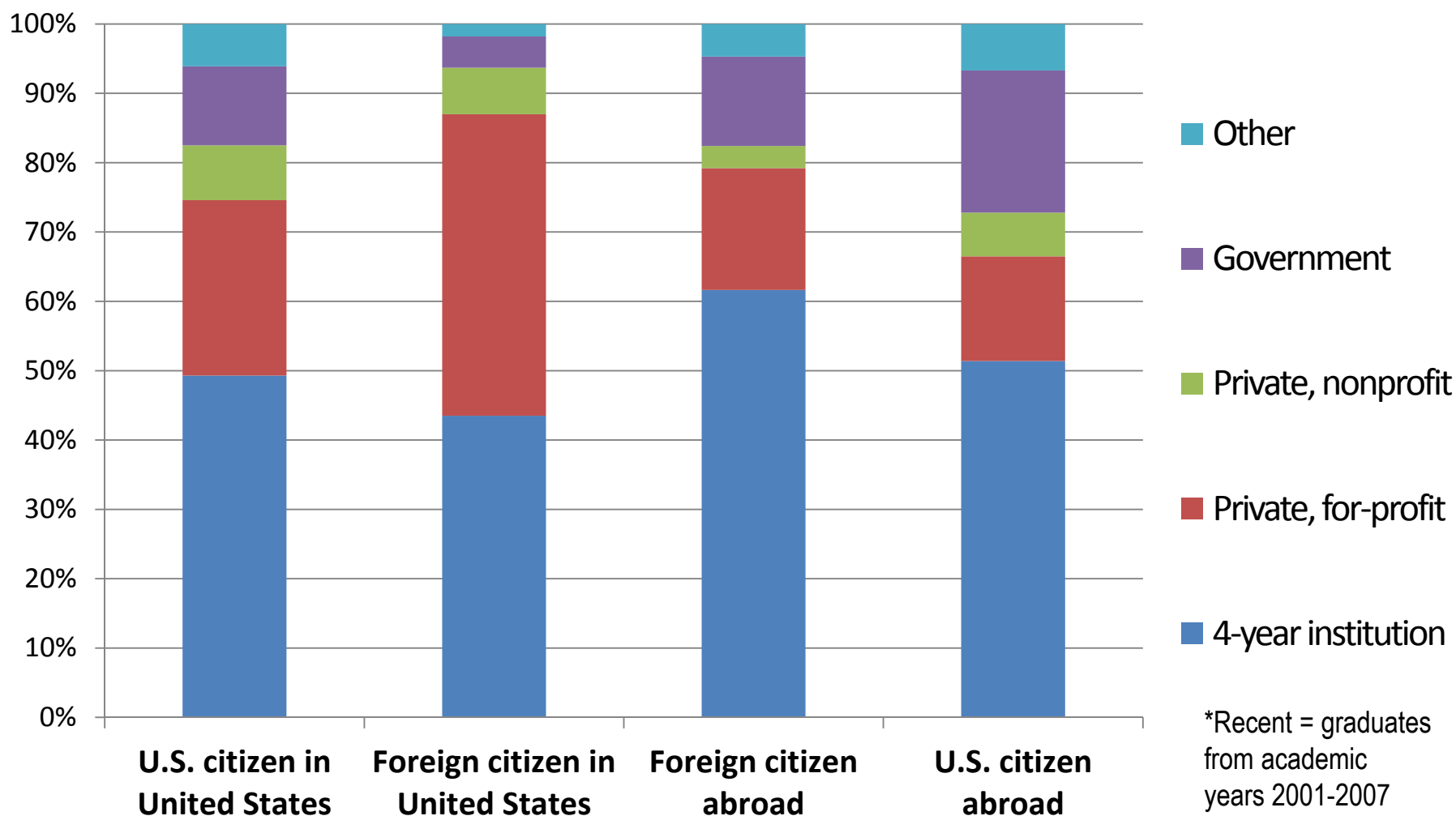


2008 SDR = NSDR + ISDR

- For the first time provides data on all U.S.-earned doctorate recipients in SEH, whether they resided in or outside of the U.S. on the survey reference date
- Complete coverage exists only for 21st-century doctoral graduates
- Analytic comparisons
 - Popular international destinations
 - Relationship between degree field and emigration
 - Differences in employment characteristics



Distribution of employment sector, by citizenship at time of graduation and current residency for recent* doctoral graduates: 2008



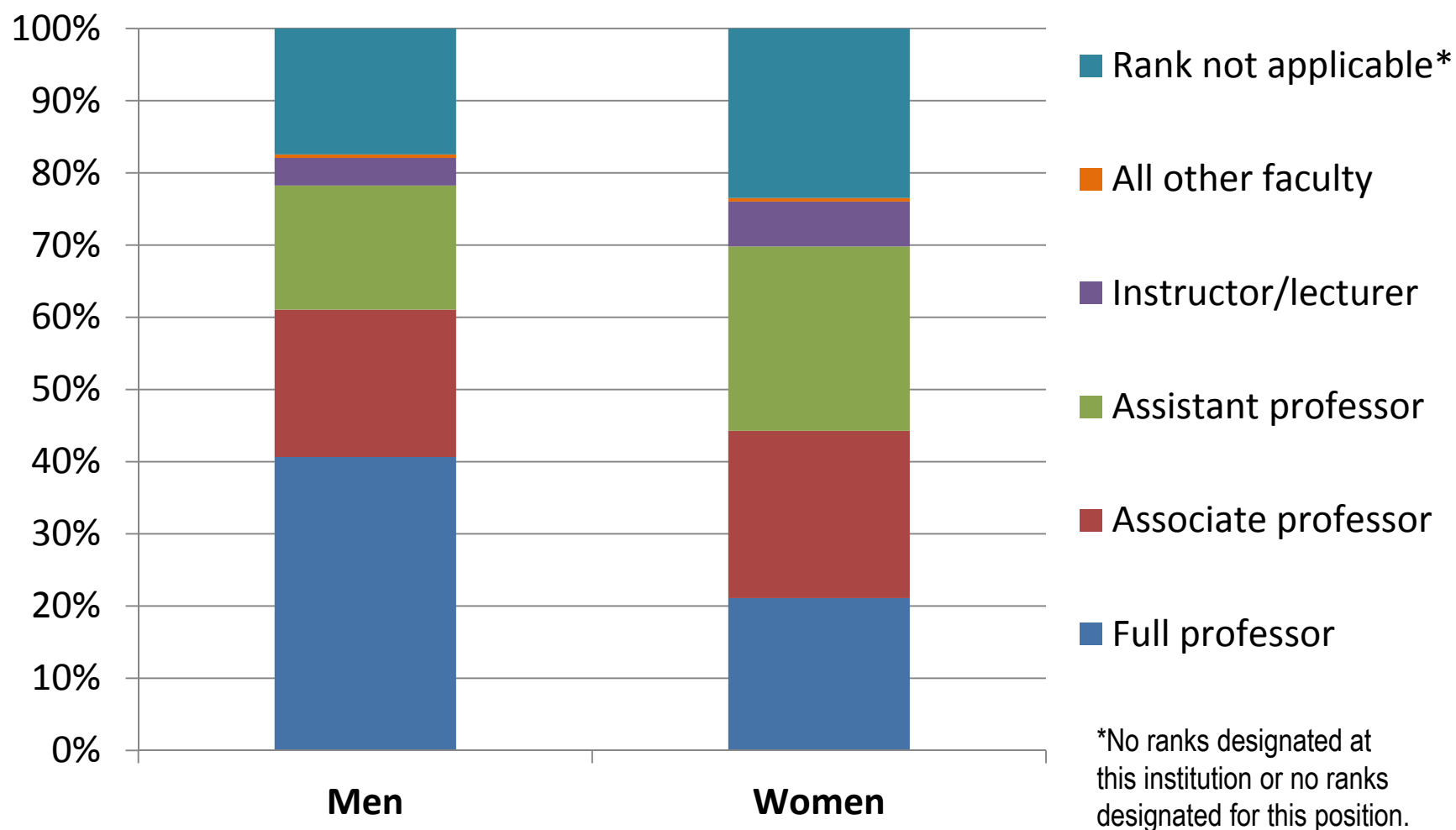


Research Uses of SDR Data

SDR data items	Recent studies using SDR data
<ul style="list-style-type: none">• Demographics• Recent training, education• Employment at time of survey:<ul style="list-style-type: none">– Employer type; change since last survey– Occupation; change since last survey– Faculty rank, tenure status– Postdoc status, reasons for holding postdoc– Work activities (primary/secondary)– Relation between job and degree– Job satisfaction– Salary and earned income• Special Topic Modules<ul style="list-style-type: none">– Number of papers, articles, books authored– Number of patents– Satisfaction with job characteristics (e.g., salary, benefits, intellectual challenge, contribution to society)	<ul style="list-style-type: none">• Career choices:<ul style="list-style-type: none">– Employment sector (academe vs. industry)– Occupation (research vs. management)• Gender differences:<ul style="list-style-type: none">– Career choices– Research productivity– Job satisfaction, salary• U.S.-born vs. foreign-born differences:<ul style="list-style-type: none">– Career choices– Research productivity– Job satisfaction, salary• Research productivity differences between doctorate holders with and without postdoc experience



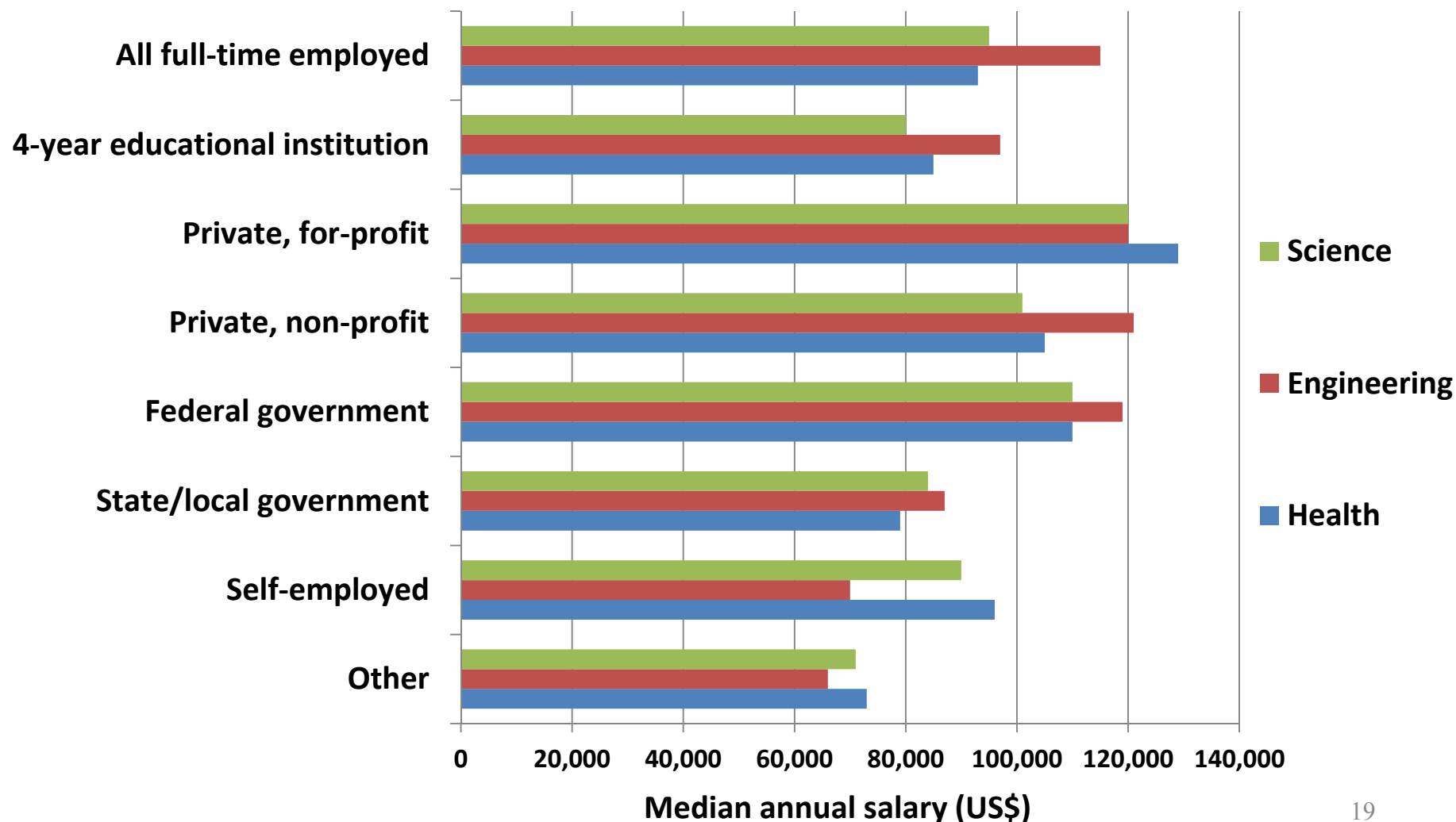
Employed doctoral scientists and engineers in 4-year educational institutions, by sex and faculty rank: 2010



SOURCE: Survey of Doctorate Recipients, 2010.



Median annual salaries of full-time employed doctoral scientists and engineers by employment sector and broad field of doctorate: 2010



SOURCE: Survey of Doctorate Recipients, 2010.



Employed doctoral scientists and engineers engaged in patent-related activities, by broad field of doctorate and employment sector: 2008

Field	4-year educational institution	Other educational institution	Private, for-profit	Private, non-profit	Federal gov't	State/local gov't	Self-employed
All fields	23.9%	0.5%	63.7%	4.0%	4.6%	0.7%	2.8%
Science	26.2%	0.8%	59.0%	5.2%	5.4%	0.9%	2.3%
Engineering	19.3%	D	71.6%	1.8%	3.4%	D	3.6%
Health	37.5%	D	62.5%	D	D	D	D

D = suppressed for confidentiality.

SOURCE: Survey of Doctorate Recipients, 2008.



Employed doctoral scientists and engineers engaged in publication-related activities, by broad field of doctorate and employment sector: 2008

Field	4-year educ. institution	Other educ. institution	Private for-profit	Private non-profit	Federal gov't	State/local gov't	Self-employed	Other
All fields	51.1%	2.1%	27.0%	6.6%	7.3%	2.2%	3.5%	0.2%
Science	54.3%	2.5%	22.5%	7.1%	7.4%	2.3%	3.7%	0.3%
Engineering	33.6%	0.5%	50.3%	3.5%	7.0%	1.7%	3.1%	D
Health	60.7%	2.1%	16.5%	9.5%	6.2%	2.9%	1.7%	D

D = suppressed for confidentiality.

SOURCE: Survey of Doctorate Recipients, 2008.



Importance of and satisfaction with job factors by doctoral scientists and engineers: 2010

Job Factors	% Very Important	% Very Satisfied		
		Job closely related to degree	Job somewhat related to degree	Job not related to degree
Intellectual challenge	74.9%	58.9%	44.9%	39.3%
Degree of independence	69.0%			
Contribution to society	56.1%	58.2%	45.6%	42.2%
Job location	55.6%			
Job security	55.0%	48.7%	38.9%	39.6%
Benefits	54.3%			
Salary	49.1%	30.6%	31.5%	36.1%
Level of responsibility	46.5%			
Opportunities for advancement	40.6%	28.2%	23.1%	26.1%

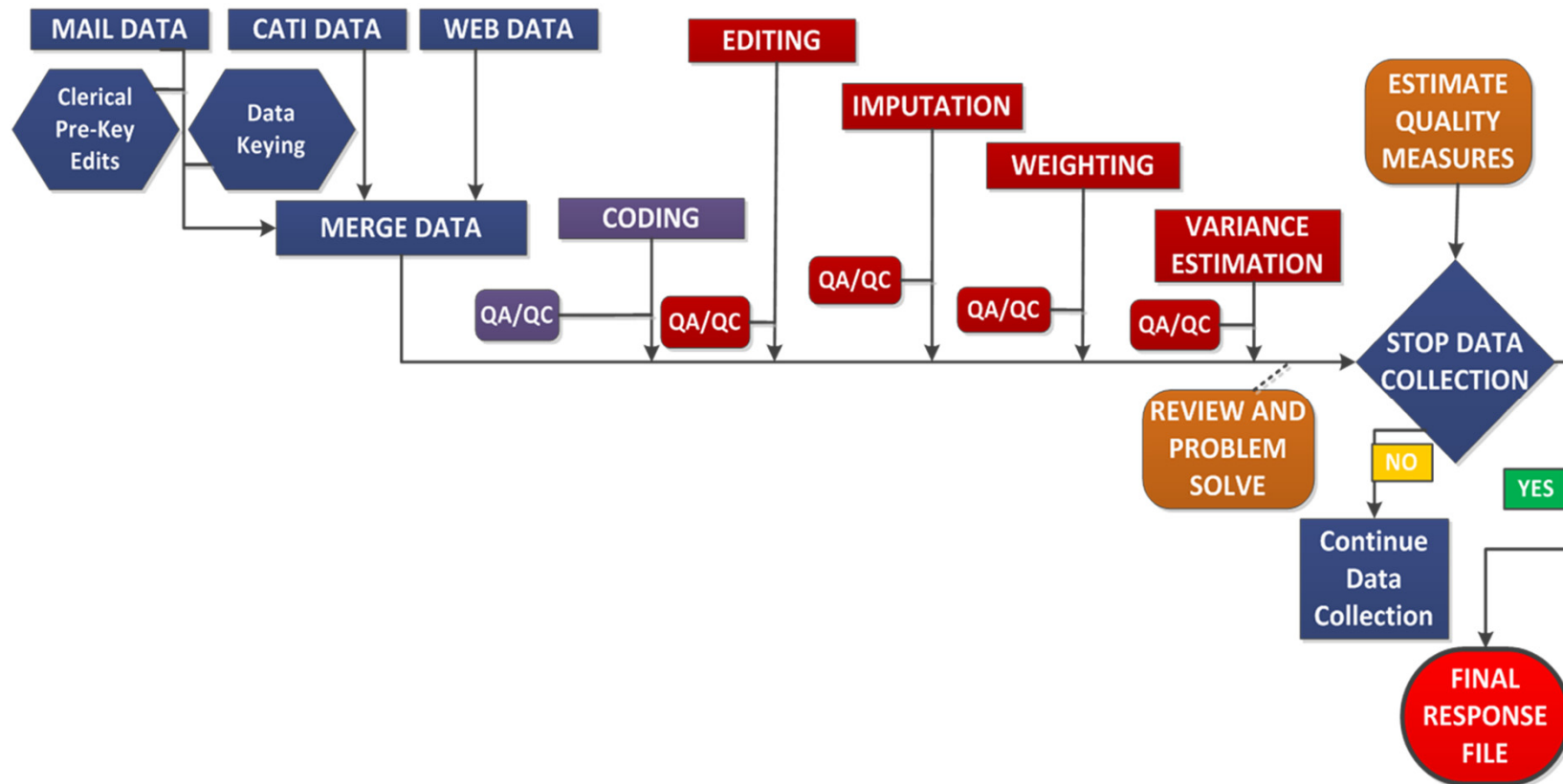
SOURCE: Survey of Doctorate Recipients, 2010.



SED & SDR Data Dissemination

- Congressionally mandated reports – *Science and Engineering Indicators; Women, Minorities, and Persons with Disabilities in Science and Engineering*
- InfoBriefs - highlight results from recent surveys or analyses
- Detailed Statistical Tables (DSTs) - standard tabulations (electronic only)
- Online databases: SED Tabulation Engine, WebCASPAR, SESTAT Data Tool table generator
- Downloadable public-use data files
- Restricted-use data files with a license

SDR Future Steps: Flow Processing





For further information,

Visit <http://www.nsf.gov/statistics/>

Or contact:

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