

# Healthcare Tech Middle Tennessee



2019

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## About Middle Tennessee Tech

The Middle Tennessee Tech research program was established in 2018 with the goal of providing industry, economic development, and academic audiences with data on the current state of the local technology workforce. It is a partnership between the MTSU Department of Information Systems and Analytics and the Greater Nashville Technology Council (NTC).

Middle Tennessee Tech formally launched with the release of the [“State of Middle Tennessee Tech”](#) report in October 2018. That report provided summary data on the Middle Tennessee tech workforce as a whole, as well as for the major occupation groups identified within the tech workforce. The findings highlighted the tremendous past and projected growth in regional technology jobs.

In recognition that healthcare is a major economic driver in this region, healthcare technology was identified as one of the tech sub-specialties worthy of additional analysis. This report examines job demand in the healthcare tech space through an analysis of online job postings that were active in 2018.

## Executive Summary

- There were **over 38,000** unique job postings for tech jobs in Middle Tennessee in 2018. Of those postings, **33.0%** came from healthcare-affiliated organizations.
- When comparing healthcare tech job demand to overall tech job demand, there was a high degree of consistency in the top occupations, job titles, skills, and qualifications. However, variation was found in the proportion of overall tech demand driven by healthcare when looking at individual occupations and job titles.
- Demand for healthcare tech workers grew steadily through 2017 and 2018, peaking at **3,072** active job postings in December 2018.
- Two HCA companies, **HCA Holdings Inc.** and **HCA – HealthONE**, combined to top the list of healthcare companies hiring in 2018. Together, they posted **over 1,300 tech** positions. **Anthem** rounded out the top three, with **roughly 750** postings.
- The most in-demand healthcare tech occupation was **Software Developers, Applications** with **12.7%** of postings associated with this occupation group. The **Management Analysts** and **Computer Systems Analysts** occupation groups followed close behind, with **12.5%** and **11.8%** of postings, respectively.
- When looking across the top occupation groups, there was considerable variation in the percent of overall tech demand attributable to healthcare. Almost half of all tech postings were attributable to healthcare for the **Management Analysts (48.9%)** and **Computer Systems Analysts (47.6%)** occupation groups.
- The most in-demand job titles were **Business Analysts (Business and Financial Operations)** and **Software Engineers**, with those titles contained in **5.2%** and **3.3%** of the healthcare tech postings, respectively. **Research Analysts** rounded out the top three, appearing in **2.6%** of postings.
- As with tech occupations, there was considerable variation in the percent of overall tech demand attributable to healthcare by job title. The postings indicate that healthcare-affiliated companies drive much of the demand for a wide variety of analyst roles. Healthcare postings for **Business Analysts (Computer and Mathematical)** and **Business Analysts (Business and Financial Operations)** comprised **47.0%** and **44.7%** of the overall tech postings, respectively.
- **SQL** is the most in-demand skill for healthcare tech workers with **23%** of postings referencing this skill. **Agile Software Development** and **Business Requirements** followed, appearing in **15%** and **9%** of postings, respectively.
- Security and networking certifications were the most prevalent qualifications found in the healthcare tech postings; however, they were mentioned in only a small percentage of postings. The top qualification, **Certified Information Systems Security Professional**, appeared in only **1.9%** of the healthcare tech postings.

## Data Sources and Analysis Approach

All data reported herein were sourced from Economic Modeling Specialists, Inc. (Emsi) using the 2019.1 datarun. Job postings are collected from various sources and processed/enriched to provide information such as standardized company name, occupation, skills, and geography. The analysis spans two Metropolitan Statistical Areas, Nashville-Davidson-Murfreesboro-Franklin and Clarksville, TN-KY. To map job postings to occupations, Emsi uses the Standard Occupational Classification (SOC) System created by the U.S. Bureau of Labor Statistics (BLS).

The definition of “tech” used for the analysis spans 26 SOC codes designed to capture traditional tech occupations, as well as analytics occupations that lie at the intersection of tech, mathematics, and business. Within those tech jobs, postings that were specific to healthcare were identified via keyword search. The keywords used to search within the tech jobs were compiled by the author with the help of subject matter experts. A detailed list of the counties included, as well as the SOC codes and keywords used can be found in the Appendix.

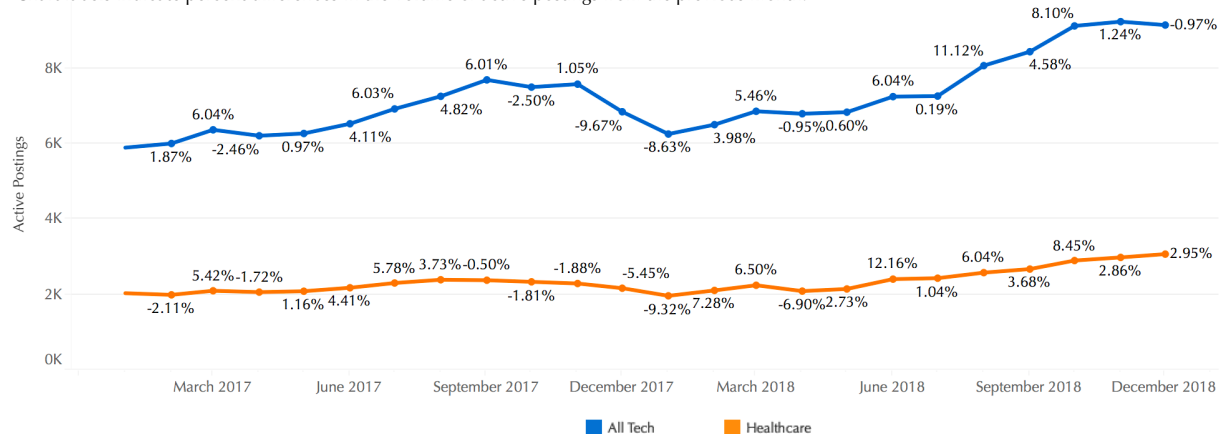
## Key Findings

This section provides an overview of current healthcare tech job demand in Middle Tennessee as measured by the number of unique job postings active during 2018. Postings were analyzed from multiple perspectives and compared to overall tech demand in order to provide context and examine differences. Of the 38,273 unique tech postings that mapped to one of the 26 tech occupations, 12,625 (33%) were identified as healthcare tech jobs.

### Demand over Time

Demand grew throughout 2017 and 2018 for healthcare tech workers, as well as for tech workers in general. Over the course of that two-year period, healthcare tech consistently represented roughly one-third of the job postings, with monthly percentages ranging from 30.2 to 34.5%. In terms of overall volume, healthcare tech was at its lowest point in January 2018 with 1,965 active postings and at its highest point in December 2018 with 3,072 active postings. From April 2018 forward, healthcare tech demand saw steady month-over-month growth in postings volume.

Chart labels indicate percent differences in the volume of active postings from the previous month.

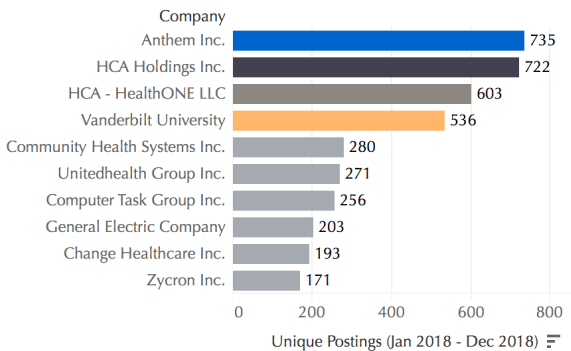


## Top Hiring Companies

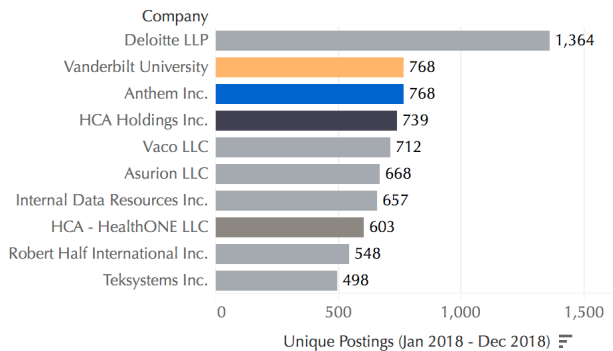
When looking at distinct organizations, Anthem was the company with the most healthcare tech postings in 2018. However, two HCA companies, HCA Holdings Inc. and HCA – HealthONE LLC, ranked second and third. When combined, those companies posted over 1,300 unique postings in 2018. Not only does that make HCA the largest hiring company in the healthcare tech space, it also puts it on par with Deloitte when looking at tech hiring overall<sup>1</sup>. Vanderbilt University was fourth in healthcare tech while ranking second overall<sup>2</sup>.

### Healthcare Tech

Colored bars represent companies appearing in both lists.



### Overall Tech



<sup>1</sup> There are slight discrepancies in the total number of job postings for the four companies that appear in both the “Healthcare Tech” and “Overall Tech” charts. This is due to the use of keyword search to identify the tech postings associated with healthcare. Due to their content, a small number of the postings made by some healthcare companies were not captured in the keyword search. These discrepancies did not result in a major shift in the analysis results.

<sup>2</sup> The web application used to produce this report does not distinguish between Vanderbilt University and Vanderbilt University Medical Center (VUMC). For the purposes of this report, it is assumed that the postings captured by the healthcare keyword search are associated with VUMC while the additional postings captured in the overall tech search reflect tech jobs posted by the university.

## Demand by Occupation Group

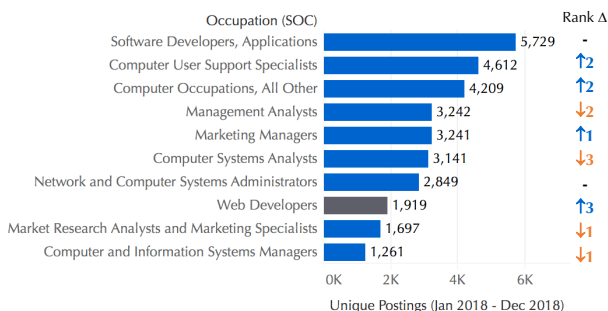
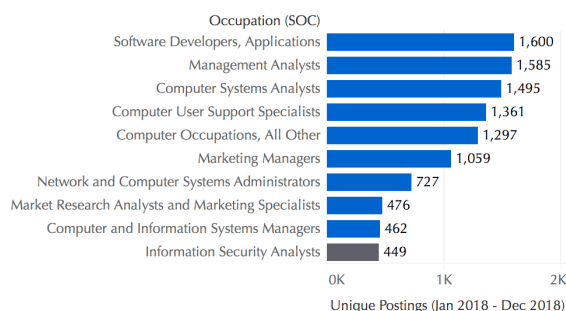
The most in-demand occupation group for healthcare tech was Software Developers, Applications which represented 12.7% of postings. The same was true of tech overall, with that occupation group representing 15.0% of postings. Most of the occupations were consistent across healthcare and overall tech with only slight changes in rankings; however, there were two differences. Information Security Analysts ranked 10<sup>th</sup> in the healthcare tech postings while ranking 11<sup>th</sup> when looking at tech overall. When looking at overall tech postings, Web Developers ranked 8<sup>th</sup>, but fell just outside the top 10 for healthcare tech to the 11<sup>th</sup> position.

When examining each occupation group independently, there was variation in the proportion of overall tech postings that were attributable to healthcare. Almost half of the overall postings for the Management Analysts and Computer Systems Analysts occupation groups were attributable to healthcare (48.9% and 47.6%, respectively). The occupation group with the lowest percentage of postings attributed to healthcare was Network and Computer Systems Administrators (25.5%).

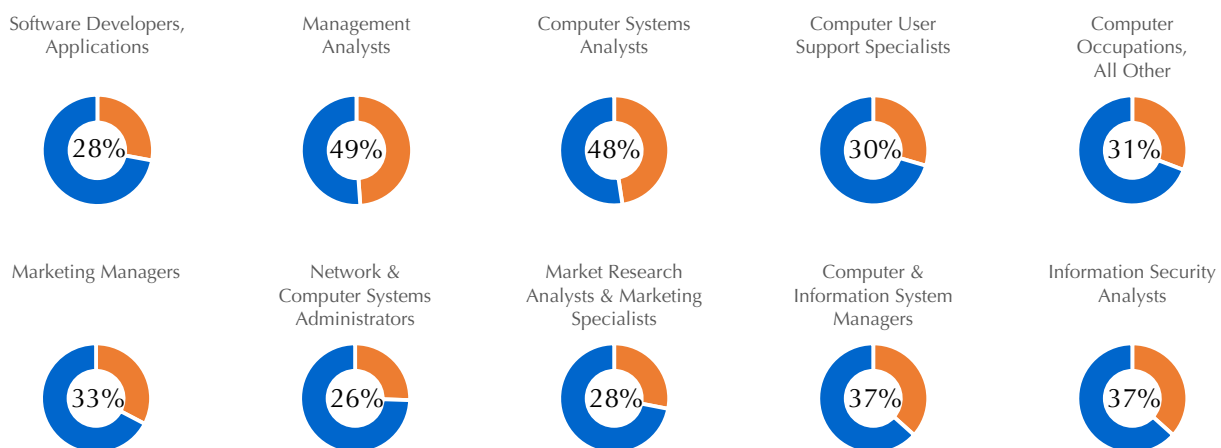
### Healthcare Tech

### Overall Tech

Gray bars indicate occupations that only appear on one list.



### Healthcare Tech Postings as % of Overall Tech Postings





## Demand by Job Title

Within the healthcare tech space, the most in-demand job title was Business Analyst (Business and Financial Operations), which appeared in 5.2% of job postings. Software Engineer was the second-ranked title, appearing in 3.3% of postings. When looking at overall tech, these two job titles switched rankings. Software Engineer held the top position, appearing in 4.0% of postings. Business Analyst (Business and Financial Operations) followed closely behind, appearing in 3.8% of overall tech postings.

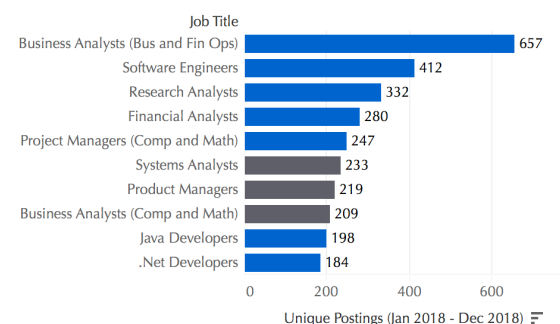
Seven of the top ten titles were consistent across healthcare tech and overall tech. The three titles that made only the top ten for healthcare were Systems Analyst (6th for healthcare, tied for 11th for overall tech), Product Manager (7th for healthcare, tied for 11th for overall tech), and Business Analyst (Computer and Mathematical) (8th for healthcare, 15th for overall tech). The three job titles that only appeared in the top ten list for tech overall were Marketing Manager (15th for healthcare, 5th for overall tech), IT Help Desk Specialist (14th for healthcare, 9th for overall tech), and Systems Engineer (12th for healthcare, 10th for tech overall).

When assessing the proportion of overall tech postings attributable to healthcare, there were wide variations based upon the job title. The postings indicate much higher demand for Business Analysts in the healthcare space. Healthcare postings for Business Analysts (Computer and Mathematical) comprised 47.0% of the overall tech postings for that title. Healthcare postings for Business Analysts (Business and Financial Operations) comprised 44.7% of the overall tech postings. Systems Analysts (44.0%), Research Analysts (43.6%), and Financial Analysts (42.8%) also showed a high proportion of overall postings attributable to healthcare organizations.

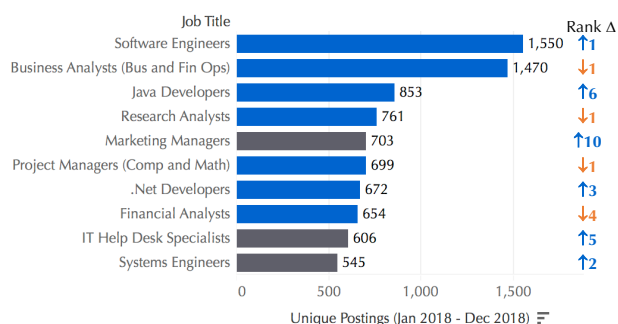
The proportion of overall tech postings attributable to healthcare was lower for software development job titles. Healthcare tech postings for .Net Developers, Software Engineers, and Java Developers comprised 27.4%, 26.6%, and 23.2%, respectively, of overall tech postings.

### Healthcare Tech

Gray bars indicate job titles that only appear on one list.

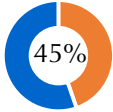


### Overall Tech

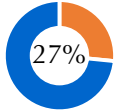


## Healthcare Tech Postings as % of Overall Tech Postings

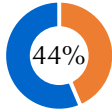
Business Analysts  
(Bus & Fin Ops)



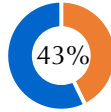
Software Engineers



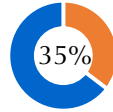
Research Analysts



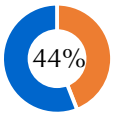
Financial Analysts



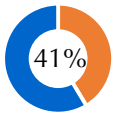
Project Managers  
(Comp & Math)



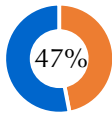
Systems Analysts



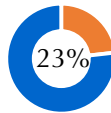
Product Managers



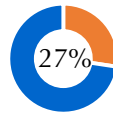
Business Analysts  
(Comp & Math)



Java Developers



.Net Developers



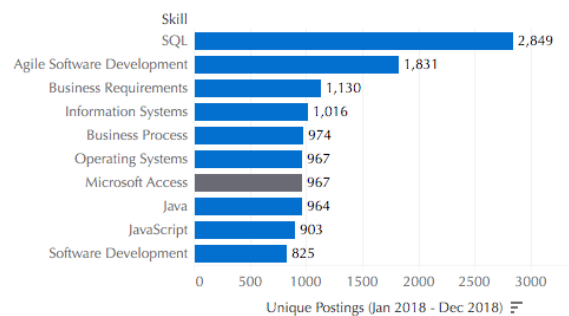
## Top Hard Skills

SQL and Agile Software Development were the two hard skills that appeared most frequently in the job postings. This was the case for both healthcare tech and tech overall. SQL appeared in 23% of the healthcare tech postings while appearing in 20% when looking at tech overall. Agile Software Methodology appeared in 15% of the healthcare postings while appearing in 13% of overall tech postings.

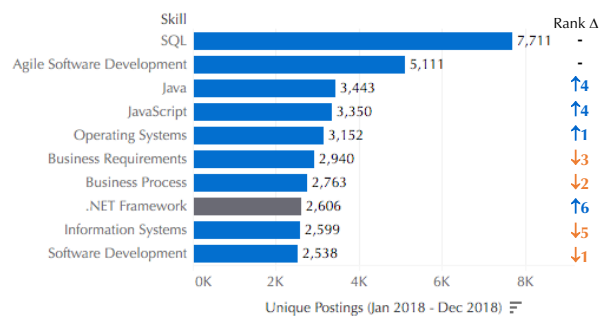
While there was a high degree of consistency in the top skills for healthcare tech and tech overall, there were two skills that only appeared on one of the two lists. Microsoft Access ranked 7<sup>th</sup> in the healthcare tech postings while ranking 18<sup>th</sup> when looking at tech overall. The .Net Framework skill ranked 8<sup>th</sup> when looking at overall tech postings, but was outside the top 10 for healthcare tech, occupying the 14<sup>th</sup> position when looking specifically at healthcare tech.

### Healthcare Tech

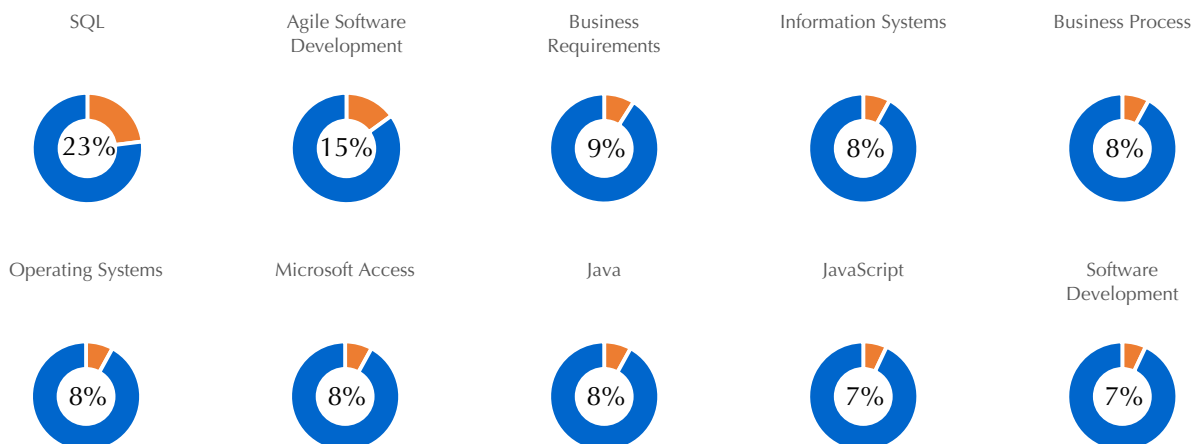
Gray bars indicate skills that only appear on one list.



### Overall Tech



### % of Healthcare Tech Postings Containing Skill



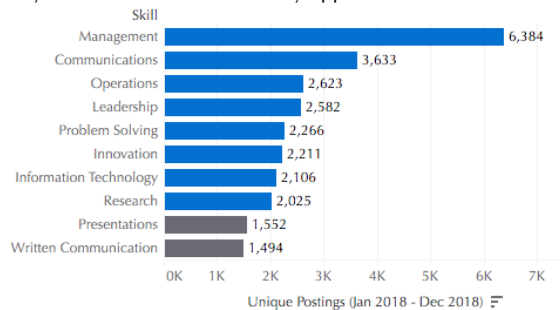
## Top Common Skills

Unsurprisingly, the percentage of postings containing the top common skills is considerably higher than the percentage of postings containing specific hard skills. The same common skills top the rankings for both healthcare tech and overall tech: Management, Communications, Operations, and Leadership. For both healthcare tech and tech overall, Management was by far the most common skill, appearing in 51% of healthcare tech postings and 46% of overall tech postings.

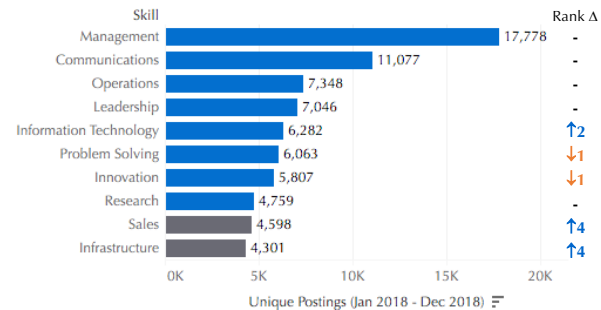
The top eight common skills were shared by healthcare tech and tech overall, with little variation in their frequency of appearance or rank order. There were, however, some differences in the common skills occupying to bottom two positions in the rankings. For healthcare tech, those spaces were occupied by Presentations and Written Communication, with both appearing in roughly 12% of postings. Sales and Infrastructure occupied those positions for overall tech, with similar frequencies of appearance.

### Healthcare Tech

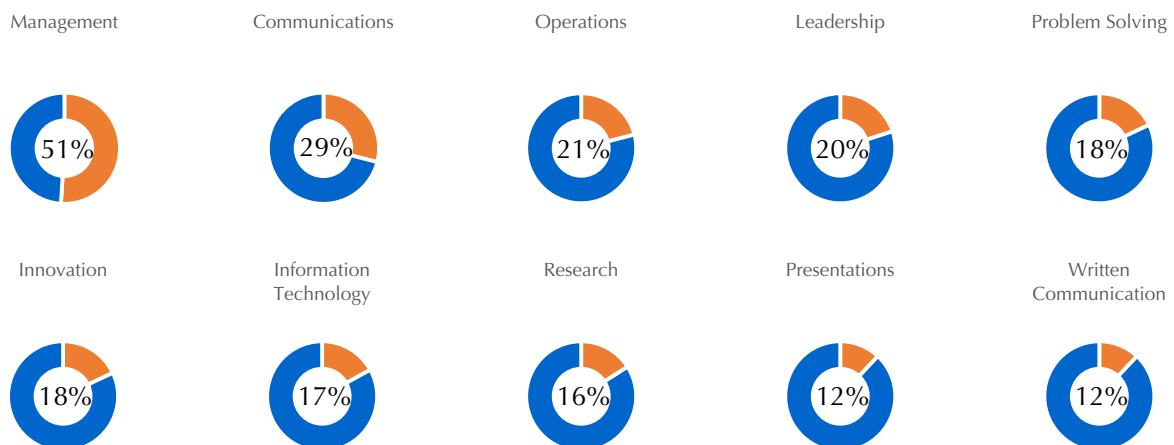
Gray bars indicate skills that only appear on one list.



### Overall Tech



### % of Healthcare Tech Postings Containing Skill

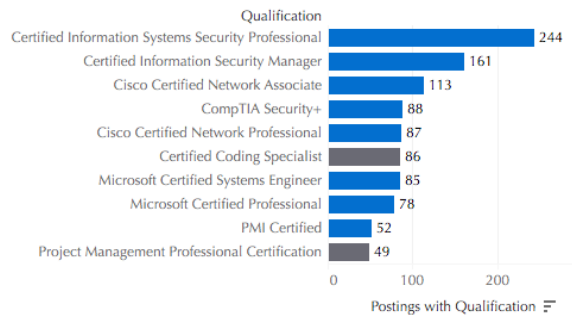


## Top Qualifications

Security and networking certifications were the most prevalent qualifications in the postings; however, it is important to note that qualifications as a whole appeared with very limited frequency. Certified Information Systems Security Professional, the top-ranking certification for both healthcare tech and overall tech, appeared in 1.9% and 1.5% of postings, respectively. Regardless of the list, the vast majority of qualifications appeared in less than 1% of postings.

### Healthcare Tech

Gray bars indicate qualifications that only appear on one list.



### Overall Tech



## Conclusion

The healthcare industry is vital to our region, and the analysis presented here provides evidence of the important role that healthcare-affiliated organizations play in employing the region's tech talent. One-third of all tech job openings posted in 2018 were associated in some way with healthcare, with demand for healthcare tech workers growing as the year went on.

No single occupation group dominated the healthcare tech postings, reflecting a wide variety of talent needs. This was also true of overall tech postings. The most in-demand occupations were largely consistent whether looking at healthcare tech or tech overall, with only slight changes in the rank positions of the various occupations.

Healthcare-affiliated organizations drove overall tech demand for some occupation groups much more than others. Of particular note were the Management Analysts and Computer Systems Analysts occupation groups, where healthcare demand constituted roughly half of overall tech demand (49% and 48%, respectively). This is in contrast to the remainder of the top ten occupations whose contributions to overall demand ranged from 28% to 37%.

The same was true of job titles. Healthcare postings drove overall demand at a much higher rate for job titles that involved analysis, whether technical- or business-oriented. The percentage of overall postings attributable to healthcare-affiliated organizations exceeded 40% for Business Analysts (Computer and Mathematical), Business Analysts (Business and Financial Operations), Research Analysts, Financial Analysts, and Systems Analysts.

Regarding hard skills and qualifications, the results reflect the importance of data manipulation and storage, with SQL referenced in nearly a quarter of the healthcare tech postings. The second-place ranking of Agile Software Development is indicative of the dominance of this development methodology. The relatively high prevalence of those skills in the postings lies in contrast to the low volume of postings referencing certifications. Future analysis will show whether certifications carry more weight when looking at other tech sub-specialties, but it does not appear that certifications are in high demand in healthcare tech organizations.

## About the Author



Dr. Amy Harris is an associate professor of information systems and analytics in the Jennings A. Jones College of Business at Middle Tennessee State University. There, she teaches undergraduate and graduate courses in business intelligence and analytics. Dr. Harris is passionate about tech workforce development, as well as diversity and inclusion. She is active in the Nashville tech community, serving on the steering committee for the Nashville Analytics Summit, as a board member for Women in Technology Tennessee, and as a member of the Nashville Technology Council's diversity committee.

Dr. Harris received her Ph.D. in Management Information Systems from the Fogelman College of Business and Economics at the University of Memphis. She earned her Master of Science in Computer Information Systems from the Jennings A. Jones College of Business at Middle Tennessee State University and her Bachelor of Arts in Music and Communications from Mississippi University for Women.

She has published research in journals including in *Communications of the ACM*, *Journal of Computer Information Systems*, *Communications of the Association of Information Systems*, and *Computers in Human Behavior*.

## Appendix

### Metropolitan Statistical Areas

MSA	County
Nashville-Davidson-Murfreesboro-Franklin	Cannon
	Cheatham
	Davidson
	Dickson
	Hickman
	Macon
	Maury
	Robertson
	Rutherford
	Smith
	Sumner
	Trousdale
	Williamson
	Wilson
Clarksville, TN-KY	Montgomery, TN
	Christian, KY
	Trigg, KY

### Standard Occupation Classification System Codes

SOC Code	Detailed Occupation
11-2021	Marketing Managers
11-3021	Computer and Information Systems Managers
13-1081	Logisticians
13-1111	Management Analysts
13-1161	Market Research Analysts and Marketing Specialists
13-2051	Financial Analysts
15-1111	Computer and Information Research Scientists
15-1121	Computer Systems Analysts
15-1122	Information Security Analysts
15-1131	Computer Programmers
15-1132	Software Developers, Applications
15-1133	Software Developers, Systems Software
15-1134	Web Developers
15-1141	Database Administrators
15-1142	Network and Computer Systems Administrators
15-1143	Computer Network Architects
15-1151	Computer User Support Specialists
15-1152	Computer Network Support Specialists
15-1199	Computer Occupations, All Other
15-2031	Operations Research Analysts
15-2041	Statisticians
17-2061	Computer Hardware Engineers
27-1014	Multimedia Artists and Animators
27-1024	Graphic Designers
43-9011	Computer Operators
49-2011	Computer, Automated Teller, and Office Machine Repairers



## Healthcare Keywords

Search Keywords	Unique Postings	Running Total	Additional Contribution	% Contribution
Healthcare	8,267	8,267	8,267	65.48%
Hospital	3,712	9,144	877	6.95%
Patient	3,083	9,608	464	3.68%
Clinical	2,741	10,010	402	3.18%
Health care	2,710	11,037	1,027	8.13%
Physician	1,457	11,074	37	0.29%
Health system	1,103	11,090	16	0.13%
Outpatient	881	11,096	6	0.05%
Surgery	853	11,103	7	0.06%
Inpatient	807	11,105	2	0.02%
Clinic	669	11,137	32	0.25%
Acute care	606	11,140	3	0.02%
HIPAA	594	11,334	194	1.54%
Medicare	567	11,396	62	0.49%
Payer	547	11,403	7	0.06%
Pharmacy	545	11,426	23	0.18%
Medicaid	443	11,455	29	0.23%
EMR	428	11,528	73	0.58%
CMS	417	11,695	167	1.32%
Informatics	415	11,746	51	0.40%
Surgical	409	11,756	10	0.08%
Ambulatory	401	11,761	5	0.04%
Laboratory	386	11,850	89	0.70%
Healthcare provider	378	11,850	0	0.00%
Pharmaceutical	352	11,927	77	0.61%
Decision support	336	12,015	88	0.70%
Clinician	317	12,020	5	0.04%
HL7	316	12,046	26	0.21%
EHR	314	12,056	10	0.08%
Managed care	311	12,060	4	0.03%
Value-based	285	12,122	62	0.49%
Health Information	250	12,152	30	0.24%
CPT	232	12,276	124	0.98%
Skilled nursing	202	12,292	16	0.13%
Telehealth	183	12,435	143	1.13%
Evidence-based	166	12,448	13	0.10%
Population Health	152	12,462	14	0.11%
Patient engagement	150	12,462	0	0.00%
Interoperability	142	12,528	66	0.52%
Public health	139	12,535	7	0.06%
Emergency department	139	12,536	1	0.01%
Electronic Health Record	121	12,537	1	0.01%
Long-term care	116	12,583	46	0.36%
Radiology	103	12,590	7	0.06%
Patient experience	100	12,590	0	0.00%
ICD	84	12,607	17	0.13%
Electronic Medical Record	76	12,608	1	0.01%
Urgent care	75	12,609	1	0.01%
HITECH	72	12,609	0	0.00%
PHI	70	12,616	7	0.06%
Care coordination	59	12,616	0	0.00%
Surgeon	50	12,616	0	0.00%
Meaningful use	49	12,616	0	0.00%
PBM	48	12,619	3	0.02%
Protected health information	47	12,619	0	0.00%
Anesthesia	32	12,621	2	0.02%
FHIR	31	12,622	1	0.01%
CPOE	28	12,622	0	0.00%
Telemedicine	22	12,623	1	0.01%
MIPS	16	12,625	2	0.02%
Provider organization	15	12,625	0	0.00%
MACRA	6	12,625	0	0.00%
Hospitalist	2	12,625	0	0.00%