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# Career and technical education: Outcomes on employment, wages and industry

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Of high school graduates who took at least one CTE course, 64 percent were employed in Indiana five and a half years later.

Career and Technical Education (CTE) represents one part of Indiana's efforts to prepare students for careers in high-wage, high-demand occupations. Primarily focused on high school students, CTE currently includes courses in six program areas:

- Agricultural education
- Business and information technology
- Engineering and technology
- Family and consumer sciences
- Health science
- Trade and industrial education

Through CTE, students can learn about potential career options and have the opportunity to learn applicable skills, earn industry certifications and gain college credits.

Analyses of outcomes for Indiana CTE participants are promising, but often tend to focus on educational outcomes (assessment exams, graduation rates or enrollment in college) or credentials earned (certificates and licenses). Analysis of wage records for Indiana employers yields additional insight on the employment status, wages and industries of graduated CTE participants.

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## Summary of findings

Long-term outcomes are defined as being 22 quarters after last CTE participation (see the 2010-2011 cohort discussion), while short-term outcomes are 10 quarters after (see the 2013-2014 cohort discussion).

### Long-term outcomes

- Of high school graduates who took at least one CTE course, 64 percent were employed in Indiana 22 quarters later.
- Those that were employed were more likely to work in manufacturing and the health care and social assistance sectors. They were less likely to work in retail trade and accommodation and food services.

### Short-term outcomes

- Rates of college enrollment, employment and industry of employment differ depending on the number of CTE courses taken and the subject areas studied.
- CTE-participating high school graduates who took five or more CTE courses were more likely to be employed in Indiana 10 quarters later compared to all CTE-participating graduates (64 percent vs. 58 percent).
- Participants who focused on trade and industrial education had relatively high rates of employment in Indiana (67 percent) and low rates of enrollment in public Indiana colleges (19 percent) in the 2015-2016 school year.
- Participants who focused on health sciences or engineering and technology had higher rates of enrollment in Indiana public colleges (42 percent and 37 percent, respectively).
- Compared to 22- to 24-year-old workers overall, CTE-participating graduates appear more likely to be working in industries related to the CTE subject areas they focused on.

## About the data

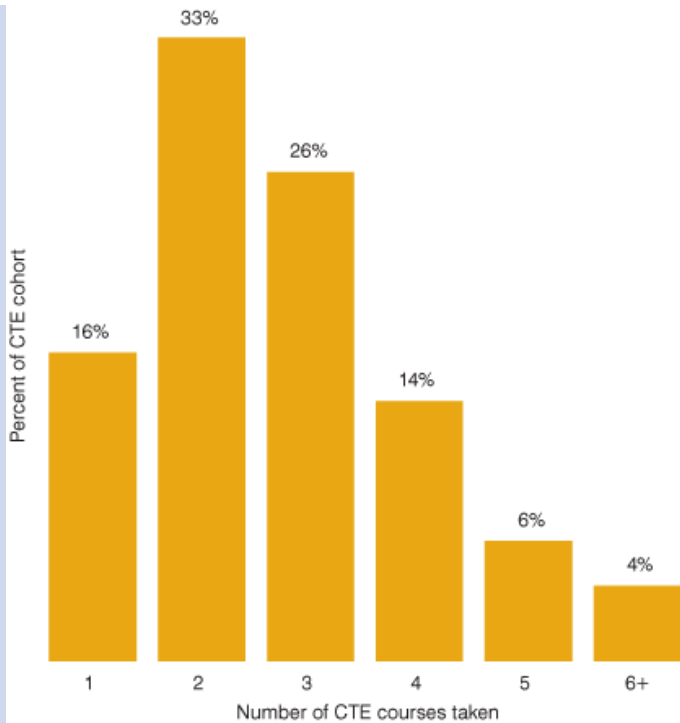
Two cohorts are used to measure employment outcomes for CTE participants. The first is the set of nearly 37,000 high school graduates whose last CTE course was in the 2010-2011 school year, and who were 18 to 19 years old at the end of that term. Graduation dates are not available in this data, so these criteria are intended to approximate the set of CTE participants who graduated from high school in that school year. These data lack detail on the number of CTE courses taken and their subject matter.

A second cohort of over 40,000 high school graduates (based on the 2013-2014 school year) is used to estimate shorter-term employment outcomes. Data for this cohort include more detail on the number of CTE courses taken and the subject matter of each CTE course.

Because these cohorts are defined regardless of college attendance, and because the short-term outcomes are likely to be influenced by college attendance, rates of enrollment in Indiana public colleges for the 2013-2014 cohort are also presented for context (in **Figure 5**).

Typically, analyses of CTE participants focus on “CTE concentrators,” a term for students who earn six or more credits in a CTE pathway. Because the data used in this analysis lack reliable information on credit hours for years before 2013-2014, the number of courses a student completed is used to identify students with more intensive CTE participation. Approximately 10 percent of the 2013-2014 cohort completed five or more CTE courses (see **Figure 1**).

### Figure 1: Total number of CTE courses taken, 2013-2014 cohort



Source: Indiana Department of Workforce Development

As noted above, definitions and data used in this analysis are not the same as those used in other reports<sup>1,2</sup> on CTE in Indiana, so results are often not directly comparable.

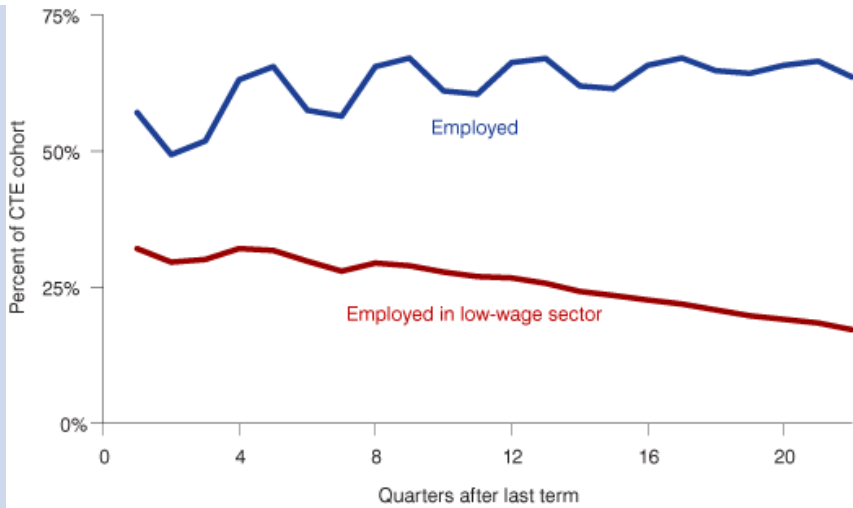
To determine employment outcomes, the CTE participants were matched to wage records from unemployment insurance filings. They were also matched to data from the Commission for Higher Education (CHE) to determine whether they were enrolled in an Indiana public college or university during the 2015-2016 school year. In some cases, data from the U.S. Census Bureau’s Quarterly Workforce Indicators on employment of 22-to 24-year-olds in Indiana is used as a comparison group.

## Long-term outcomes

### Employment and wages

The 2010-2011 cohort of CTE-participating high school graduates can provide a general picture of long-term employment and wage outcomes. The number employed in each quarter grew to around 64 percent by the 22nd quarter after the cohort’s last term (see **Figure 2**). It is important to note that this does not count anyone who was employed outside Indiana. Immediately following the last term, 32 percent of graduates (56 percent of those employed) worked in retail trade or accommodation and food services—industry sectors that tend to include a high percentage of low-wage workers. This percentage declined to 17 percent (27 percent of workers) by the 22nd quarter.

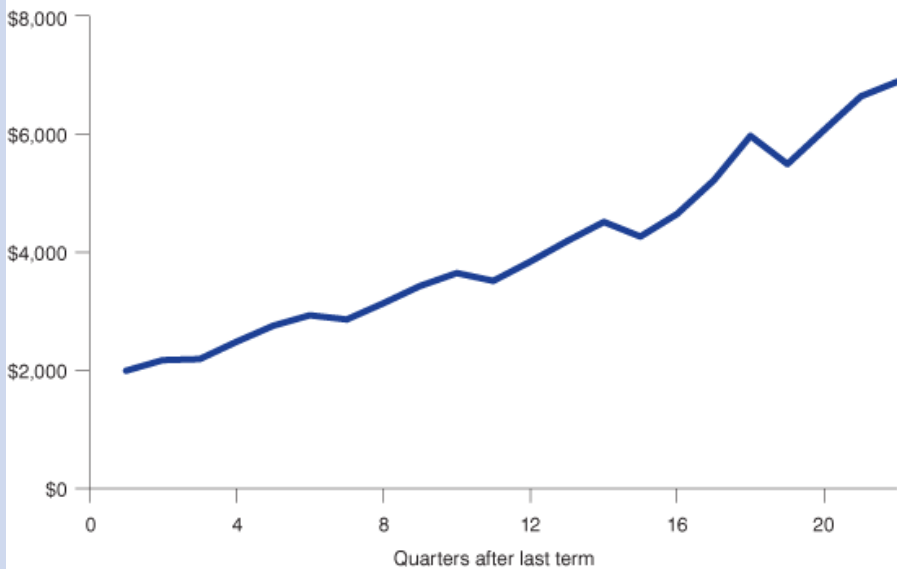
**Figure 2: Employment outcomes of CTE graduates by quarter, 2010-2011 cohort**



Note: Employment data are limited to those who were employed within Indiana.  
Source: Indiana Department of Workforce Development

Average quarterly wages also increased for graduates who were employed, from just under \$2,000 up to \$6,885 in the 22nd quarter (see **Figure 3**). It isn't immediately clear how much of this increase results from more hours worked and how much is due to higher wage rates, but the decline in the percentage of graduates in low-wage sectors implies that the latter probably explains a portion of the increase.

**Figure 3: Average quarterly wages of CTE graduates, 2010-2011 cohort**

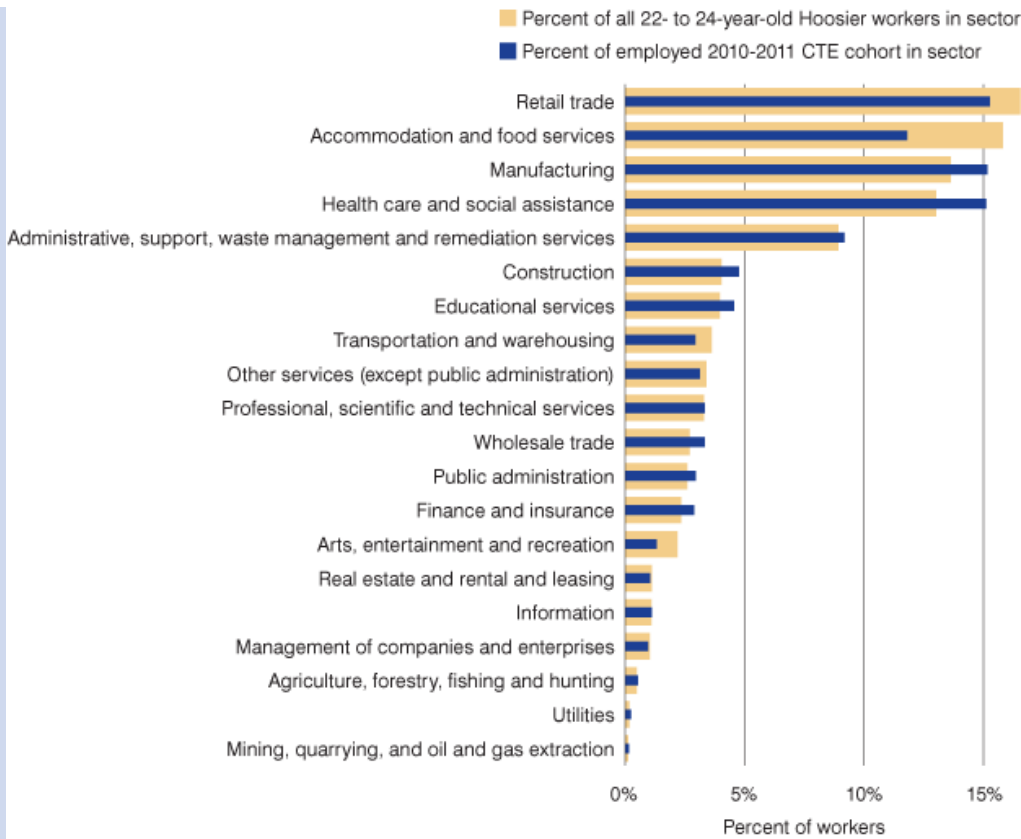


Source: Indiana Department of Workforce Development

### Industry of employment

Breaking out employment by industry sector in the 22nd quarter reveals some interesting information about how employment outcomes for CTE participants compare to overall employment of young adults in Indiana (see **Figure 4**). A smaller share (27 percent) of CTE participants work in the two low-wage sectors compared to all 22- to 24-year-olds in Indiana (32 percent). Instead, CTE participants are more likely to work in the manufacturing or health care and social assistance sectors than other workers at similar ages.

**Figure 4: Industry of CTE graduate workers, 22 quarters after last term, 2010-2011 cohort**



Source: Indiana Department of Workforce Development (CTE cohort) and U.S. Census Bureau Quarterly Workforce Indicators (all workers)

## Short-term outcomes (2013-2014 cohort)

### Employment and wages

The 2013-2014 cohort can provide a more detailed view of how outcomes for CTE participants vary depending on the number and subject area of the courses they took. In the fourth quarter of 2016 (10 quarters after the 2013-2014 cohort's last term), 58 percent of the cohort was employed in Indiana (see **Figure 5**). Graduates who took five or more CTE courses were more likely to be employed (64 percent) than CTE graduates overall.

**Figure 5: Outcomes for CTE graduates 10 quarters after last term, 2013-2014 cohort**

	Number:	Percent enrolled CHE 2015-2016:	Percent employed in Indiana:	Percent employed in low-wage sectors:
All CTE graduates	41,766	30%	58%	24%
Graduates with five or more CTE courses	4,352	30	64	24
Graduates with at least three courses in:				
Trade and industrial education	468	19	67	20
Family and consumer sciences	3,175	28	64	30
Health science education	1,610	42	61	24
Agricultural education	1,207	28	60	18
Business, marketing and IT	1,262	33	56	24
Engineering and technology education	1,373	37	49	19

Source: Indiana Department of Workforce Development

Thirty percent of CTE participants were enrolled in an Indiana public college during the 2015-2016 school year. CHE enrollment and wage employment are not mutually exclusive, so some of these students may also be counted in the 58 percent employed. Twenty-four percent of CTE participants were employed in the retail or accommodation and food services sectors.

Looking at the subject areas that CTE participants studied can provide further insight into the relationship between CTE and employment outcomes. Students who took courses in health science or in engineering and technology education were most likely to be enrolled in public colleges in Indiana during the 2015-2016 school year (42 percent and 37 percent, respectively). Students who took at least three courses in the trade and industrial education subject area had the lowest CHE enrollment rate (19 percent), but the highest employment rate (67 percent). Students who studied family and consumer sciences also had high employment rates (64 percent), but nearly half of them worked in the low-wage retail and food and accommodation sectors.

Industry of employment

Although the wage data lacks information on workers' occupations, the industry of the employer can still provide some information on whether fields CTE students end up in are related to their CTE participation. Associating each CTE subject area with specific industry sectors or subsectors (see Table 1) enables a crude analysis of whether CTE participants are more likely to work in fields related to the CTE courses they took in high school.

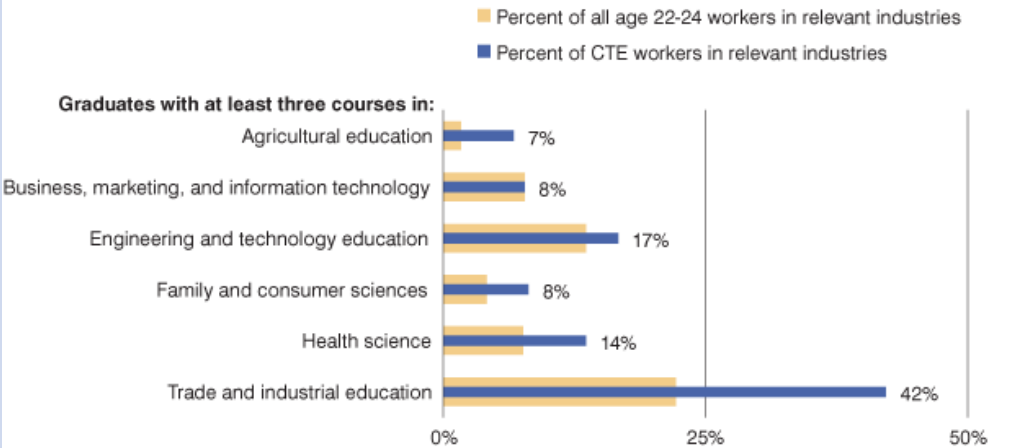
Table 1: Relevant industries for each CTE program area

CTE subject area	Relevant industries (NAICS code)
Agricultural education	Agriculture, forestry, fishing and hunting (11), food manufacturing (311)
Business, marketing and information technology	Information (51), finance and insurance (52), professional, scientific, and technical services (54), management of companies and enterprises (55)
Engineering and technology education	Manufacturing (31-33)
Family and consumer sciences	Elementary and secondary schools (6111), social assistance (624)
Health science	Ambulatory health care services (621), hospitals (622)
Trade and industrial education	Construction (23), manufacturing (31-33), transportation and warehousing (48-49), repair and maintenance (811)

Source: Indiana Department of Workforce Development

In general, it appears that employed graduates who took at least three courses in a single CTE subject area are more likely to be working in related industries when compared to the share of 22- to 24-year-old Hoosiers in those industries overall (see Figure 6).

Figure 6: Graduates tend to work in CTE subject areas they studied



Source: Indiana Department of Workforce Development (CTE cohort) and U.S. Census Bureau Quarterly Workforce Indicators (all workers)

This is especially true in trade and industrial education, as well as health science. For example, 42 percent of CTE participants with three or more courses in trade and industrial education were employed in the construction, manufacturing, transportation and warehousing, or repair and maintenance industries. However, only 22 percent of all 22- to 24-year-old Hoosiers work in these industries.

# Directions for future research

There are two major limitations on this analysis that might be remedied in future research. First, using data that includes only CTE participants limits the ability to compare outcomes for CTE-participating graduates to similar high school graduates who did not participate in CTE. One potential solution to this problem is to use student data matched to wage records for all high school graduates to form a better comparison group.

Another limitation on this analysis is that the lack of data on occupation of employed graduates makes it difficult to determine with confidence whether CTE participants are employed in fields where their CTE education is relevant. The Indiana Department of Workforce Development is currently partnering with the Indiana Business Research Center with the goal of assigning occupational classifications to the department's wage records.<sup>3</sup> The outcome of this project might result in better opportunities to evaluate how employment outcomes for CTE participants relate to the subject areas and pathways they choose in school.

## Notes

1. Fleck Education, "2016 Indiana Career Readiness Report," [www.doe.in.gov/sites/default/files/cte/17-state-cte-career-readiness-report-final-3-3-17.pdf](http://www.doe.in.gov/sites/default/files/cte/17-state-cte-career-readiness-report-final-3-3-17.pdf).
2. Center for Education and Career Innovation, "CTE ROI Study Update," October 28, 2014, [www.in.gov/icc/files/Sector\\_Strategies\\_Taskforce\\_-\\_CTE\\_ROI\\_10-28-14\\_Final.pdf](http://www.in.gov/icc/files/Sector_Strategies_Taskforce_-_CTE_ROI_10-28-14_Final.pdf).
3. Thea Evans and Carol O. Rogers, "Occupation Assignment Engine Helps Fill Knowledge Gaps," *InContext*, July 2017, [www.incontext.indiana.edu/2017/july-aug/article2.asp](http://www.incontext.indiana.edu/2017/july-aug/article2.asp).


**Next:** Understanding the administrative, support, waste management and remediation services sector

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# Understanding the administrative, support, waste management and remediation services sector

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The services to buildings and dwellings industry group accounts for 21 percent of the sector's employment within Indiana, while employment services accounts for half of the sector's employment in the state.

Most discussions of industry sectors mention the “administrative and support and waste management and remediation services” sector. But what exactly is that? This article discusses the types of firms that are included, how it compares to other sectors and how its employment is changing over time. (For the sake of brevity, we will use the term “administrative and waste management sector” interchangeably with the sector's official name.)

## Definition

The North American Industry Classification System (NAICS) defines the sector this way:

*“The administrative and support and waste management and remediation services sector comprises establishments performing routine support*

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*activities for the day-to-day operations of other organizations. These essential activities are often undertaken in-house by establishments in many sectors of the economy. The establishments in this sector specialize in one or more of these support activities and provide these services to clients in a variety of industries and, in some cases, to households. Activities performed include: office administration, hiring and placing of personnel, document preparation and similar clerical services, solicitation, collection, security and surveillance services, cleaning, and waste disposal services.”<sup>1</sup>*

**Table 1** details the five-digit industries included in this sector, with the four-digit industry groups shown in blue.

**Table 1: Industries within the administrative, support, waste management and remediation services sector**

Code	Name	Description
Office Administrative Services		
56111	Office Administrative Services	Provide a range of day-to-day office administrative services, such as financial planning; billing and recordkeeping; personnel; and physical distribution and logistics for others on a contract or fee basis. These establishments do not provide operating staff to carry out the complete operations of a business.
Facilities Support Services		
56121	Facilities Support Services	Provide operating staff to perform a combination of support services within a client's facilities. Establishments typically provide a combination of services, such as janitorial, maintenance, trash disposal, guard and security, mail routing, reception, laundry, and related services to support operations within facilities. These establishments provide operating staff to carry out these support activities, but are not involved with or responsible for the core business or activities of the client. Establishments providing facilities (except computer and/or data processing) operation support services and establishments providing private jail services or operating correctional facilities (i.e., jails) on a contract or fee basis are included in this industry.
Employment Services		
56131	Employment Placement Agencies and Executive Search Services	Provide one of the following: (1) listing employment vacancies and referring or placing applicants for employment; or (2) providing executive search, recruitment and placement services.
56132	Temporary Help Services	Supply workers to clients' businesses for limited periods of time to supplement the workforce of the client. The individuals provided are employees of the temporary help service establishment. However, these establishments do not provide direct supervision of their employees at the clients' work sites.
56133	Professional Employer Organizations	Provide human resources and human resource management services to client businesses. Establishments operate in a co-employment relationship with client businesses or organizations and are specialized in performing a wide range of human resource and personnel management duties, such as payroll, payroll tax, benefits administration, workers' compensation, unemployment and human resource administration. Professional employer organizations (PEOs) are responsible for payroll, including withholding and remitting employment-related taxes, for some or all of the employees of their clients, and also serve as the employer of those employees for benefits and related purposes.
Business Support Services		
56141	Document Preparation Services	Provide one or more of the following: (1) letter or resume writing; (2) document editing or proofreading; (3) typing, word processing or desktop publishing; and (4) stenography (except court reporting or stenotype recording), transcription and other secretarial services.
56142	Telephone Call Centers	Includes (1) establishments primarily engaged in answering telephone calls and relaying messages to clients and (2) establishments primarily engaged in providing telemarketing services on a contract or fee basis for others, such as promoting clients' products or services by telephone; taking orders for clients by telephone; and soliciting contributions or providing information for clients by telephone. Telemarketing establishments never own the product or provide the service that they are representing and generally can originate and/or receive calls for others.

56143	Business Service Centers	Includes (1) establishments primarily engaged in providing mailbox rental and other postal and mailing services (except direct mail advertising); (2) establishments, generally known as copy centers or shops, primarily engaged in providing photocopying, duplicating, blueprinting and other document copying services without also providing printing services (i.e., offset printing, quick printing, digital printing or prepress services); and (3) establishments that provide a range of office support services (except printing services), such as mailing services, document copying services, facsimile services, word processing services, on-site PC rental services and office product sales.
56144	Collection Agencies	Collect payments for claims and remit payments collected to their clients.
56145	Credit Bureaus	Compile information, such as credit and employment histories on individuals and credit histories on businesses, and provide the information to financial institutions, retailers and others who have a need to evaluate the creditworthiness of these persons and businesses.
56149	Other Business Support Services	Provide business support services (except secretarial and other document preparation services; telephone answering or telemarketing services; private mail services or document copying services conducted as separate activities or in conjunction with other office support services; monetary debt collection services; and credit reporting services). Address bar coding services, mail presorting services, court reporting services and fundraising organization services are included in this industry.
Travel Arrangement and Reservation Services		
56151	Travel Agencies	Act as agents in selling travel, tour and accommodation services to the general public and commercial clients.
56152	Tour Operators	Arrange and assemble tours. The tours are sold through travel agencies or tour operators. Travel or wholesale tour operators are included in this industry.
56159	Other Travel Arrangement and Reservation Services	Includes establishments (except travel agencies and tour operators) primarily engaged in providing travel arrangement and reservation services, such as condominium time-share exchange services, convention or visitors bureaus, ticket offices, and reservation services.
Investigation and Security Services		
56161	Investigation, Guard, and Armored Car Services	Provide one or more of the following: (1) investigation and detective services; (2) guard and patrol services; and (3) picking up and delivering money, receipts or other valuable items with personnel and equipment to protect such properties while in transit.
56162	Security Systems Services	Includes establishments engaged in (1) selling security systems, such as burglar and fire alarms and locking devices, along with installation, repair or monitoring services or (2) remote monitoring of electronic security alarm systems.
Services to Buildings and Dwellings		
56171	Exterminating and Pest Control Services	Exterminate and control birds, mosquitoes, rodents, termites, and other insects and pests (except for crop production and forestry production). Establishments providing fumigation services are included in this industry.
56172	Janitorial Services	Clean building interiors, interiors of transportation equipment (e.g., aircraft, rail cars, ships), and/or windows.
56173	Landscaping Services	Includes (1) establishments primarily engaged in providing landscape care and maintenance services and/or installing trees, shrubs, plants, lawns or gardens and (2) establishments primarily engaged in providing these services along with the design of landscape plans and/or the construction (i.e., installation) of walkways, retaining walls, decks, fences, ponds and similar structures.
56174	Carpet and Upholstery Cleaning Services	Clean and dye used rugs, carpets and upholstery.
56179	Other Services to Buildings and Dwellings	Provide services to buildings and dwellings (except exterminating and pest control; janitorial; landscaping care and maintenance; and carpet and upholstery cleaning). Swimming pool cleaning and maintenance, chimney cleaning services, and drain or gutter cleaning services are included in this industry.
Other Support Services		
56191	Packaging and Labeling Services	Package client-owned materials, which may include labeling and/or imprinting the package.
56192	Convention and Trade Show Organizers	Organize, promote, and/or manage events, such as business and trade shows, conventions, conferences, and meetings (whether or not they manage and provide the staff to operate the facilities in which these events take place).
56199	All Other Support	Provide day-to-day business and other organizational support services (except office administrative services, facilities support services, employment services, business support services, travel arrangement and reservation services, security and investigation services, services to buildings and other structures, packaging and

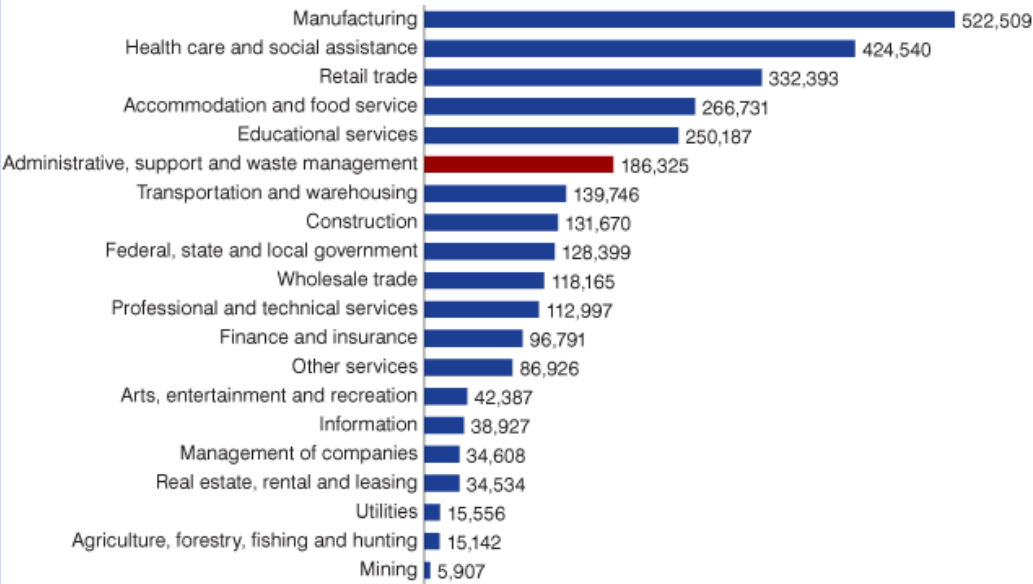
	Services	labeling services, and convention and trade show organizing services). Bartering services, traffic control services and inventory taking services are included in this industry.
Waste Collection		
56211	Waste Collection	Includes (1) collecting and/or hauling hazardous waste, nonhazardous waste, and/or recyclable materials within a local area and/or (2) operating hazardous or nonhazardous waste transfer stations. Hazardous waste collection establishments may be responsible for the identification, treatment, packaging and labeling of waste for the purposes of transport.
Waste Treatment and Disposal		
56221	Waste Treatment and Disposal	Includes (1) operating waste treatment or disposal facilities (except sewer systems or sewage treatment facilities) or (2) the combined activity of collecting and/or hauling of waste materials within a local area and operating waste treatment or disposal facilities. Waste combustors or incinerators (including those that may produce byproducts, such as electricity), solid waste landfills and compost dumps are included in this industry.
Remediation and Other Waste Management Services		
56291	Remediation Services	Includes one or more of the following: (1) remediation and cleanup of contaminated buildings, mine sites, soil or ground water; (2) integrated mine reclamation activities, including demolition, soil remediation, waste water treatment, hazardous material removal, contouring land and revegetation; and (3) asbestos, lead paint and other toxic material abatement.
56292	Materials Recovery Facilities	Includes (1) operating facilities for separating and sorting recyclable materials from nonhazardous waste streams (i.e., garbage) and/or (2) operating facilities where commingled recyclable materials, such as paper, plastics, used beverage cans and metals, are sorted into distinct categories.
56299	All Other Waste Management Services	Includes waste management services (except waste collection, waste treatment and disposal, remediation, operation of materials recovery facilities, and waste management consulting services), such as sewer cleaning services and portable toilet renting.

Source: North American Industry Classification System

## 2016 employment

Indiana’s administrative, support, waste management and remediation services sector consists of almost 9,300 establishments and employs nearly 187,000 workers. This equates to 6.2 percent of total employment in the state (compared to 6.4 percent in the U.S. as a whole). It is Indiana’s sixth largest sector (see **Figure 1**).

**Figure 1: Indiana’s employment by sector, 2016**

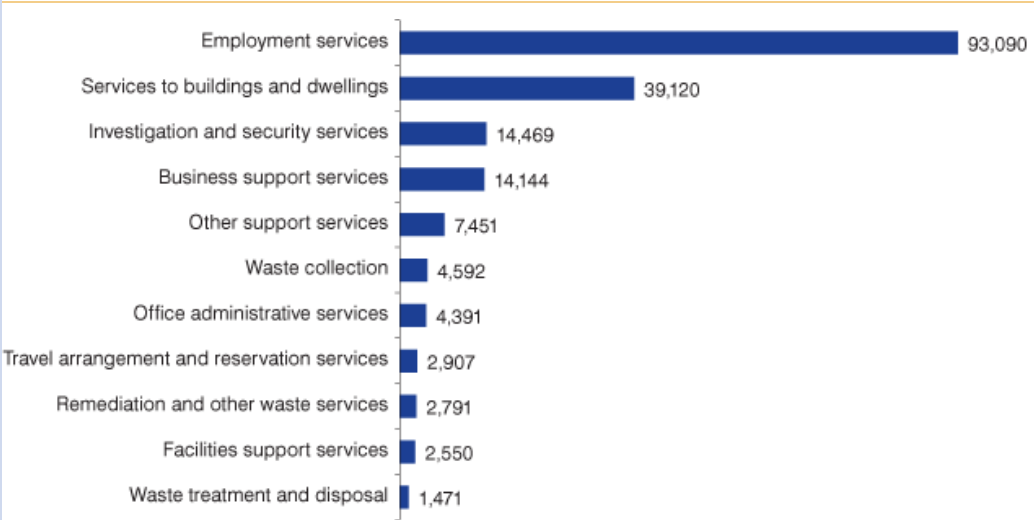


Source: U.S. Bureau of Labor Statistics, using Quarterly Census of Employment and Wages data

Within the administrative and waste management sector, employment services (e.g., employment placement agencies and executive search services, temporary help services, and professional employer organizations) accounts for half of all employment within the sector at the state level (see **Figure 2**). For comparison, the employment services industry group comprises just 39 percent of the

sector at the national level.

**Figure 2: Indiana employment by industry group within the administrative and waste management sector, 2016**



Note: When summed, employment totals in this chart differ from the sector total in Figure 1 due to disclosure issues.  
Source: U.S. Bureau of Labor Statistics, using Quarterly Census of Employment and Wages data

The next largest industry group is services to buildings and dwellings (e.g., pest control, janitorial services, landscaping services, and carpet cleaning). This accounts for 21 percent of the sector’s employment within Indiana and 23 percent of sector employment at the national level.

### Change over time

In the past 15 years, employment in the sector has increased by nearly 52,000 (or 38 percent). And nearly half of this growth has happened since 2011 (see **Table 2**).

**Table 2: Change in Indiana’s administrative and waste management sector employment**

Industry Group	15-year change (2001-2016)		5-year change (2011-2016)	
	Numeric	Percent	Numeric	Percent
Sector Total	51,952	38%	24,085	15%
Employment services	31,117	50%	10,675	13%
Services to buildings and dwellings	8,763	29%	5,670	17%
Business support services	3,005	27%	2,454	21%
Office administrative services	2,614	147%	1,529	53%
Investigation and security services	2,658	23%	1,052	8%
Waste collection	1,371	43%	923	25%
Facilities support services	1,787	234%	512	25%
Other support services	615	9%	400	6%
Remediation and other waste services	927	50%	374	15%
Travel arrangement and reservation services	-735	-20%	307	12%
Waste treatment and disposal	-170	-10%	188	15%

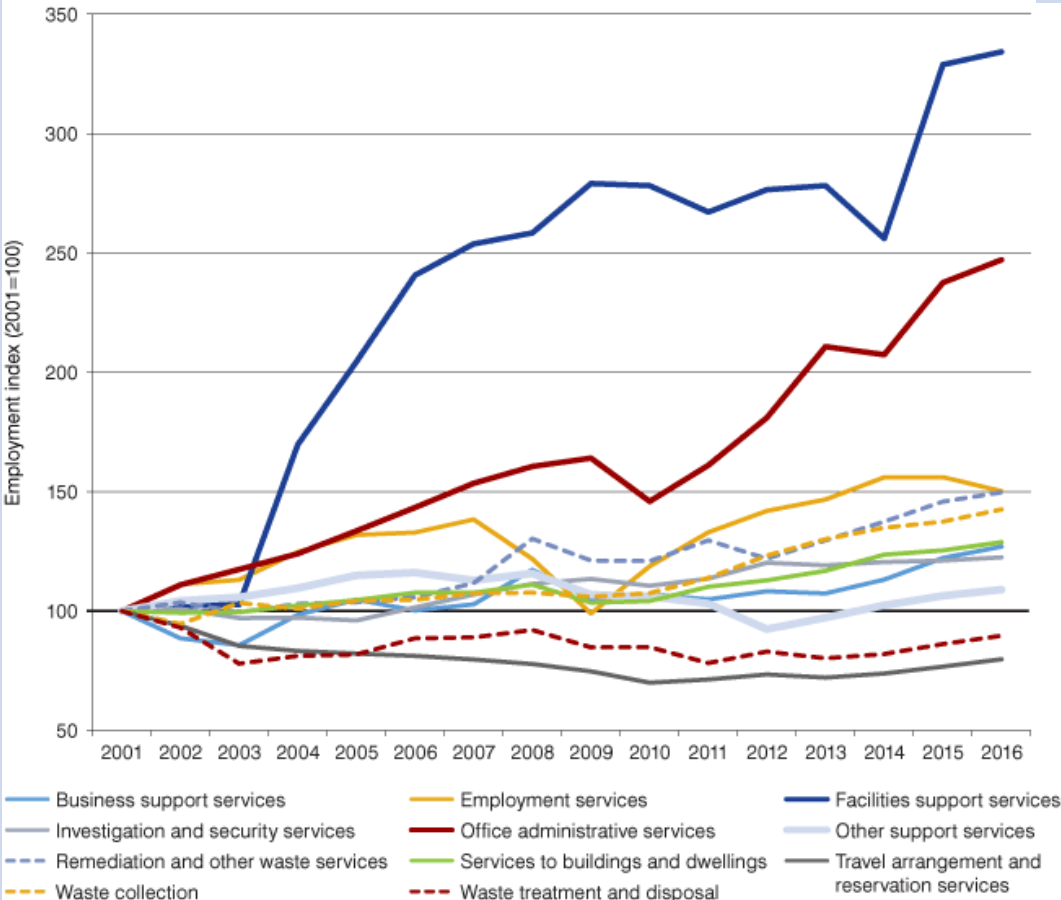
Note: This table is sorted by five-year numeric change.  
Source: U.S. Bureau of Labor Statistics, using Quarterly Census of Employment and Wages data

Growth in the employment services industry group has accounted for 60 percent of the sector’s job growth since 2001. When combined with services to buildings and dwellings, those two industry groups alone account for 77 percent of the numeric growth in the sector between 2001 and 2016 (and

68 percent of the growth since 2011).

However, facilities support services experienced the most dramatic growth in percentage terms among industry groups since 2001, with a 234 percent increase (see **Figure 3**). Only two industry groups within the sector have experienced declining employment over the 15-year time frame—travel arrangement and waste treatment and disposal—though there has been slight growth in both in recent years.

**Figure 3: Indiana’s administrative and waste management industry group employment indexed to 2001**



Source: U.S. Bureau of Labor Statistics, using Quarterly Census of Employment and Wages data

## Summary

The administrative, support, waste management and remediation services sector covers a broad range of industries. State-level employment in the sector and its industry groups has been increasing over both a five-year and a 15-year time frame (with just a couple of exceptions). However, it is worth keeping in mind that much of the sector’s growth lies in employment services (e.g., temp jobs); therefore, a large increase in that industry group may not necessarily be a positive thing.

## Notes

1. “Administrative and Support and Waste Management and Remediation Services: NAICS 56,” U.S. Bureau of Labor Statistics, <https://www.bls.gov/iag/tgs/iag56.htm>.

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