



The National Training, Education, and Workforce Survey (NTEWS)

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Non-Degree Credentials Research Network
Second Researcher Meeting
August 12, 2019

National Center for Science and Engineering Statistics
Directorate for Social, Behavioral and Economic Sciences
National Science Foundation
<https://nces.nsf.gov>



Presentation Roadmap

- NCSES Introduction
- Measuring the Science and Engineering (S&E) Workforce
- Skilled Technical Workforce (STW)
- Investigating Potential STW Data Sources
- National Education, Training, and Workforce Survey (NTEWS)



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The National Center for Science and Engineering Statistics (NCSES)

- One of the nation's thirteen principal statistical agencies



- An organization within the National Science Foundation's Directorate for Social, Behavioral and Economic Sciences



NCSES Mission

Legislatively mandated to provide statistical data on:

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

NCSES strives to provide policy-relevant policy-neutral information for evidence-based decision making for the science and engineering enterprise.

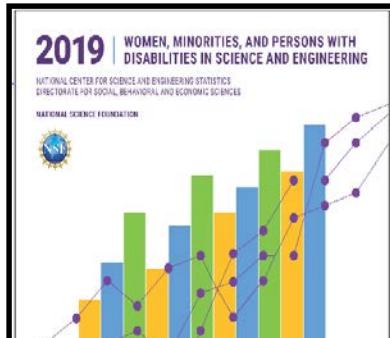
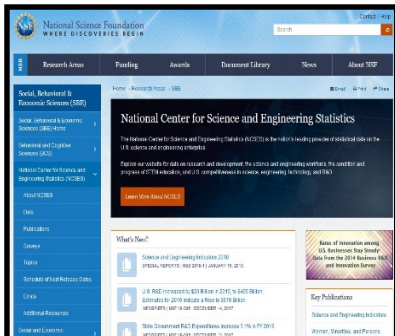
NCSES Data Products

NCSES Website and Data Tools

InfoBriefs and Special Reports

Congressionally Mandated Reports

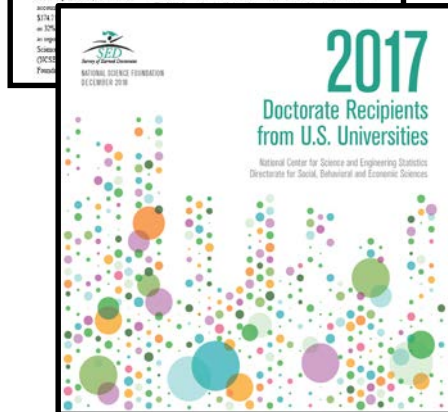
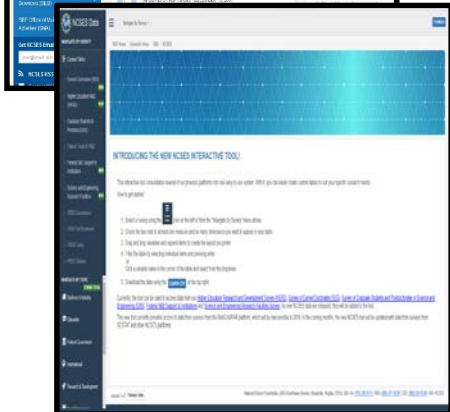
Data Tables



Doctorate recipients, by major field of study: Selected years, 1987-2017

(Source and format)

Field of study	1987		1993		2007		2012		2017	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All fields	82,061	100.0	93,196	100.0	42,291	100.0	40,217	100.0	32,944	100.0
Life sciences	9,700	11.8	11,775	12.6	6,451	15.3	6,878	17.1	6,512	19.8
Agricultural, biological, and natural resources	1,344	1.6	1,521	1.6	820	1.9	1,029	2.6	1,025	3.1
Biological and biomedical sciences	8,356	10.2	10,254	11.0	5,631	13.3	5,849	14.5	5,487	16.6
Health sciences	800	1.0	1,012	1.1	1,603	3.8	1,849	4.6	2,027	6.2
Physical sciences and earth resources	33,818	41.2	37,116	40.0	18,717	44.3	17,478	43.5	14,748	44.8
Chemistry	1,676	2.0	2,213	2.4	2,146	5.1	1,922	4.8	2,276	6.9
Geosciences, atmospheric, oceanic, and solar-terrestrial sciences	339	0.4	367	0.4	805	1.9	969	2.4	1,047	3.2
Physics and astronomy	12,027	14.8	13,027	14.1	6,599	15.6	6,284	15.6	5,767	17.5
Mathematics and computer sciences	1,688	2.1	1,917	2.1	3,585	8.5	3,540	8.8	3,446	10.5
Computer and information sciences	402	0.5	551	0.6	1,901	4.5	2,024	5.0	1,937	5.9
Mathematics and statistics	709	0.9	1,366	1.5	1,619	3.8	1,516	3.8	1,509	4.6
Psychology and social sciences	6,007	7.3	6,242	6.7	3,286	7.8	3,029	7.5	2,698	8.2
Psychology	3,072	3.8	3,202	3.4	1,607	3.8	1,575	3.9	1,399	4.2
Anthropology	202	0.2	239	0.3	404	0.9	406	1.0	347	1.1
Education	103	0.1	118	0.1	1,026	2.4	1,006	2.5	1,246	3.8
Public and social service	461	0.6	478	0.5	465	1.1	466	1.2	474	1.4
Healthcare	427	0.5	465	0.5	371	0.9	347	0.9	312	0.9
Other non-STEM	289	0.4	292	0.3	1,286	3.0	1,291	3.2	1,262	3.8



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- **Measuring the Science and Engineering (S&E) Workforce**
- Skilled Technical Workforce (STW)
- Investigating Potential STW Data Sources
- National Education, Training, and Workforce Survey (NTEWS)

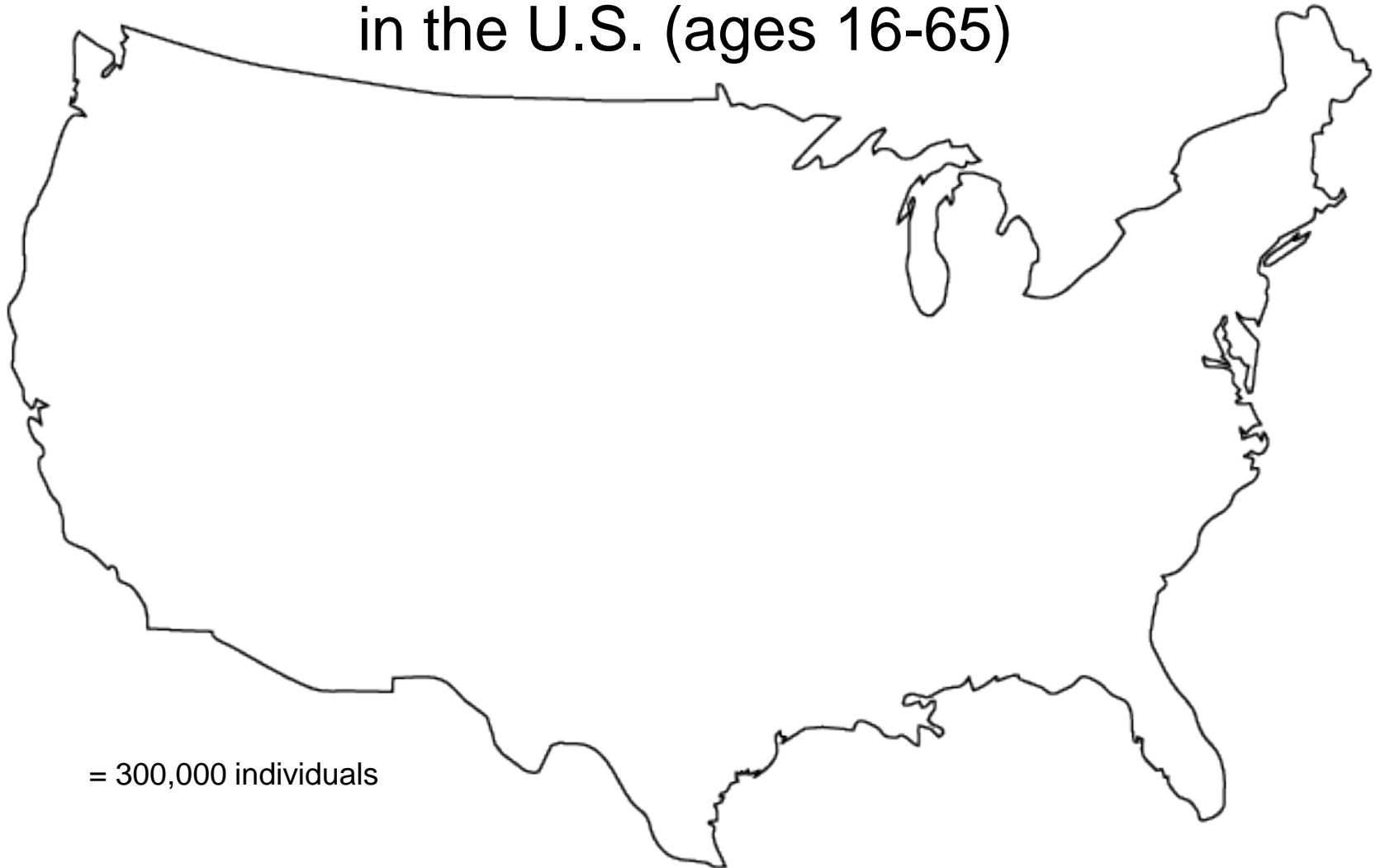
Measuring the S&E Workforce

- There is no standard definition of the S&E workforce
- NCSES presents multiple categorizations for S&E workforce measurement
- Stakeholder groups:
 - Congress
 - Federal agencies
 - Academe
 - Media
 - Office of Management and Budget
 - National Science Board
 - Researchers
 - The Public
- Stakeholder needs:
 - Descriptive statistics
 - Educational history
 - Workforce training
 - Demographic characteristics
 - Occupational details
 - Pathways and flows

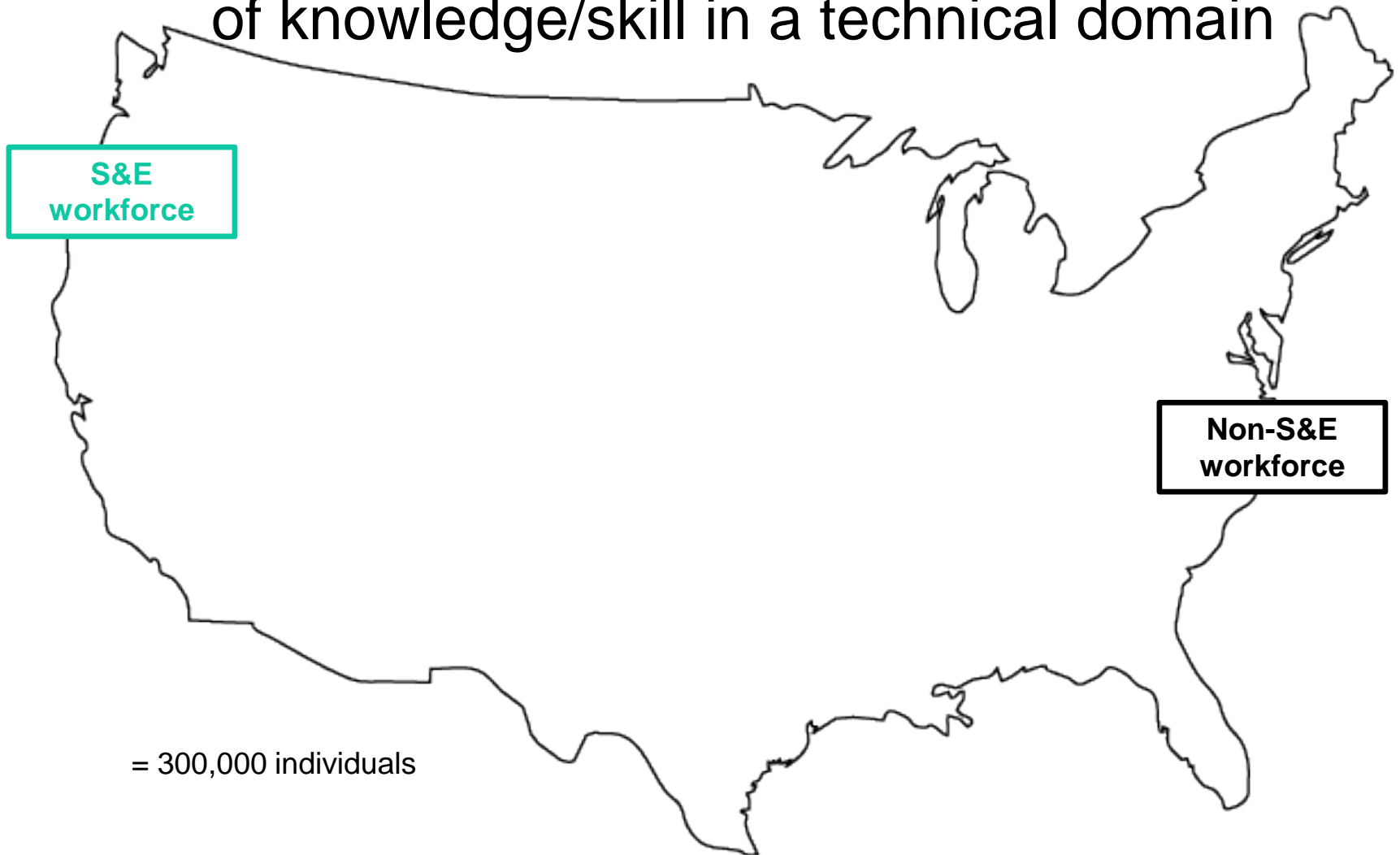
Measuring the S&E Workforce (continued)

- S&E workforce definitions in the *2018 Science and Engineering Indicators* report include:
 - Educated in an S&E degree field
 - Employed in an S&E occupation
 - Employed in an occupation that requires a high level of knowledge or skill in a technical domain
- For this presentation, “S&E workforce” refers to occupations that require a high level of knowledge or skill in a technical domain

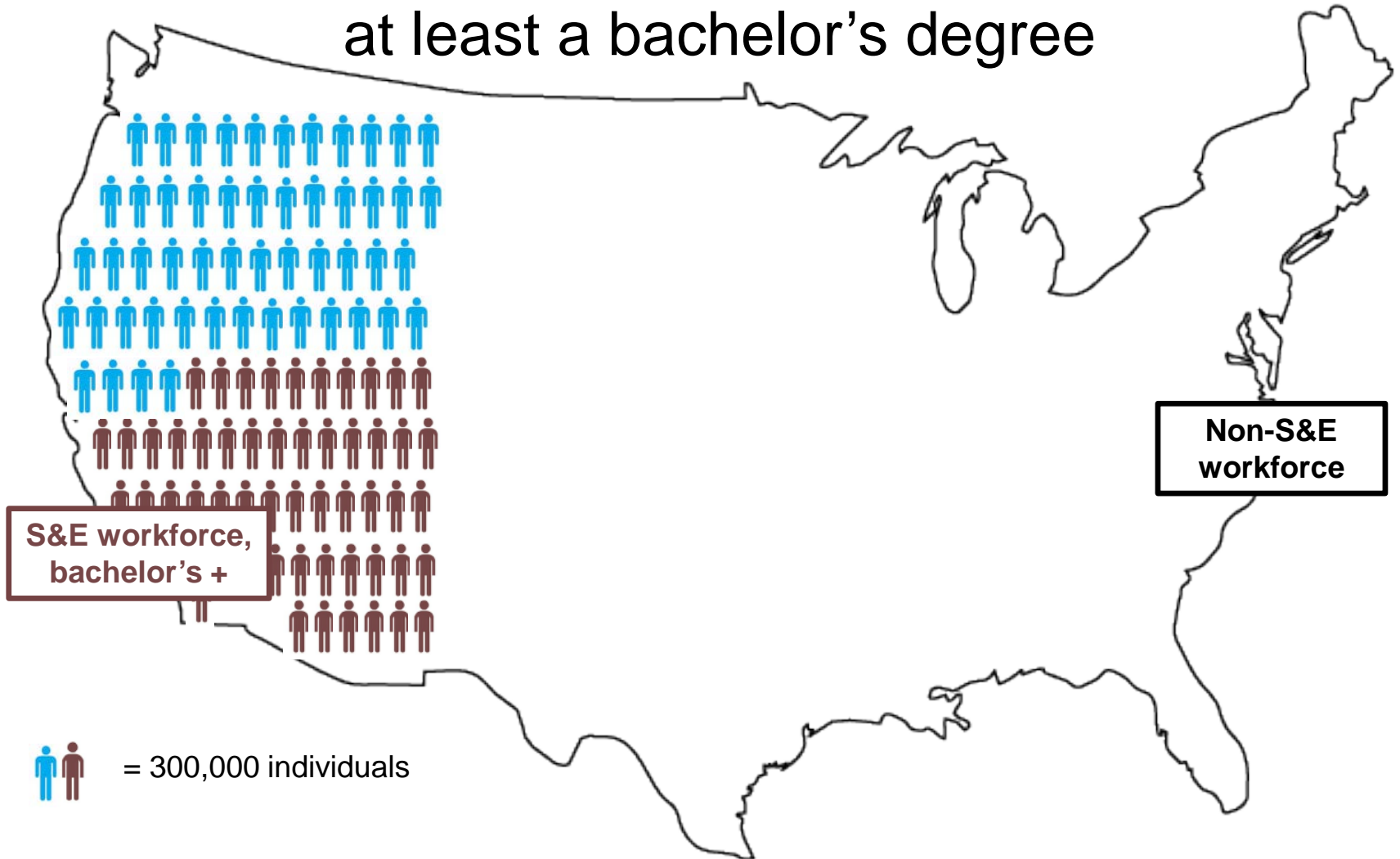
There are 143 million employed individuals
in the U.S. (ages 16-65)



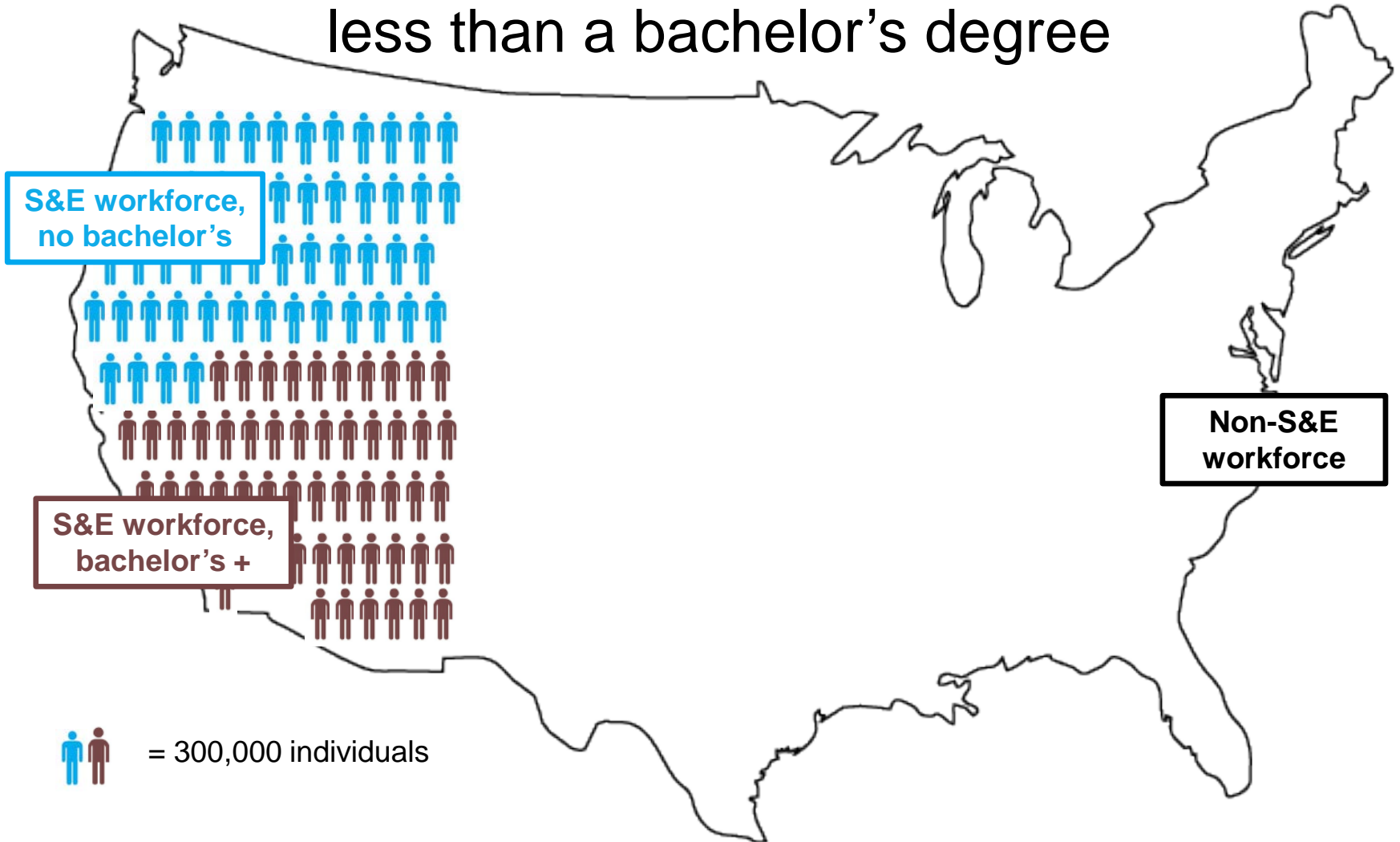
32 million are in occupations that require a high level of knowledge/skill in a technical domain



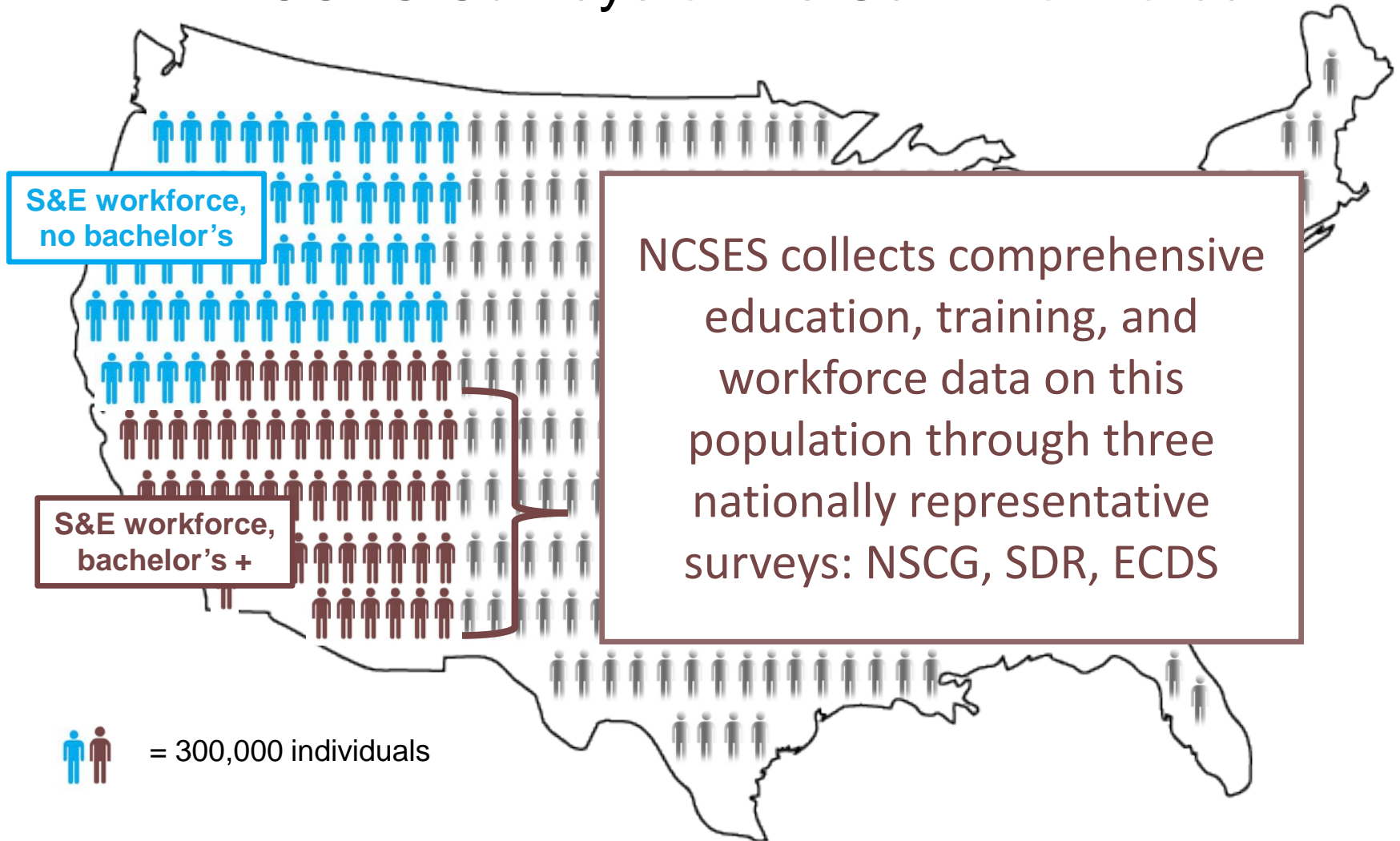
15 million individuals in the S&E workforce have at least a bachelor's degree



17 million individuals in the S&E workforce have less than a bachelor's degree



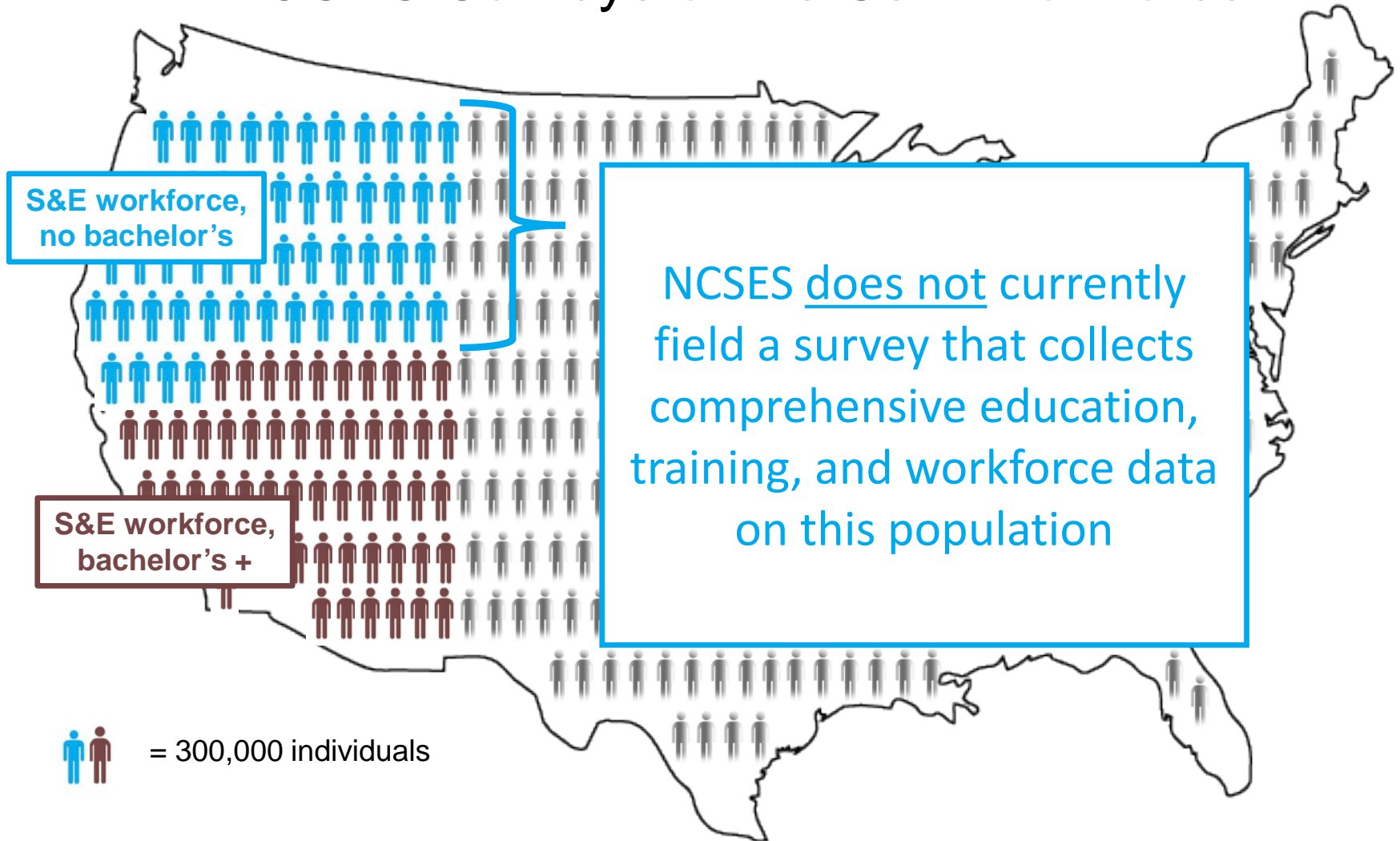
NCSES Surveys of the S&E Workforce



NCSES Surveys of the S&E Workforce

Survey	Target Population
National Survey of College Graduates (NSCG)	College graduates
Survey of Doctorate Recipients (SDR)	S&E doctorate recipients
Early Career Doctorates Survey (ECDS)	Recent doctorate recipients

NCSES Surveys of the S&E Workforce



Presentation Roadmap

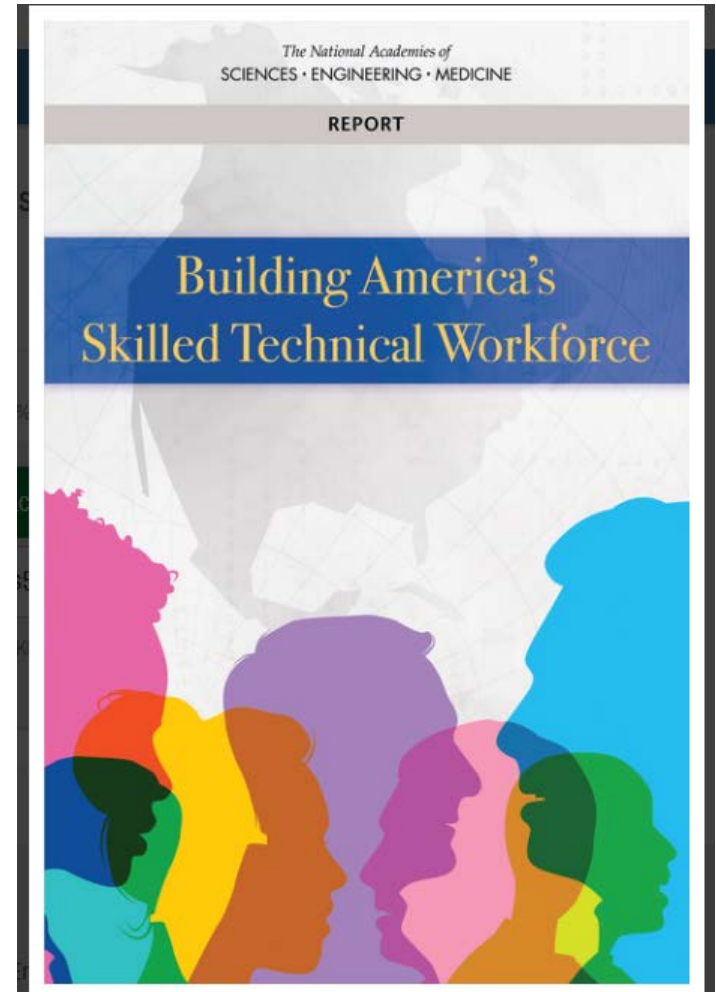
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- National Education, Training, and Workforce Survey (NTEWS)

S&E Workforce, No Bachelor's = Skilled Technical Workforce

- These occupations that require technical knowledge, but do not require a bachelor's degree for entry have taken on various names including:
 - Middle skilled occupations
 - Skilled technical occupations
- Within NCSES, we refer to the population of individuals employed in skilled technical occupations as the skilled technical workforce

Skilled Technical Workforce

- Motivation for investigation
 - National Academies (2017)
 - CNSTAT (1989, 2008)
 - National Science Board (2017)
 - Recent proposed legislation (2018)
 - National Council for the American Worker
- Definition
 - High level of knowledge in a technical domain
 - Education attainment level below the bachelor's degree
 - Rothwell (2016)
- Industry
 - Healthcare
 - Information technology
 - Cybersecurity
 - Advanced manufacturing



Skilled Technical Workforce Information Needs

- A lack of information about skilled technical workers makes it difficult for policy makers, employers, and workers to address issues in workforce development
- Ultimately, NCSES is attempting to answer the following:
 - How do people ENTER the skilled technical workforce?
 - How do people maintain RELEVANCE in the skilled technical workforce?
 - How do people seek ADVANCEMENT in the skilled technical workforce?

Skilled Technical Workforce Information Needs (continued)

- Data gaps
 - The relationship of non-degree credentials and employment outcomes
 - Examination of the skilled technical workforce by demographics (broadening participation)
 - Information from employers on required skills for workers
 - Types of skills used in these occupations
 - Alignment of skill demand and skill supply
 - Job environment of skill technical workers

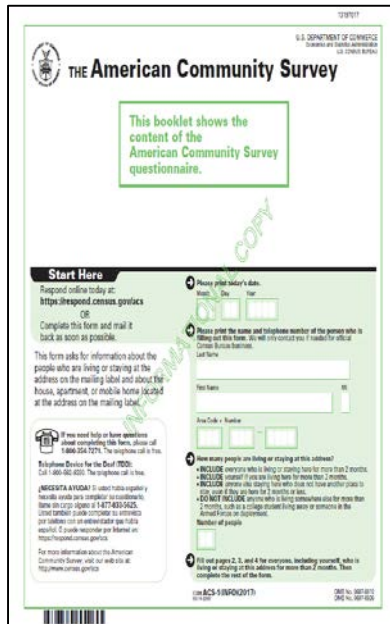
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Investigating Potential STW Data Sources: Criteria

- Population coverage: Must include individuals with an educational attainment level below the bachelor's degree
- Survey content:
 - Education background
 - Training (certifications, certificates, work experience programs)
 - Reasons for education/credential attainment
 - Employment characteristics
 - Demographics (sex, race/ethnicity, disability status)
- Sample design: Occupation oversampling; Longitudinal analysis
- Reliable STW estimation

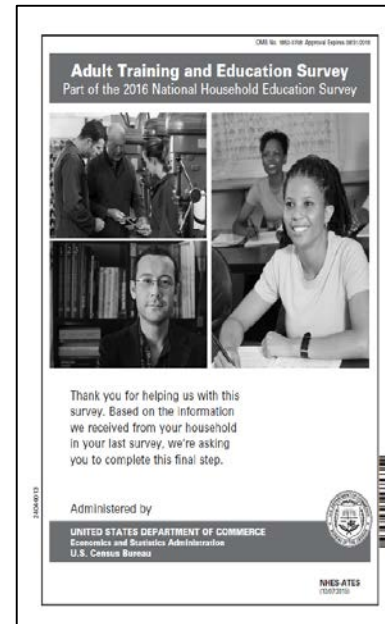
Investigating Potential STW Data Sources: Options



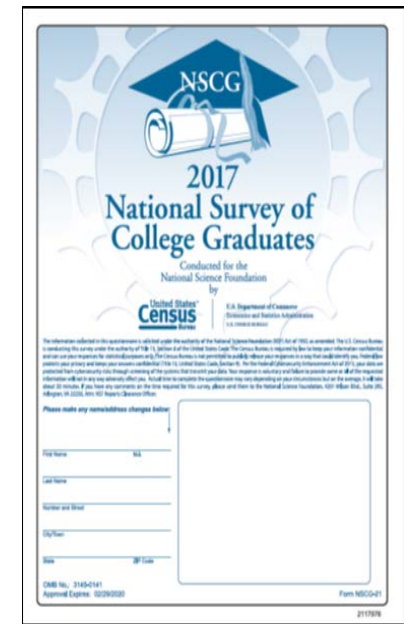
American Community Survey (ACS)



Current Population Survey (CPS)



Adult Training and Education Survey (ATES)



National Survey of College Graduates (NSCG)

Investigating Potential STW Data Sources

Criteria		ACS	CPS	ATES	NSCG
Population coverage					
Survey content	Education background				
	Certifications				
	Certificates				
	Work experience programs				
	Reasons for attainment				
	Employment Characteristics				
	Demographics				
Sample Design	Occupation oversampling				
	Longitudinal analysis				
Reliable STW estimation					

Investigating Potential STW Data Sources

Criteria		ACS	CPS	ATES	NSCG
Population coverage		✓			
Survey content	Education background	✓			
	Certifications				
	Certificates				
	Work experience programs				
	Reasons for attainment				
	Employment Characteristics	✓			
	Demographics	✓			
Sample Design	Occupation oversampling				
	Longitudinal analysis				
Reliable STW estimation					

Investigating Potential STW Data Sources

Criteria		ACS	CPS	ATES	NSCG
Population coverage		✓	✓		
Survey content	Education background	✓	✓		
	Certifications		✓		
	Certificates				
	Work experience programs				
	Reasons for attainment				
	Employment Characteristics	✓	✓		
	Demographics	✓	✓		
Sample Design	Occupation oversampling				
	Longitudinal analysis				
Reliable STW estimation					

Investigating Potential STW Data Sources

Criteria		ACS	CPS	ATES	NSCG
Population coverage		✓	✓	✓	
Survey content	Education background	✓	✓	✓	
	Certifications		✓	✓	
	Certificates			✓	
	Work experience programs			✓	
	Reasons for attainment				
	Employment Characteristics	✓	✓	✓*	
	Demographics	✓	✓	✓*	
Sample Design	Occupation oversampling				
	Longitudinal analysis				
Reliable STW estimation					

Note: * indicates that the information collected is not as comprehensive as the other surveys.

Investigating Potential STW Data Sources

Criteria		ACS	CPS	ATES	NSCG
Population coverage		✓	✓	✓	
Survey content	Education background	✓	✓	✓	✓
	Certifications		✓	✓	✓
	Certificates			✓	
	Work experience programs			✓	
	Reasons for attainment				✓
	Employment Characteristics	✓	✓	✓*	✓
	Demographics	✓	✓	✓*	✓
Sample Design	Occupation oversampling				✓
	Longitudinal analysis				✓
Reliable STW estimation					

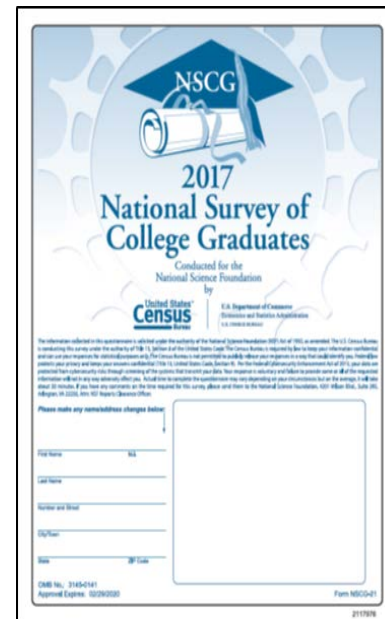
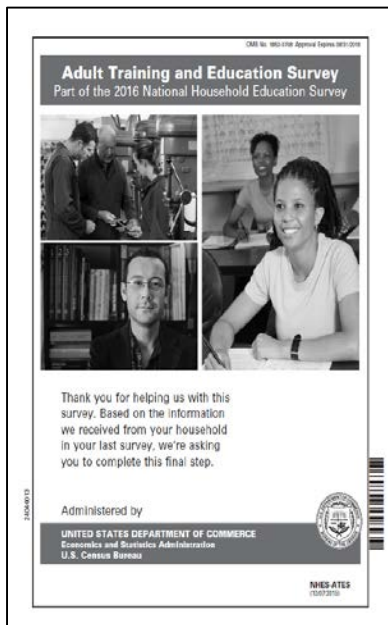
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Investigating Potential STW Data Sources

Criteria		ACS	CPS	ATES	NSCG
Population coverage		✓	✓	✓	
Survey content	Education background	✓	✓	✓	✓
	Certifications		✓	✓	✓
	Certificates			✓	
	Work experience programs			✓	
	Reasons for attainment				✓
	Employment Characteristics	✓	✓	✓*	✓
	Demographics	✓	✓	✓*	✓
Sample Design	Occupation oversampling				✓
	Longitudinal analysis				✓
Reliable STW estimation					

Note: * indicates that the information collected is not as comprehensive as the other surveys.

Investigating Potential STW Data Sources (continued)



Pros:

- Credential information
- Population coverage

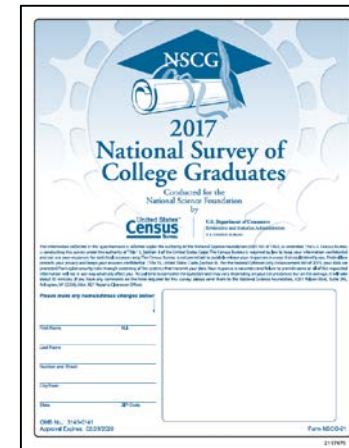
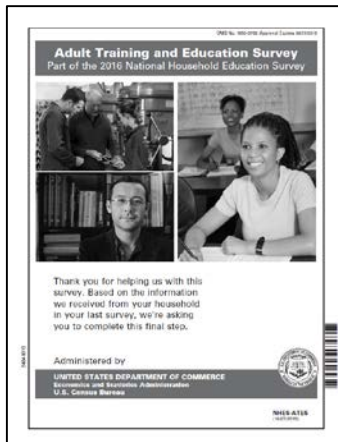
- Reasons for attainment
- Sample design

Cons:

- Unreliable STW estimation
- Uncertain future (low RR)

- Incomplete credential information
- Population coverage

Investigating Potential STW Data Sources (continued)



- Credential information
- Population coverage

- Reasons for attainment
- Sample design



NTEWS
National Training, Education,
and Workforce Survey

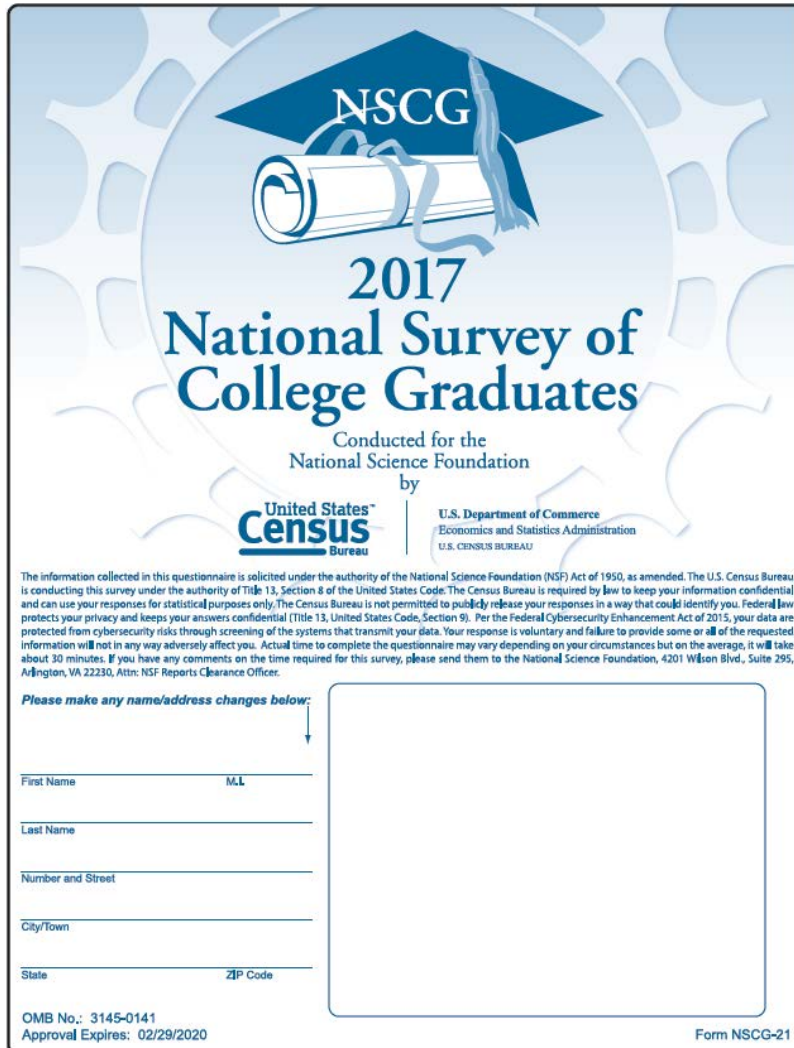


NCSES's Collection of Non-Degree Credential (NDC) Information on the NSCG

NCSES Collection of NDC Information on the NSCG

- Motivated by stakeholder interest in understanding the factors that influence an individual's career pathway
- NCSES was part of the Interagency Working Group on Expanded Measures of Enrollment and Attainment
- Prior to the 2015 survey cycle, NCSES examined potential NDC items (certifications, licenses, certificates)
- Questions on certification and licenses were included on the 2015, 2017, and 2019 NSCG

NDC Information Collected on the NSCG



NSCG
2017
National Survey of College Graduates
Conducted for the National Science Foundation
by
United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU

The information collected in this questionnaire is solicited under the authority of the National Science Foundation (NSF) Act of 1950, as amended. The U.S. Census Bureau is conducting this survey under the authority of Title 13, Section 8 of the United States Code. The Census Bureau is required by law to keep your information confidential and can use your responses for statistical purposes only. The Census Bureau is not permitted to publicly release your responses in a way that could identify you. Federal law protects your privacy and keeps your answers confidential (Title 13, United States Code, Section 9). Per the Federal Cybersecurity Enhancement Act of 2015, your data are protected from cybersecurity risks through screening of the systems that transmit your data. Your response is voluntary and failure to provide some or all of the requested information will not in any way adversely affect you. Actual time to complete the questionnaire may vary depending on your circumstances but on the average, it will take about 30 minutes. If you have any comments on the time required for this survey, please send them to the National Science Foundation, 4201 Wilson Blvd., Suite 295, Arlington, VA 22230, Attn: NSF Reports Clearance Officer.

Please make any name/address changes below:

First Name M.I.

Last Name

Number and Street

City/Town

State ZIP Code

OMB No.: 3145-0141
Approval Expires: 02/29/2020

Form NSCG-21

2117976

- Education history (detailed)
- Employment
- Demographics
- Certifications and licenses
 - Attainment
 - Number
 - Work-related
 - Name
 - Year
 - Type of work
 - Issuer
 - Reasons for attainment
 - Continuing education units required
 - Paid for by employer
 - For your principal job

NDC Information Collected on the NSCG (continued)

2017 National Survey of College Graduates
 Conducted for the National Science Foundation
 by
 United States Census Bureau
 U.S. Department of Commerce
 Economics and Statistics Administration
 U.S. CENSUS BUREAU

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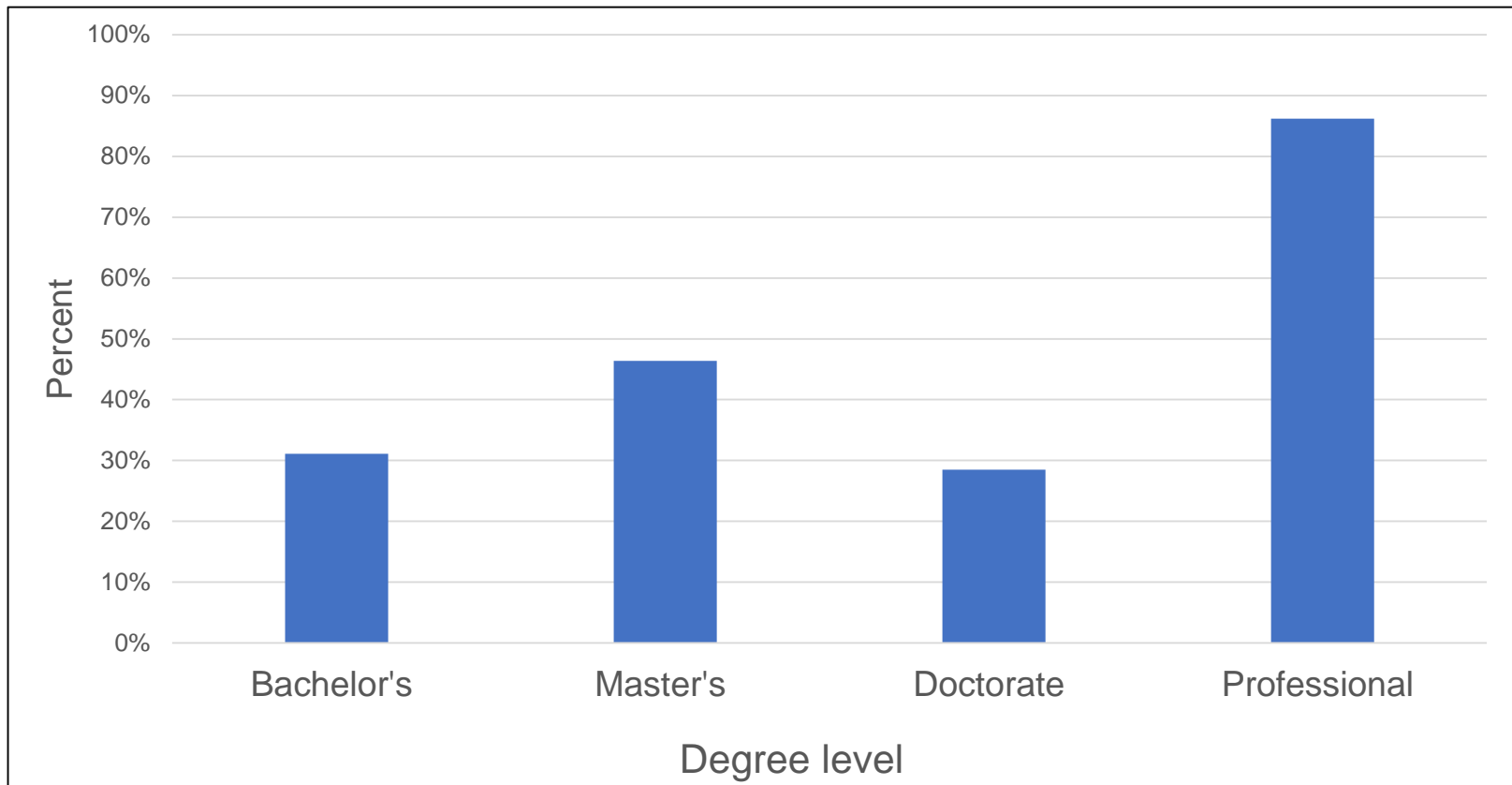
Form NSCG-21

A46. Why do you currently hold this certification or license?

Mark Yes or No for each item.

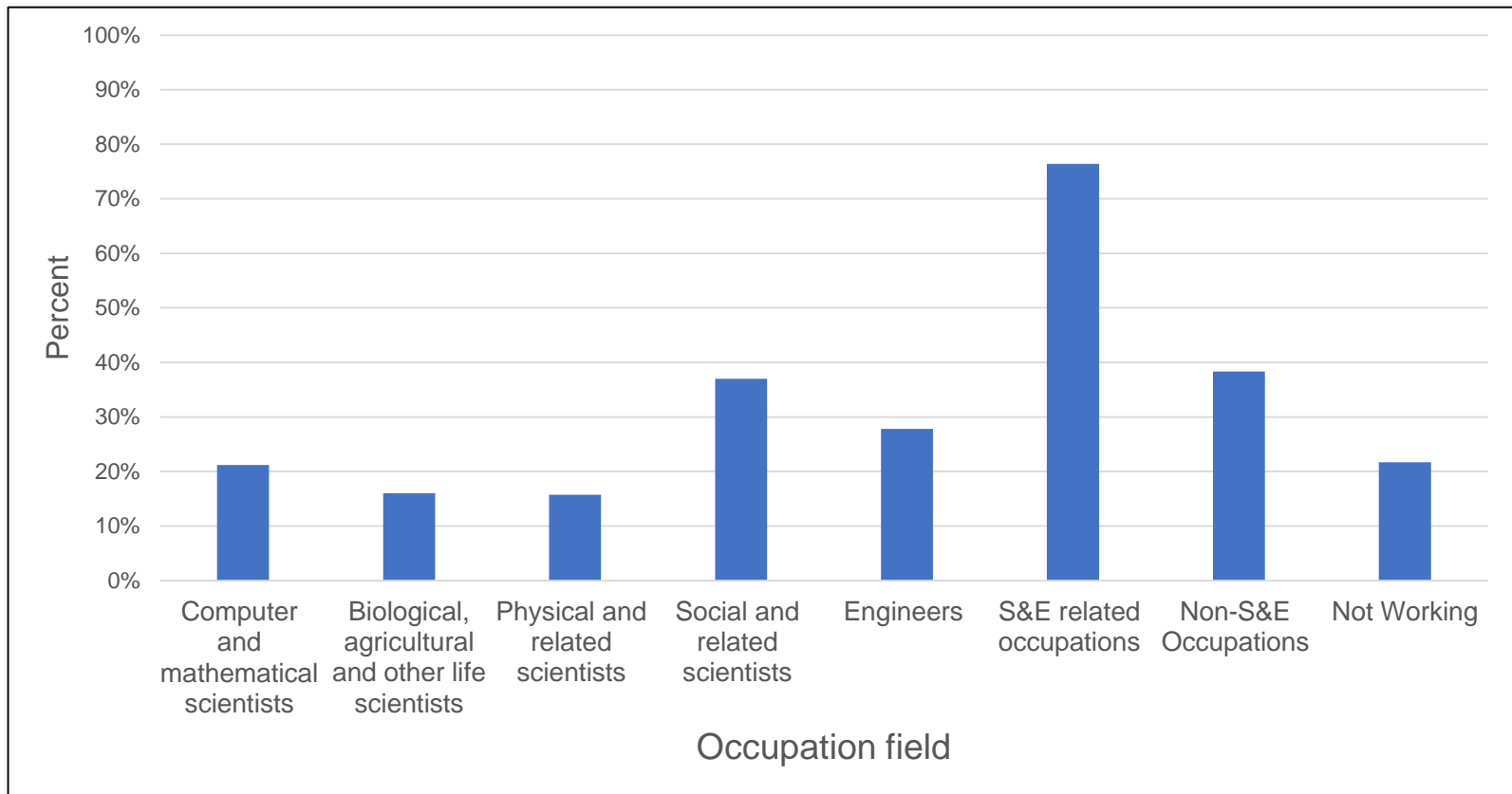
- | | Yes
↓ | No
↓ |
|---|----------------------------|----------------------------|
| 1 To improve skills or knowledge in your current occupational field | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> |
| 2 To increase opportunities for promotion or advancement in your current occupational field | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> |
| 3 To facilitate a change to a different occupational field | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> |
| 4 Required or expected by employer | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> |
| 5 To start your own business | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> |
| 6 Other – Specify ↴ | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> |

Credential prevalence varies by degree level among college graduates



Source: National Survey of College Graduates, 2017

Credential prevalence varies by occupation field among college graduates



Source: National Survey of College Graduates, 2017




NCES's Collection of Non-Degree Credential (NDC) Information on the ATES

NDC Information Collected on the ATES

OMB No. 1850-0788; Approval Expires 08/31/2018


Adult Training and Education Survey
Part of the 2016 National Household Education Survey



Thank you for helping us with this survey. Based on the information we received from your household in your last survey, we're asking you to complete this final step.

Administered by

UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau



NHES-ATES
(10/07/2015)


- Education attainment
- Employment
- Demographics
- Certifications and licenses
 - Attainment
 - Number
 - Name
 - Type of work
 - Required by federal or state govt
 - Ability to revoke/suspend
 - Year
 - Preparation
 - Relationship to current job
 - Value (job, marketability, skills)
 - 2nd certification/license
 - 3rd certification/license



NDC Information Collected on the ATES (continued)

OMB No. 1850-0788; Approval Expires 08/31/2018


Adult Training and Education Survey
Part of the 2016 National Household Education Survey



Thank you for helping us with this survey. Based on the information we received from your household in your last survey, we're asking you to complete this final step.

Administered by

UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau



NHES-ATES
(10/07/2015)


- Certificates
 - Type
 - Field
 - Issuer
 - Hours of instruction
 - Enrollment requirements
 - Relationship to certification/license
 - Relationship to current job
 - Value (job, marketability, skills)



NDC Information Collected on the ATES (continued)

OMB No. 1850-0768: Approval Expires 08/31/2018


Adult Training and Education Survey
Part of the 2016 National Household Education Survey



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Administered by

UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau



NHES-ATES
(10/07/2015)

- Work experience programs
 - Participation
 - Type of work
 - Length of program
 - Wage
 - Type of instruction
 - Outcome
 - Program type
 - Relationship to certification/license
 - Relationship to current job
 - Relationship to current job skills
 - Value (job, marketability, skills)





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NTEWS Overview

- General population survey with a focus on the skilled technical workforce
- U.S. residents ages 16-75 not currently enrolled in high school
- Provides data to understand the relationship between credentials and career opportunities
- NCSES is the lead sponsor, NCES is the cosponsor, and the Census Bureau serves as the data collection contractor

NTEWS Survey Content: Credentials

Content	ATES	NSCG	NTEWS
Certifications/licenses	✓	✓	✓
Certificates	✓		✓
Work experience programs	✓		✓
Detailed information for credentials	✓	✓	✓
Reasons for credentials		✓	✓

NTEWS Survey Content: Credentials (continued)

Reasons for credentials questionnaire item

Thinking back to when you first got this license, which ONE of the following best describes why you got it?

Mark one answer

- To enter the workforce
- To improve skills for a job I already had
- To advance or be promoted in my line of work (including managing)
- To switch to a new line of work
- Other – Please specify:

NTEWS Survey Content: Education

Content	ATES	NSCG	NTEWS
Education level	✓	✓	✓
Field of study for highest level	✓	✓	✓
Current enrollment status	✓	✓	✓
High school completion date	✓	✓	
Complete degree history		✓	
Student debt		✓	
Reasons for educational attainment			✓

NTEWS Survey Content: Employment

Content	ATES	NSCG	NTEWS
Labor force status	✓	✓	✓
Part-time/full-time	✓	✓	✓
Salary	✓	✓	✓
Employer sector (private, govt, etc)	✓	✓	✓
Job title and activities		✓	✓
Employer characteristics		✓	✓
Job satisfaction		✓	✓

NTEWS Survey Content: Demographics

Content	ATES	NSCG	NTEWS
Sex	✓	✓	✓*
Race/ethnicity	✓	✓	✓*
Marital status	✓	✓	✓
Veteran status	✓	✓	✓
Age	✓	✓	✓*
English ability	✓	✓	✓*
Disability status		✓	✓
Child indicator		✓	
Parent education indicator		✓	
Citizenship status		✓	✓*
Visa information		✓	

Note: * represents variables collected on the ACS that will be appended to the NTEWS data

NTEWS Survey Design: Oversampling

Content	ATES	NSCG	NTEWS
Black and Hispanic households	✓	✓	
Underrepresented groups in S&E		✓	✓
Foreign-trained doctorates		✓	
Recent degree recipients		✓	
S&E workforce, bachelor's degree +		✓	✓
Skilled Technical Workforce			✓

NTEWS Survey Design: Rotating Panel Design

NTEWS		Panel			
Year					
2020 Pilot	New Sample				2020 Total
	2018 ACS (n=40,000)				40,000
2022	Returning Sample		New Sample		2022 Total
	2018 ACS (n=25,000)		2020 ACS (n=95,000)		120,000
2024	Returning Sample		New Sample		2024 Total
	2018 ACS (n=24,000)	2020 ACS (n=60,000)	2022 ACS (n=50,000)		134,000
2026	Returning Sample			New Sample	2026 Total
	2018 ACS (n=23,000)	2020 ACS (n=30,000)	2022 ACS (n=31,000)	2024 ACS (n=50,000)	134,000
2028	Returning Sample			New Sample	2028 Total
	2020 ACS (n=29,000)	2022 ACS (n=30,000)	2024 ACS (n=31,000)	2026 ACS (n=50,000)	140,000

2020 NTEWS Pilot Methodological Research

- Contact strategies experiment
- Incentive experiment
- Adaptive design evaluation
- Certificate seeded sample

NTEWS Tentative Schedule

Survey	Top-level Milestone	Estimated Timing
2020 NTEWS operations and content pilot	Data collection	June-December 2020
	Data Release	Fall 2021
2022 NTEWS full-scale production	Data collection	June-December 2022
	Data Release	Fall 2023

NCSES's STW Multidimensional Initiative

- Stakeholder outreach and workshop
- STW definition standardization
- Survey data analysis
- Administrative data analysis
- Survey development



Thank you

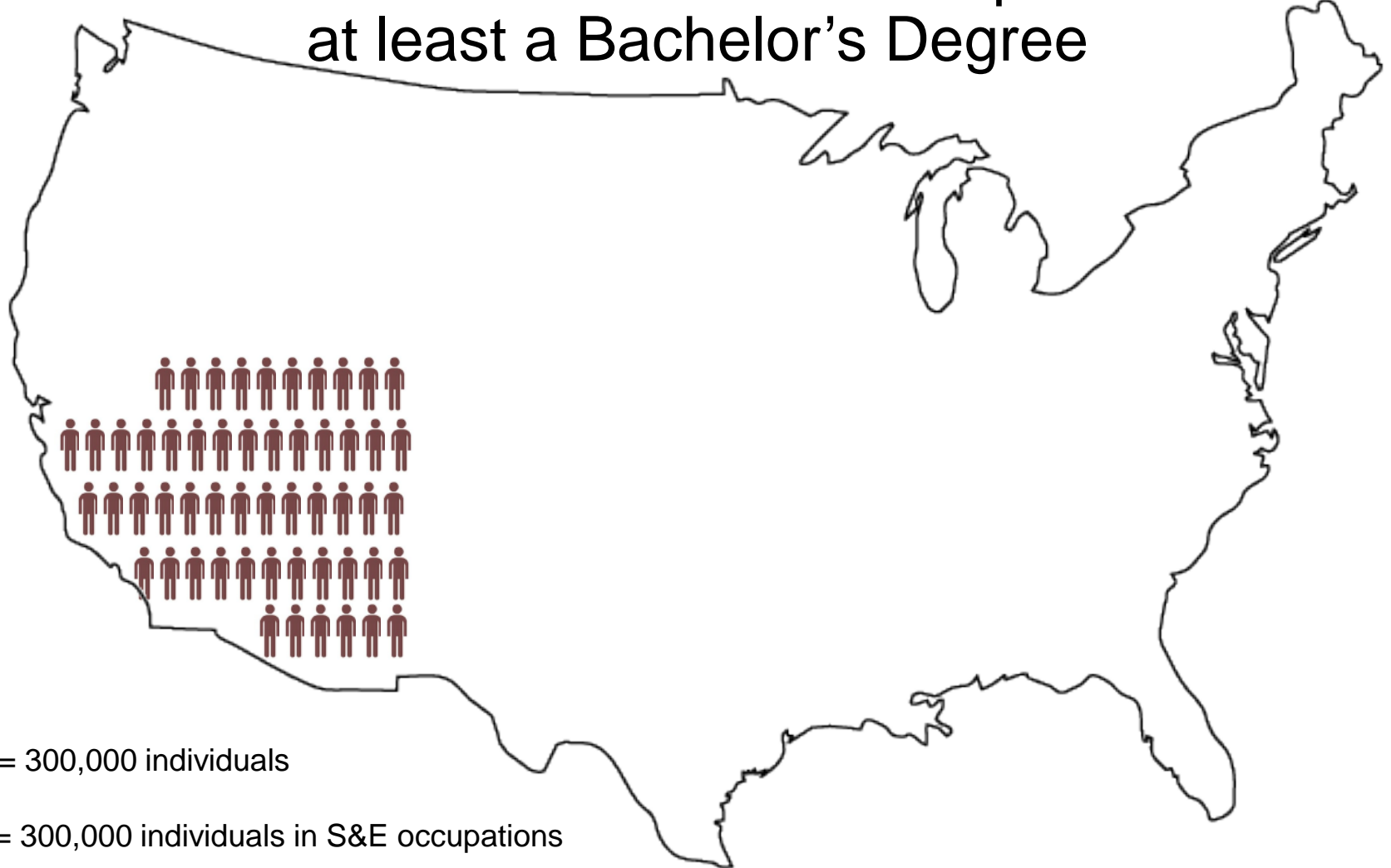
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15 million Individuals in S&E Occupations have at least a Bachelor's Degree



= 300,000 individuals

= 300,000 individuals in S&E occupations

NCSES's S&E Workforce Surveys

