

***Career pathways for middle-skill jobs in the  
Greater Washington region's leading industry  
clusters***

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*Prepared for:*

*The 2030 Group*

*Prepared by:*

*Dr. Ellen Harpel*

*Business Development Advisors*



*Dr. Mark C. White*

*Center for Regional Analysis*

*George Mason University*



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## Executive Summary

“Everything comes down to talent.” This quote from one of the first Roadmap for the Washington Region’s Economic Future reports captures the dominant theme from The 2030 Group’s many conversations about how to fuel our region’s growth potential.

We know that the Washington region is a knowledge-based economy dominated by high-skill jobs and a highly educated population. Washington ranks first among the country’s largest metropolitan areas by educational attainment, with 49 percent of the population age 25 and over holding a college degree and nearly 24 percent with an advanced degree.

However, 51 percent of this population does not hold a college degree. What are their opportunities for good quality jobs that pay a sustaining wage in our region? What does it mean for businesses when the local talent pipeline excludes this many people?

Washington has a polarized employment pattern that makes it difficult to answer these questions. More than one-third of all jobs – and over 40 percent of projected net new jobs over the next five years – require a college degree. 56 percent of current jobs often require no more than a high school degree and many of these jobs pay relatively low wages.

This report shines light on a set of middle-skill jobs in our region’s leading industry clusters and shows pathways into and beyond these jobs for individuals who currently do not hold a college degree. For this project we define middle-skill jobs as those requiring more than a high school diploma but less than a 4-year college degree, with an emphasis on jobs paying a sustaining wage.

Among the findings:

- There are approximately 160,000 middle-skill jobs within the region’s seven leading clusters.
- Real-time job posting data estimates suggest that employer demand for middle-skill workers is high in our region, with an estimated 100,000 online job advertisements last year for the 60+ occupations relevant to (but not limited to) career pathways in the region’s leading clusters.
- Job advertisements are a useful indicator of employer demand, but they are not the same as actual jobs. Occupational projections suggest that the annual number of job openings over each of the next five years for middle-skill jobs within the seven clusters will exceed 5,000.
- Career pathways for a set of in-demand, middle-skill occupations demonstrate how these jobs are connected to both entry-level and advanced positions, allowing job seekers and employers to think more broadly about career opportunities and hiring patterns. In lieu of using a college degree as a screening credential, experience and industry recognized certifications can play a critical role in bridging the gap between job seeker and employer.
- For employers, this report and the accompanying material provide insight into potentially untapped labor pools and existing resources – from boot camps to certification classes to

two-year degree programs - that might allow them to fill their talent needs more efficiently.

### Next Steps

We suggest three ways to share these findings in order to increase awareness of opportunities and make real connections between job seekers and businesses.

#### 1. Deploy the data

Several regional leaders consulted during the course of this research suggested that workforce organizations and elected leaders concerned with talent development convene to discuss the findings of this report and implications for workforce programs region-wide.

#### 2. Tell the story

It is easy to overlook the opportunities associated with middle-skill occupations given the dominance of both higher- and lower-skill jobs in the Washington regional economy. The 2030 Group can help address this issue by using its platform to draw attention to the opportunities and value of middle-skill work in the Washington region. The research team can support this mission by synthesizing the information developed for this report into a user-friendly presentation that can be made available to multiple audiences.

#### 3. Go deeper

Challenging issues always reveal additional interesting research topics. In this case, addressing the extent to which these middle-skill occupations rely on freelance, gig or contract work instead of traditional full-time employment and whether these jobs are at risk of being lost to advances in technology remain open questions. The potential implications for the Washington region of these trends would be worthwhile topics for further research.

### Call to Action

This report's findings bolster the notion that expanding the talent pipeline while expanding opportunity for more individuals within our region should be a priority. As in other communities around the country, our region's business leaders can strengthen their role in talent development. The 2030 Group, the Roadmap sponsors, and other regional leaders have an opportunity think beyond the data and research tasks described above to consider more substantial ways to deepen their engagement on talent development issues.

Following are a set of departure points for consideration:

- Develop a 2030 Group strategy to deepen the engagement of the region's business community with workforce partners for the seven Roadmap clusters across the region. Many organizations engaged in talent development are actively seeking greater business involvement. The 2030 Group could play a valuable role in expanding these relationships and making them more productive for all involved.
- Establish a cluster-specific internship or apprenticeship program to bring more individuals into stepping-stone positions for middle-skill jobs.

- Take on one of the challenging regional topics that individual jurisdictions can't address on their own. One example is facilitating student access to specialized training or education programs outside of one's home jurisdiction.
- Examine workforce development and training incentive programs in DC, Maryland and Virginia to consider how well they serve the needs of the Washington region. Assess whether there are program changes for which The 2030 Group could advocate to improve their utility for this region.
- Continue to support research and share quality labor market information with regional organizations interested in workforce and talent development topics.

## Introduction

The Washington region is a knowledge-based economy dominated by high-skill jobs and a highly educated population.<sup>1</sup> It is ranked first among the country's largest metropolitan areas by educational attainment,<sup>2</sup> with 49.4 percent of the population age 25 and over holding a college degree and 23.9 percent with an advanced degree (compared to 11.4 percent in the US as a whole).<sup>3</sup> A third of the region's jobs currently require at least a bachelor's degree, but over the next five years, 42.1

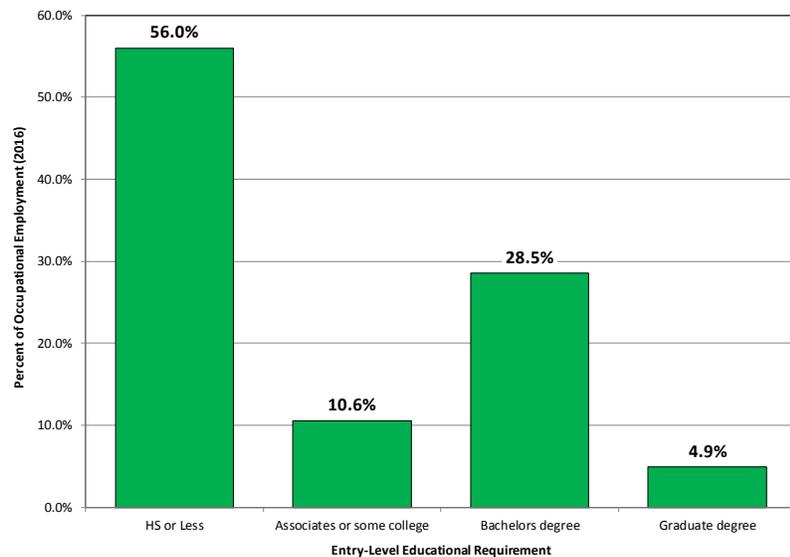
percent of the region's net new jobs will require the same.<sup>4</sup>

The region has a highly educated and trained workforce, but it is also a relatively polarized workforce. Figure 1 shows that 56 percent of current jobs often have formal education requirements that demand no more than a high school degree. Moreover, many of these jobs pay relatively low wages.<sup>5</sup>

Notably, sectors with many of these types of jobs are growing faster than the region's export-oriented, leading industry clusters and have accounted for over 40 percent of the region's total job gain over the last two years. Growth in these jobs has occurred while offering average salaries that are less than half the average salary of the high-skill jobs in our dominant professional and business services industry.<sup>6</sup> This high-low distribution of jobs and salary—or job polarization—is a concern across the country.

What do these facts mean for the 51 percent of the Washington region's population without a college degree? What opportunities do they see for good quality jobs that pay a sustaining wage in

**Figure 1: Percent of occupational employment by minimum education requirements**



Source: Chmura Economics, JobsEQ, 2016 Q4

<sup>1</sup> Stephen S. Fuller, *The Roadmap for the Washington Region's Future Economy*, December 2015; Metropolitan Washington Council of Governments, *State of the Region, Human Capital Report*, February 2017.

<sup>2</sup> *Fast Facts*, The Stephen S. Fuller Institute, accessed February 2017.

<sup>3</sup> *Labor Market Intelligence*, Northern Virginia Community College Workforce Development Division, January 2017.

<sup>4</sup> Chmura Economics, Jobs EQ and Center for Regional Analysis, George Mason University

<sup>5</sup> Chmura Economics, Jobs EQ and Center for Regional Analysis, George Mason University

<sup>6</sup> The Stephen S. Fuller Institute, *The Roadmap for the Washington Region's Future Economy: Pivoting the Region's Economy Away from its Federal Dependence – An Assessment*, February 2017.

our region? What does it mean for businesses when the local talent pipeline excludes this many people? The business imperative for developing the region’s existing talent becomes even greater as the Washington region experiences local population growth, but net domestic outmigration (the difference between movers into and out of the region from within the United States).<sup>7</sup>

“We also know that nearly 800,000 individuals in our region have no education past high school. This is a particular challenge given our region’s highly-skilled economy. With more than 70% of net new living wage jobs in our region expected to require post-secondary education or training, our region’s skills gap persists.”

- *Greater Washington Works*, Greater Washington Workforce Development Collaborative and JPMorgan Chase, 2016.

The availability of middle-skill jobs—those that require more than a high school diploma but less than a college degree—is a critical issue for both individuals in the Washington region and for industry. We are not alone in our concern on this issue. Thoughtful studies in the District of Columbia, Virginia, Maryland and across Greater Washington<sup>8</sup> have examined the region’s middle-skill, middle class job opportunities and considered steps to connect non-degreed residents with fast-growing, in-demand jobs that pay family sustaining wages and offer advancement opportunities.

This report adds to this body of work by 1) focusing attention on middle-skill jobs in the leading industry clusters as identified in the Roadmap for the Washington Region’s Economic Future; and 2) describing career pathways into these middle-skill occupations and then onward to our economy’s high-skill, in-demand occupations.

Our approach is not to suggest employers change the way they do business or somehow “create” more middle-skill jobs, but rather to highlight the connections between high school and high-skill jobs so that more job seekers can pursue the necessary steps (stackable credentials and training) to make the transition from entry-level jobs to middle-skill positions and, if desired, to high-skill occupations in the region’s leading industry clusters.

“Two out of every three workers who have a certificate and a college degree earned the certificate first, an indication that certificates can serve as a stepping stone on the way to a college degree.”

- *Certificates: Gateway to Gainful Employment and College Degrees*, Georgetown University Center on Education and the Workforce, June 2012.

<sup>7</sup> Metropolitan Washington Council of Governments, [State of the Region. Human Capital Report](#), February 2017, p. 9.

<sup>8</sup> Among them: *Greater Washington Works*, 2016; *Career Pathways in the District of Columbia*, 2015; *Commonwealth of Virginia Workforce Innovation and Opportunity Act Combined State Plan*, 2016; *Addressing Workforce Development in Montgomery County: An Economy at a Crossroads*, 2015; *Maryland’s Forgotten Middle-Skill Jobs*, 2010; *Maryland Workforce Innovation and Opportunity Act State Plan*, 2016.

## The 2030 Group and Roadmap for the Washington Region’s Future Economy

Two years ago, The 2030 Group commissioned the Roadmap for the Washington Region’s Economic Future to identify Greater Washington’s competitive strengths and weaknesses and the export-based, high value-added industry clusters that could spur economic growth and development throughout the region.<sup>9</sup> These advanced clusters include:<sup>10</sup>

- Advocacy Services
- Information and Communications Technology Services
- Science and Security Technology Services
- Biological and Health Technology Services
- Business and Financial Services
- Media and Information Services
- Business and Leisure Travel

The Roadmap research team also interviewed leaders in each of these clusters to understand what factors could accelerate—or hinder—their expansion in the Washington region.<sup>11</sup> These business leaders identified talent as one of the primary factors affecting the growth potential of these clusters. Growth doesn’t just benefit companies; it creates opportunities for residents. Supporting investment in these economic clusters to grow the economy is one of the top “opportunities to support the region’s human capital,” according to the latest report from the Metropolitan Washington Council of Governments.<sup>12</sup>

“Everything comes down to talent.”

- *Roadmap for the Washington Region’s Economic Future. Growth Opportunities and Constraints: Perspectives from CEOs and High-Ranking Executives*, Metropolitan Policy Center, School of Public Affairs, American University and Business Development Advisors, 2015.

Business leaders across the region described several broad sets of challenges related to talent attraction, retention, and development that must be addressed to continue growing these economic pillars. In response, the Roadmap sponsors and supporters are pursuing initiatives related to affordable housing, transportation, global opportunities, innovation and regional

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<sup>9</sup> Bob Buchanan, President of The 2030 Group, in Roadmap to Our Region’s Economic Future, 24<sup>th</sup> Annual Economic Conference (Advertising Supplement). 2015. *Washington Business Journal*.

<sup>10</sup> Inforum, University of Maryland, [Roadmap for the Washington Region’s Economic Future: Seven Key Economic Clusters](#), 2015.

<sup>11</sup> Metropolitan Policy Center, School of Public Affairs, American University and Business Development Advisors, [Roadmap for the Washington Region’s Economic Future. Growth Opportunities and Constraints: Perspectives from CEOs and High-Ranking Executives](#), 2015.

<sup>12</sup> Metropolitan Washington Council of Governments, [State of the Region, Human Capital Report](#), February 2017, p. 4.

identity that affect talent attraction and retention.<sup>13</sup> **An important remaining element is *inclusive talent development*, focused on connecting the region’s existing workforce to promising jobs in the top industry clusters.**

This research paper addresses this critical regional issue by:

- Identifying key middle-skill jobs in each of the top industry clusters;
- Providing demand projections for these occupations; and
- Mapping the career pathways and earning potential associated with these jobs.

Middle-skill jobs are the focus because they present real opportunities for area residents and are attainable for workers who currently lack post-secondary education but seek to raise their level of education and training. These jobs also tend to pay family-sustaining wages for workers without a 4-year college degree.

For employers, this approach can help expand the talent pool by helping workers already present in the region establish pathways from high school through middle-skill jobs to more advanced jobs in the region’s top clusters. Much of this work also represents business support functions that are necessary for effective operations and strategy execution—such as sales and information technology (IT) support specialists—that are in demand across multiple industries and can be hard to fill in the Washington region.

### **Middle-skill jobs across the region’s top industry clusters**

A recent report from Greater Washington Works found that almost one-third of jobs in the Washington metropolitan area are middle-skill positions.<sup>14</sup> Our definition of middle-skills jobs is slightly different and focuses on two primary criteria:

- More than high school, but less than 4-year degree required. No on-the-job training (OJT) required.
- More than 1 month of OJT<sup>15</sup>, requiring education between a high school degree and Associates degree.

Using occupational employment estimates and projections provided by Chmura Economics<sup>16</sup>, we found that middle-skill positions accounted for approximately 23 percent of all jobs in the Washington, DC metro area. As shown in Figure 2, within the region’s top industry clusters middle-skill jobs ranged from a low of about 12 percent for Advocacy and ICT to roughly 28 percent in media & information services and biotechnology. Combined, there are about 160,000 middle-skill jobs in the seven clusters, and occupational projections suggest that the annual demand for new and replacement hires in these middle-skill cluster jobs will exceed 5,000 openings for each of the next five years.

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<sup>13</sup> The 2030 Group, [Update: Roadmap for Greater Washington’s Economic Future](#), 2016.

<sup>14</sup> Greater Washington Workforce Development Collaborative and JPMorgan Chase, *Greater Washington Works*, 2016. This report defined middle-skills jobs as requiring postsecondary education, but less than a 4-year degree.

<sup>15</sup> The US Bureau of Labor Statistics defines short-term OJT as 1 month or less, moderate-term OJT involves more than a month, but less than a year, and long-term OJT is more than a year. For more information see: [https://www.bls.gov/emp/ep\\_education\\_tech.htm](https://www.bls.gov/emp/ep_education_tech.htm)

<sup>16</sup> Chmura Economics, Jobs EQ 2016 Q4.

**Figure 2: Middle-skill jobs as a proportion of total employment**

	Middle-skill jobs*	Middle-skill jobs as a percent of total cluster employment	Projected annual middle skill openings (16-21)#
Advocacy	14,874	12.5%	389
ICT	45,883	22.0%	1,487
Science & security technologies	20,699	16.6%	647
Biotechnology	3,644	27.4%	89
Business & financial services	52,840	21.4%	1,796
Media & information services	7,864	28.4%	131
Business & leisure hospitality	14,194	19.0%	472
<b>Total cluster occupations</b>	<b>159,998</b>	<b>19.6%</b>	<b>5,011</b>
<b>All regional occupations</b>	<b>748,657</b>	<b>22.7%</b>	<b>24,441</b>

Source: Chmura Economics JobsEQ, 2016 Q4

\*Defined as more than high school, but less than 4-year degree required and no OJT required, or more than 1 month of OJT, requiring education between a high school degree and Associates degree.

#Includes both replacement and arowth demand

*Trends in Workforce Demand, Seven Key Economic Clusters*, an October 2016 report from the Metropolitan Washington Council of Governments (MWCOCG), also analyzed workforce demand (top ten occupations) in each cluster. MWCOCG used real-time job posting data for its analysis and focused on advanced industries and STEM-intensive occupations in this insightful and useful study. Among its findings were that a majority (73 percent) of job postings for 60 of the 70 occupations analyzed require at least a college degree. Further, 50 percent of job postings for 10 of the 70 occupations require only a high school degree.

As a complement to this information, our report looks beyond this high-low set of occupations to focus on middle-skill jobs. Real-time job posting data estimates suggest that employer demand for middle-skill workers is high in our region, with an estimated 100,000 online job advertisements last year for the 60+ occupations relevant to (but not limited to) career pathways in the region's leading clusters.<sup>17</sup> We also consider what kinds of opportunities these jobs might create moving forward and how they are linked to the higher-skill positions.

To create the list of middle-skill jobs, we examined the occupational staffing patterns of the industries that comprise each cluster. We then filtered the list of occupations by typical education and training requirement for entry-level positions. As noted earlier, we focused primarily on two criteria: 1) jobs that require some post-secondary education, but less than 4-year degree and no on-the-job training (OJT), and 2) jobs requiring at least a high school degree and more than 1 month of OJT, but not postsecondary education.

<sup>17</sup> Burning Glass annual job postings 2016, provided via WorkSource Montgomery (data accessed March 2017).

We also sought to broaden our focus somewhat by considering a third criterion—jobs that required a minimum of a 4-year degree, but did not call for experience or on-the-job training required, and which paid relatively low wages. This is not a standard or common way to define middle-skill occupations, but it allowed us to consider jobs where a college degree might not be connected to the specific skills needed to perform the job. We were also attempting to adjust for credential inflation in this region’s workplace.

These criteria enabled us to begin identifying common middle-skill occupations in each of the targeted clusters. Appendix A identifies the most common middle-skill occupations within each cluster by employment in the Washington, DC metropolitan area. These occupations provided us with an initial list of occupations to consider for further analysis. Since the objective is to identify pathways for as many individuals as possible into middle-skill positions and onward, we subsequently examined the broader labor market trends for these middle-skill occupations, not just within the clusters.

### **Middle-skill jobs most relevant to the targeted clusters**

Figure 3 lists 20 of the most common middle-skill occupations within the targeted clusters. For each of these occupations, we further examined the occupational demand throughout the entire Washington metro area. Several items are worth highlighting in Figure 3. First, several targeted clusters make use of similar occupations. For instance, five different clusters employ sales representatives-services, computer user support specialists, and bookkeeping, accounting and auditing clerks; four different clusters hire web developers.

Second, all of these occupations have median wages<sup>18</sup> that exceed \$42,000—an annual wage that the Economic Policy Institute determined an individual living in the Washington region required to meet their basic needs.<sup>19</sup> The 2015 median annual wage for all occupations in the Washington metro area was \$50,690; 14 of the occupations listed in Figure 3 exceed that wage.

Third, several of these occupations provide significant job opportunities for area workers, as seven of these occupations represent more than 10,000 jobs. Finally, even though the projected growth for some of these occupations is more modest than for others, they all have a positive long-term growth forecast in that they are all generating employment through both growth and replacement job opportunities. In some instances, the more short-term and current demand for workers in these occupations is significant.

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<sup>18</sup> US Bureau of Labor Statistics 2015 Occupational Employment Statistics.

<sup>19</sup> <http://www.epi.org/resources/budget/>

**Figure 3: Middle-skill Jobs in the Greater Washington Region's Target Clusters**

SOC	Occupation	2016 Emp.*	Med. Annual Wage^	Proj. annual openings (16-21)*	Relevant Cluster#
49-9071	General Maint. & Repair Workers	28,947	\$43,100	1,054	Advocacy, Bus. & Leisure Travel
41-3099	Sales Reps., Services	26,515	\$63,160	1,028	Advocacy, S&ST, Bus. & Fin. Services, Media & Info., Bus. & Leisure Travel
15-1151	Computer User Support Specialists	21,248	\$58,150	739	Advocacy, ICT, S&ST, Bus. & Fin. Services, Media & Info.
13-1161	Market Research Analysts & Marketing Specialists	16,756	\$69,160	622	ICT
41-4012	Sales Reps., Wholesale & MFG, Except Tech. & Scientific Products	15,998	\$60,430	489	ICT
23-2011	Paralegals & Legal Assistants	11,357	\$63,040	353	Bus. & Fin. Services
15-1134	Web Developers	6,373	\$83,060	313	Advocacy, ICT, Bus. & Fin. Services, Media & Info.
27-1024	Graphic Designers	7,028	\$64,100	280	Advocacy
41-3011	Advertising Sales Agents	5,146	\$54,450	199	Advocacy, Media & Info.
15-1152	Computer Network Support Specialists	6,562	\$72,400	179	ICT, Bus. & Fin. Services
43-3031	Bookkeeping, Accounting, & Auditing Clerks	40,608	\$45,200	169	Advocacy, ICT, S&ST, Bus. & Fin. Services, Bus. & Leisure Travel
29-2071	Medical Records & Health Info. Techs.	4,273	\$46,370	161	Bus. & Fin. Services
49-3011	Aircraft Mechanics & Service Techs.	4,884	\$68,410	139	Leisure & Travel
17-3023	Electrical & Electronic Engineering Techs.	4,201	\$68,790	118	S&ST
19-4021	Biological Techs.	3,672	\$51,330	115	S&ST, Biotech.
47-4011	Construction & Building Inspectors	2,844	\$63,120	111	S&ST
13-1121	Meeting, Convention, & Event Planners	3,654	\$62,330	95	Advocacy
25-4031	Library Techs.	1,880	\$44,440	90	Media & Info.
49-2098	Security & Fire Alarm Systems Installers	2,041	\$44,620	85	S&ST
19-4031	Chemical Techs.	1,072	\$49,200	45	Biotech.

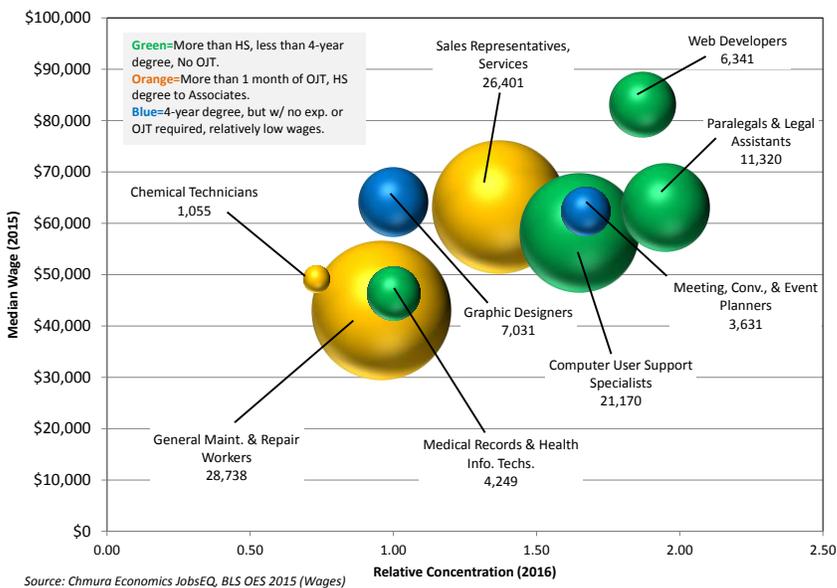
Source: \*Chmura Economics Jobs EQ 2016 Q4; ^BLS Occupational Employment Statistics 2015, #The Roadmap for the Washington region's Economic Future

This list enabled us to identify and select several occupations for more detailed examination. The factors described above (e.g., multiple clusters, projected openings, decent wages, etc.) influenced our selection of occupations for further analysis. However, we also made sure to include a middle-skill occupation from each cluster. This report (and a set of [accompanying profiles](#)) provides more detailed information about the following middle-skill occupations:

- Computer User Support Specialists
- Web Developers
- Medical Records and Health Information Technicians
- Graphic Designers
- Sales Representatives, Services
- Paralegals and Legal Assistants
- General Maintenance and Repair Workers
- Meeting, Convention and Event Planners
- Chemical Technicians

Figure 4 shows these occupations by size, median wage, and by relative concentration.<sup>20</sup> It shows that the middle-skills occupations that are frequently found in the region’s professional and business services sectors (e.g., web developers, paralegals and legal assistants, and computer user support specialists) are 50 percent more concentrated in the Washington metropolitan region’s

**Figure 4: Key middle-skill occupations within the Washington metro area’s targeted industry clusters**



economy than they are nationally. The relative concentration of occupations such as graphic designers, medical records and health information technicians, and general maintenance and repair workers more closely resemble the national economy.

<sup>20</sup> As measured by location quotients (LQ). LQs measure the relative concentration of a given industry or occupational employment in a given place, often relative to the nation. They are used to identify potential sources of competitive advantage or areas of regional specialization. LQs are calculated by dividing the proportion of the region’s economic activity in an occupation by the proportion of the nation’s economic activity in that same occupation.

## Career pathways and talent pipelines

How can job seekers connect to these in-demand occupations? How can businesses find the workers they need in these occupations? What training, certification, or credentials are required to make that connection?

Because we figure that nobody starts their career or job search by saying, “I want to be a computer user support specialist,” we wanted to identify ways that individuals might connect to these opportunities through an entry-level occupation or via credentials and training that would guide them to these types of jobs. Similarly, we wanted to consider how both the entry-level and middle-skill jobs form a pathway into the in-demand, higher skill occupations that drive our regional economy. Accordingly, we developed a series of stylized career pathway diagrams to lay out how these occupations might connect to other similar occupations that may provide different opportunities. These diagrams are based on a variety of sources including minimum education requirements, related occupations that involve similar tasks or skills,<sup>21</sup> as well as information about job switching from the Current Population Survey.

### Computer User Support Specialists

Computer user support specialists (SOC 15-1154) provide technical support to computer users by answering questions or resolving computer problems for their clients. Assistance may be provided in person, via telephone, or electronically and is likely concerning the use of computer hardware and software. People employed within this occupation often have titles such as computer specialist, computer technician, help desk analyst, and IT specialist. People working as computer user support specialists have a median income of \$58,150 and can typically make anywhere from \$33,120 to \$94,100.

Workers finding jobs as computer user support specialists can come from a variety of fields provided they have some basic computer literacy. Approximately 57 percent of workers in this occupation have less than a 4-year degree. Two relatively lower skill occupations that feed into this occupation are computer operators and customer service representatives. In the former, workers may have the basic computer skills needed for this job, and in the latter they may have developed the requisite interpersonal skills.

There are many different avenues for workers to start in these careers. At the most basic level, workers need some fundamental IT training, and for many, this training will begin in high school. One of the common themes throughout is the importance of certifications relative to degrees. Gaining these certifications can happen as early as high school. For instance, Northern Virginia Community College (NVCC) recently received a \$100,000 grant from the Capital One Foundation that will allow NVCC to work with students from two Prince William County schools to get CompTIA<sup>22</sup> A+ certification and introduce them to career opportunities within the rapidly growing cybersecurity industry.

At the community college level, WorkSource Montgomery is working with Montgomery College to provide IT and cybersecurity training for students via a \$5.6 million America’s Promise grant.

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<sup>21</sup> Related occupations are drawn from the occupational profiles available through the O\*NET database ([www.onetcenter.org](http://www.onetcenter.org)).

<sup>22</sup> Computer Technology Industry Association (CompTIA)

Montgomery College and Prince George's Community College participate in the Cyber Pathways Across Maryland program to address career pathways and meet employer demand for skilled cyber workers. This program allows the colleges to share curriculum on a variety of topics including providing guidance on how workers can obtain security clearances<sup>23</sup>—an important consideration for many jobs within the Washington metro area.

However, there are many adult workers who instead need programs that will allow them to improve their basic computer literacy. For instance, within the District of Columbia, the Byte Back Program, which is often offered through area workforce centers, helps workers develop a basic level of computer literacy. Some workforce centers are looking to expand this effort to train individuals in more sophisticated computer-related activities.

For workers that are looking to shift into IT-related careers and cannot afford to take the time for a full two year degree, there are boot camps available within the region that will enable them to develop new skills quickly. For instance, Northern Virginia Community College's 'Uncommon Coders' program is a 12-week program directed in part toward veterans with the purpose of helping them move into private sector IT jobs. It is a collaborative effort with The Iron Yard and has been supported by local businesses, workforce boards, and the Northern Virginia Technology Council.<sup>24</sup>

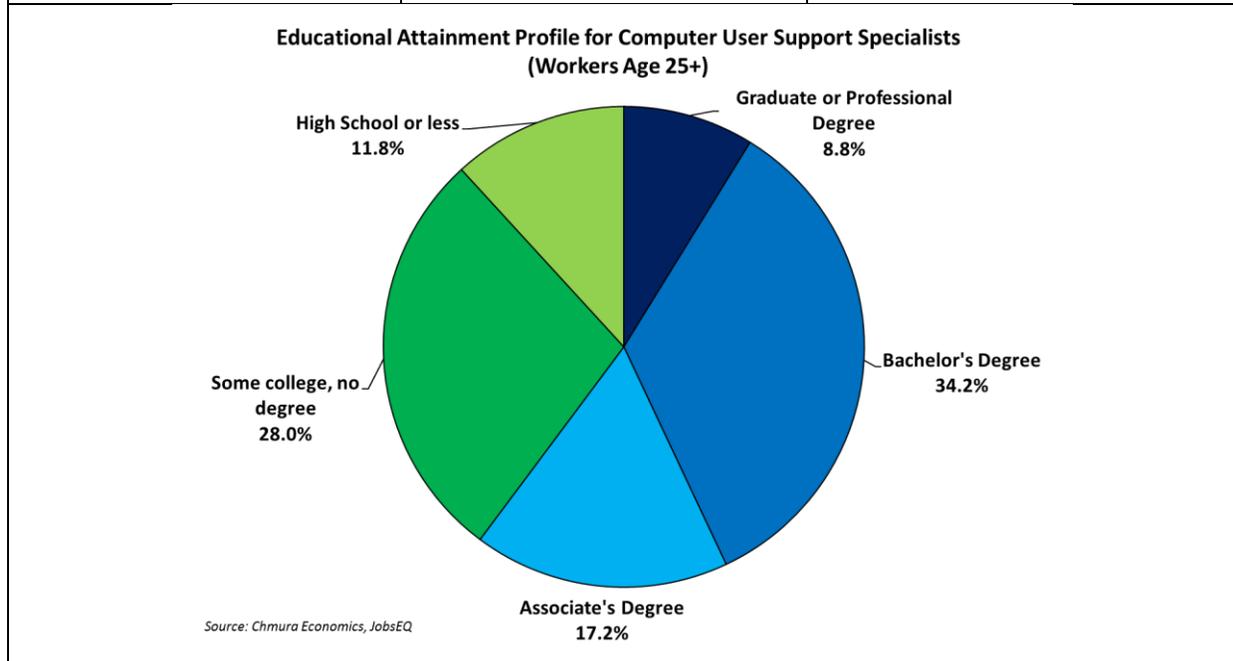
Once workers have these skills, 'Help Desk' type jobs are often places where workers can start their careers. The employment projections show that the region will have about 700 opportunities annually over the next half decade, but there are also far more jobs being currently advertised. That said, there are a few significant obstacles that can hinder the ability of people to move into these positions. Since many employers currently hiring are federal contractors, they are often required to hire workers with 4-year degrees. This can limit their pool of potential workers because there may be candidates with the requisite skills, certifications, and experience but lack the degree. For those workers that are able to further their education and advance their skills, there are many available jobs in software development or supporting and administering computer networks, as well as the rapidly growing field of information security.

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<sup>23</sup>[https://www.pgcc.edu/Programs and Courses/Noncredit/Continuing Education Program Detail.aspx?id=6442472169](https://www.pgcc.edu/Programs%20and%20Courses/Noncredit/Continuing%20Education%20Program%20Detail.aspx?id=6442472169)

<sup>24</sup><http://www.nvcc.edu/workforce/uncommon-coders/index.html>

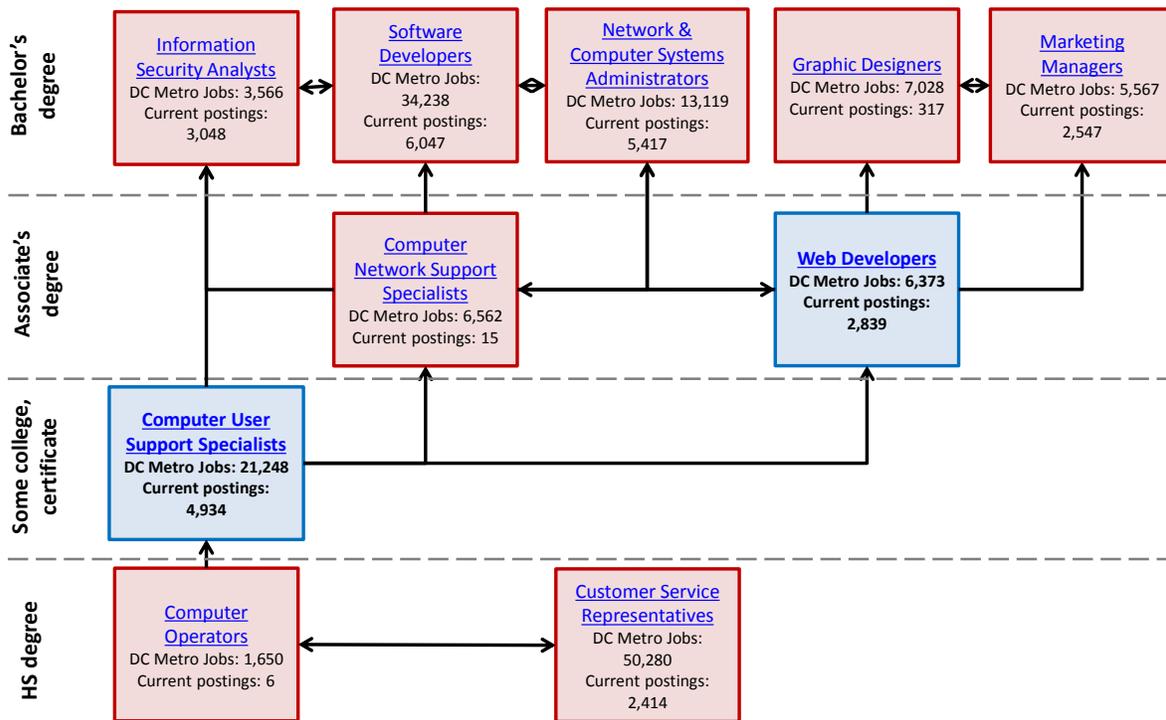
Recent monthly online job advertisements (2017)	Total jobs	Projected annual openings (2016-2021)
4,934	21,248	739



Top Certifications	Clearance DoD 8570 Certification CompTIA+Security; CompTIA A+ Microsoft Certified Professional (MCP) Systems Administrator, Systems Engineer Cisco Certified Network Associate
Sample Programs	NoVA Community College – multiple Montgomery College – multiple UDC Community College Prince George’s Community College Byte Back – DC Per Scholas – MD Year Up – VA

Source: O\*Net; Employment from Chmura Economics JobsEQ, Average of 4 quarters ending in Q4 2016, recent monthly online job advertisements represent online job ads in 30 Days between 2/15/2017 and 3/16/2017.

## Career Pathways for Computer User Support Specialists/Web Developers



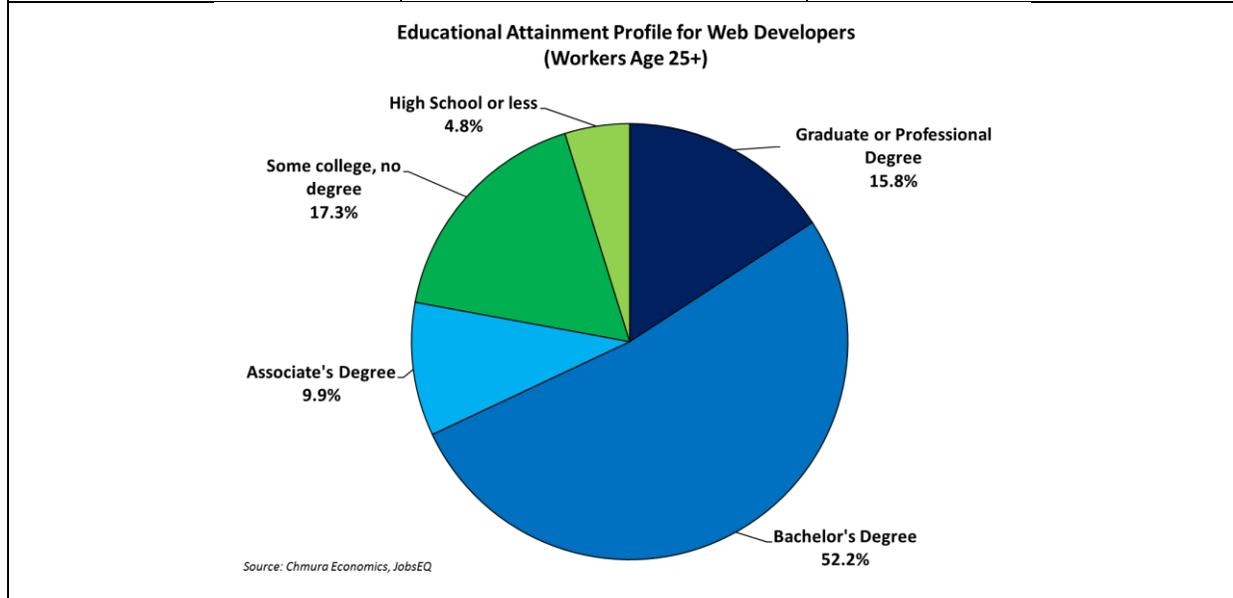
Source: O\*Net; Employment from Chmura Economics JobsEQ. Average of 4 quarters ending in Q4 2016, Current postings represent online ads in 30 Days between 2/15/2017 and 3/16/2017.

### Web Developers

Web developers (SOC 15-1151) design, create, and maintain web sites. They implement and modify web site content, graphics, performance, and capacity by analyzing user needs. Developers integrate web sites with other computer applications and may utilize software designed to facilitate the creation of web and multimedia content as well as convert written, graphic, audio, and video components to compatible web formats. Individuals employed within this occupation often have titles such as web designer, web developer, or webmaster. People working as web developers have a median income of \$83,060 and can typically make anywhere from \$44,100 to \$131,380.

The career pathways for web developers have significant overlap with that of computer user support specialists. Web developers can follow similar pathways as computer user support specialists, although the majority of workers in this occupation have at least a 4-year degree and the minimum education requirement for this occupation is a 2-year degree. Again, much like computer user support specialists there are many industry-recognized credentials that can help workers better position themselves for jobs in this field or advance in their career. Certifications and training can be obtained through many of the region's community colleges, as well as other institutions like the Art Institute of Washington. Working as a web developer can open up career opportunities in other IT fields, as well as creative jobs like marketing and graphic design.

Recent monthly online job advertisements (2017)	Total jobs	Projected annual openings (2016-2021)
2,839	6,373	313



Top Certifications	Clearance Oracle Database 11g Administrator Certified Professional CI Poly (CIP) Business Process Management Programming Languages (BPM) IAT Level 2 Microsoft Certified Systems Engineer, Technology Specialists
Sample Programs	NoVA Community College – multiple Montgomery College – multiple The Art Institute of Washington offers 2 and 4 year degrees in Web Design & Interactive Media

Source: O\*Net; Employment from Chmura Economics JobsEQ, Average of 4 quarters ending in Q4 2016, recent monthly online job advertisements represent online job ads in 30 Days between 2/15/2017 and 3/16/2017.

### Medical Records and Health Information Technicians

Medical records and health information technicians (SOC 29-2071) work with medical records of hospital and clinic patients and must compile, process, and maintain them in a manner consistent with requirements of the health care system. Individuals employed within this occupation often have titles such as coder, health information clerk, health information specialist, or medical records analyst. People working as medical records and health information technicians have a median income of \$46,370 and can typically make anywhere from \$29,720 to \$76,730.

Medical records and health information technician is a middle-skill occupation that lies at the intersection of two growing industries—healthcare and IT. Almost 80 percent of people working in this occupation had an associate’s degree or less. While not as large and in-demand as several of the other IT-related middle-skill occupations discussed above, the region still projects to have about 160 annual openings over the next five years. Related jobs that tend to require lower levels of educational attainment include medical secretaries or jobs that require a combination of administrative and interpersonal work such as hotel clerks, receptionists, or customer service representatives.

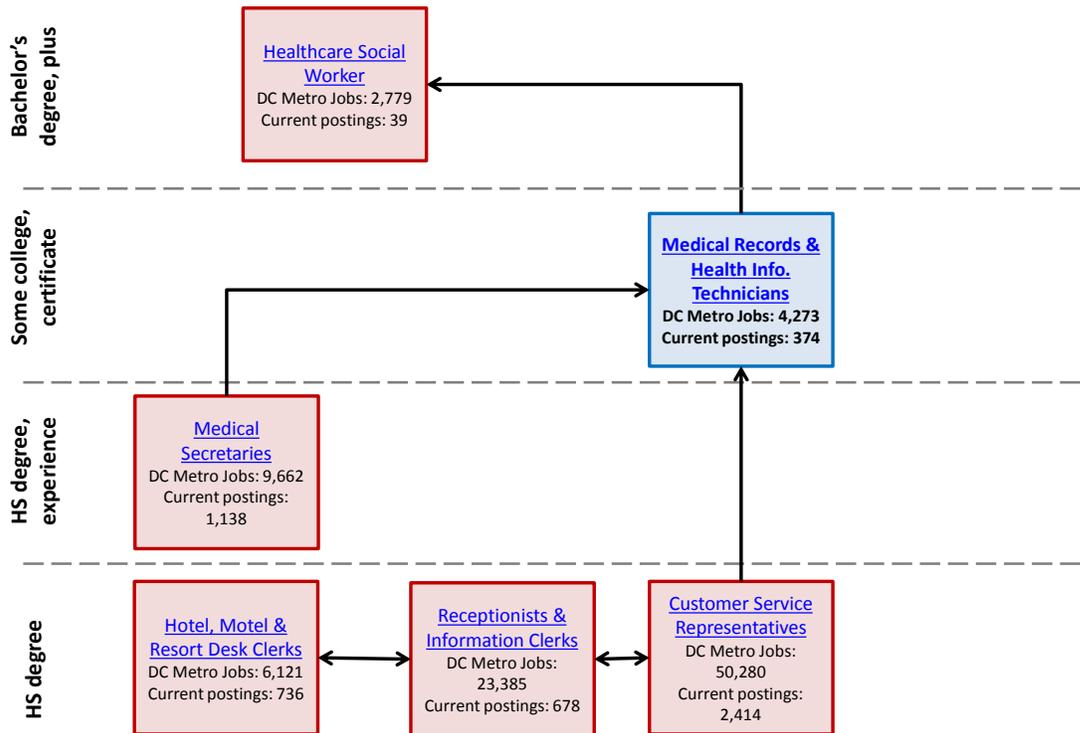
There are several key certifications required for people to work and advance in this occupation. These certifications include Certified Coding Specialist (CCS) and the Registered Health Information Technician (RHIT) certifications. Opportunities for degree programs and certifications are available at many of the region’s community colleges including Prince George’s Community College, Montgomery College, and Northern Virginia Community College. Certificate programs are also available through for profit institutions such as Fortis College-Landover and Brightwood College-Beltsville.

As workers advance in their careers, they may be able to find additional opportunities within the broader field of healthcare IT by pursuing continuing education and securing more advanced certifications like the Registered Health Information Administrator (RHIA) certification. Additional training within this career might also open up opportunities to move into more typical allied health professions. Although many of these careers fall outside of the targeted clusters that drive growth in the region, allied health presents many middle-skill career opportunities.

Recent monthly online job advertisements (2017)	Total jobs	Projected annual openings (2016-2021)												
374	4,273	161												
<p style="text-align: center;"><b>Educational Attainment Profile for Medical Records and Health Information Technicians (Workers Age 25+)</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>Educational Attainment Profile Data</caption> <thead> <tr> <th>Education Level</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>High School or less</td> <td>25.3%</td> </tr> <tr> <td>Graduate or Professional Degree</td> <td>4.0%</td> </tr> <tr> <td>Bachelor's Degree</td> <td>16.8%</td> </tr> <tr> <td>Associate's Degree</td> <td>19.4%</td> </tr> <tr> <td>Some college, no degree</td> <td>36.5%</td> </tr> </tbody> </table> <p style="font-size: small; margin-top: 10px;">Source: Chmura Economics, JobsEQ</p>			Education Level	Percentage	High School or less	25.3%	Graduate or Professional Degree	4.0%	Bachelor's Degree	16.8%	Associate's Degree	19.4%	Some college, no degree	36.5%
Education Level	Percentage													
High School or less	25.3%													
Graduate or Professional Degree	4.0%													
Bachelor's Degree	16.8%													
Associate's Degree	19.4%													
Some college, no degree	36.5%													
Top Certifications	Registered Health Information Technician Registered Health Information Administrator Certified Coding Specialist													
Sample Programs	Health Information/Medical Records Technology - Montgomery College, NoVA CC, Prince George's CC Medical Insurance Coding Specialist – Fortis College Landover, Brightwood College; Montgomery College, NoVA CC, Prince George's CC													

Source: O\*Net; Employment from Chmura Economics JobsEQ, Average of 4 quarters ending in Q4 2016, recent monthly online job advertisements represent online job ads in 30 Days between 2/15/2017 and 3/16/2017.

## Career Pathways for Medical Records and Health Information Technicians



Source: O\*Net; Employment from Chmura Economics JobsEQ. Average of 4 quarters ending in Q4 2016, Current postings represent online ads in 30 Days between 2/15/2017 and 3/16/2017.

### Graphic Designers

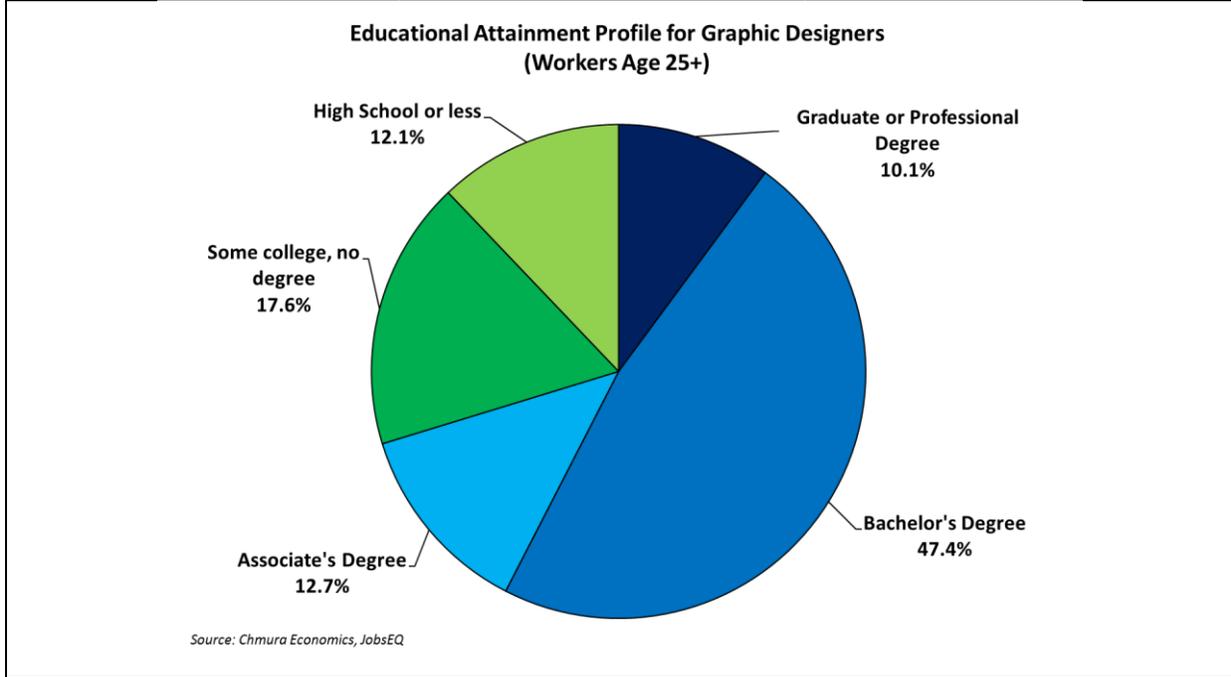
Graphic designers (SOC 27-1024) design or create visuals to meet specific commercial or promotional needs. Designers use a variety of artistic mediums to create artistic or decorative effects and the results are often used on packaging, displays, or logos. Individuals employed within this occupation often have titles such as artist, creative director, designer, production artist, creative manager, or online producer. People working as graphic designers have a median income of \$64,100 and can typically make anywhere from \$37,920 to \$99,300.

Graphic designer is one of the jobs where the minimum education requirements are identified as a 4-year degree, but over 40 percent of people working in this occupation have less than a 4-year degree. Broader access to graphic designer opportunities is reflected in the variety of programs available throughout the region particularly at community colleges. Similarly, people with experience in other IT-related middle jobs such as computer user support specialists, web developers, or desktop publishers can conceivably move into this occupation.

With greater experience, people working in graphic design can move into other creative and media related occupations such as multimedia artists and animators, producers and directors, or advertising and promotions managers. Given that there are fewer numbers of regional workers in those occupations, another path that graphic designers might take is to work for themselves and

pursue entrepreneurial opportunities. This type of occupation lends itself to the 'gig economy;' even if the goal is to have a stable paycheck, individuals can still find opportunities with project work as a source of additional income.

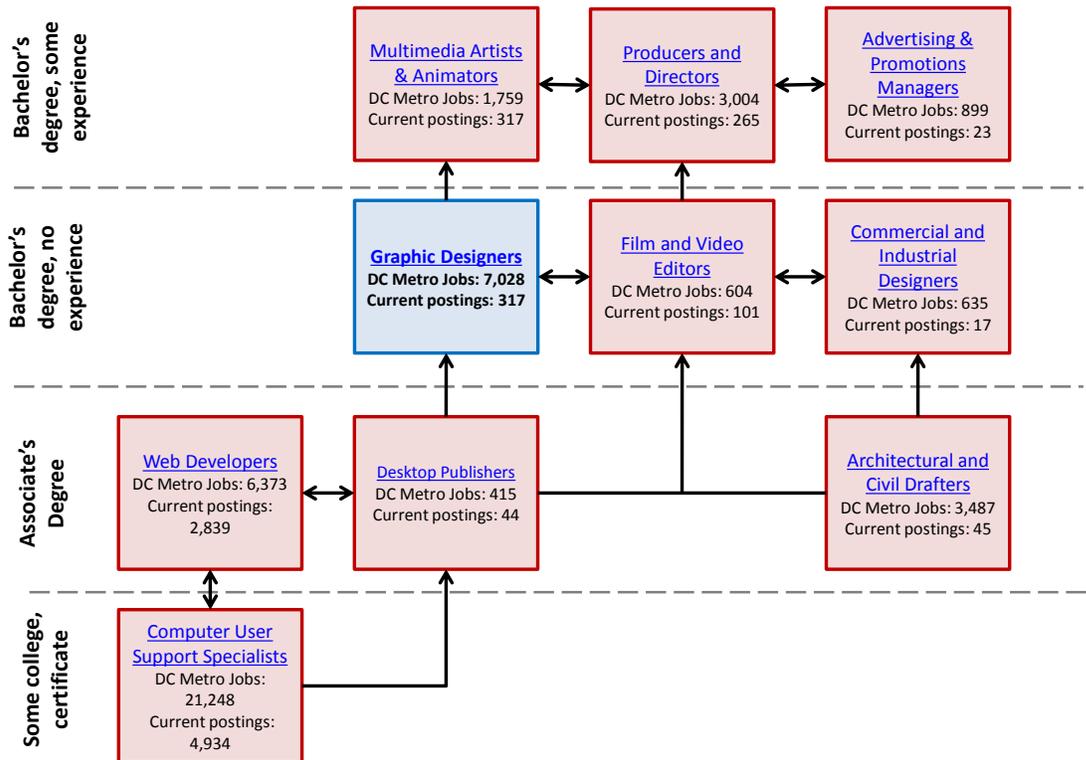
Recent monthly online job advertisements (2017)	Total jobs	Projected annual openings (2016-2021)
317	7,028	280



Top Certifications	Clearance
Sample Programs	NoVA Community College – Design and Visual Communication Montgomery College – Commercial and Advertising Art; multiple certificates UDC – Graphic Design PGCC – multiple certificates Art Institute of Washington

Source: O\*Net; Employment from Chmura Economics JobsEQ, Average of 4 quarters ending in Q4 2016, recent monthly online job advertisements represent online job ads in 30 Days between 2/15/2017 and 3/16/2017.

## Career Pathways for Graphics Designers



Source: O\*Net; Employment from Chmura Economics JobsEQ. Average of 4 quarters ending in Q4 2016, Current postings represent online ads in 30 Days between 2/15/2017 and 3/16/2017.

### Sales Representatives, Services

Service sales representatives (SOC 41-3099) sell services to customers by working with them to meet their needs, create solutions, and ensure a smooth sales process. Sales representatives will work to find new sales leads through business directories and client referrals. Individuals employed within this occupation often have titles such as sales agent, membership solicitor, account representative, or service representative. People working as service sales representatives have a median income of \$63,160 and can typically make anywhere from \$29,740 to \$146,970.

Over 50 percent of people that work within this occupation do not have 4-year degrees, but the wide range of opportunities enables a wide range of potential salaries. Almost all industries have some kind of sales force, and this is one of the reasons why the sales representative occupation is one of the region's largest middle-skill jobs, but also one with the most projected annual openings.

There are many different ways for workers to enter this occupation, but often workers will have previous experience as relatively lower paying retail salespersons and customer service representatives. Given the significant demand for sales representatives, many of the region's workforce councils are investing in programs designed to help people enhance their skills and marketability. The most prominent of these certifications is the National Retail Federation's Customer Service and Sales Certification. This certification is typically designed for young adults or adults with little retail experience to learn some of the basics of the retail business (e.g.,

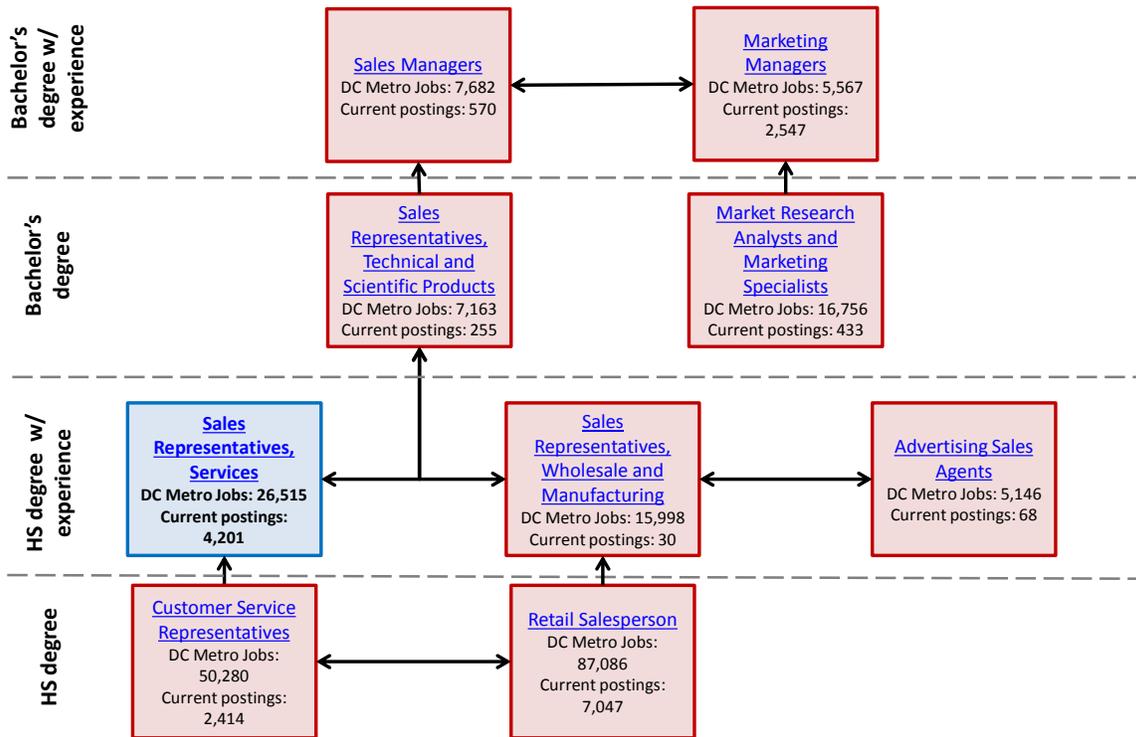
meeting customer needs, inventory control, etc.). It typically takes about 40-60 hours to complete and can give job seekers a leg up in getting work and advancing their sales careers.

For workers looking to advance their careers further, there are additional certifications related to retail management that can enable workers to advance from sales people to management positions that offer greater salaries. In addition to moving into more managerial positions, workers can also advance in their careers by finding sales positions with firms that sell more sophisticated and technical products and services. Sales representatives that sell more technical or scientific products tend to earn higher wages but also tend to have higher levels of educational attainment, such as an associates degree in business.

Recent monthly online job advertisements (2017)	Total jobs	Projected annual openings (2016-2021)												
4,201	26,515	1,028												
<p style="text-align: center;"><b>Educational Attainment Profile for Sales Representatives, Services (Workers Age 25+)</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>Educational Attainment Profile Data</caption> <thead> <tr> <th>Attainment Level</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Bachelor's Degree</td> <td>39.3%</td> </tr> <tr> <td>Some college, no degree</td> <td>25.9%</td> </tr> <tr> <td>High School or less</td> <td>18.1%</td> </tr> <tr> <td>Associate's Degree</td> <td>8.4%</td> </tr> <tr> <td>Graduate or Professional Degree</td> <td>8.4%</td> </tr> </tbody> </table> <p style="text-align: left; font-size: small;">Source: Chmura Economics, JobsEQ</p>			Attainment Level	Percentage	Bachelor's Degree	39.3%	Some college, no degree	25.9%	High School or less	18.1%	Associate's Degree	8.4%	Graduate or Professional Degree	8.4%
Attainment Level	Percentage													
Bachelor's Degree	39.3%													
Some college, no degree	25.9%													
High School or less	18.1%													
Associate's Degree	8.4%													
Graduate or Professional Degree	8.4%													
Top Certifications	Driver's license <a href="#">NRF Customer Service Certification</a> Project Management													
Sample Programs	American Public University System – Retailing and Retail Operations Montgomery College – A.A. in Business													

Source: O\*Net; Employment from Chmura Economics JobsEQ, Average of 4 quarters ending in Q4 2016, recent monthly online job advertisements represent online job ads in 30 Days between 2/15/2017 and 3/16/2017.

## Career Pathways for Sales Representatives-Services



Source: O\*Net; Employment from Chmura Economics JobsEQ. Average of 4 quarters ending in Q4 2016, Current postings represent online ads in 30 Days between 2/15/2017 and 3/16/2017.

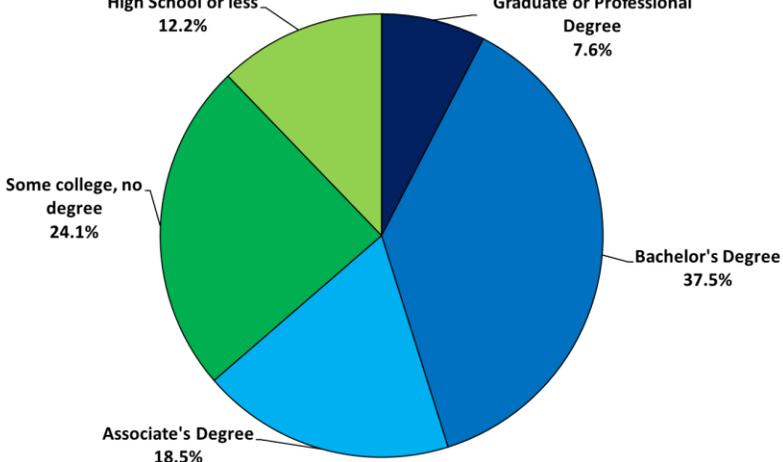
### Paralegals and Legal Assistants

Paralegals and legal assistants (SOC 23-2011) support lawyers and legal proceedings through research of legal precedent, formulation of a defense, and initiation of legal action. In addition, they prepare legal documents and investigate facts. Individuals employed within this occupation often have titles such as law clerk, legal analyst, paralegal, paralegal specialist, or law associate. People working as paralegals and legal assistants have a median income of \$63,040 and can typically make anywhere from \$36,670 to \$102,930.

Given the strength of the region's professional and business services sector, it is not surprising that the Washington metro area has a relatively high concentration of paralegals and legal assistants. Currently, over 11,000 people work as paralegals and legal assistants throughout the region, and this is projected to grow steadily over the next five years. Occupations that tend to require less education but have overlapping skills and tasks include legal secretaries and book keeping, accounting and auditing clerks.

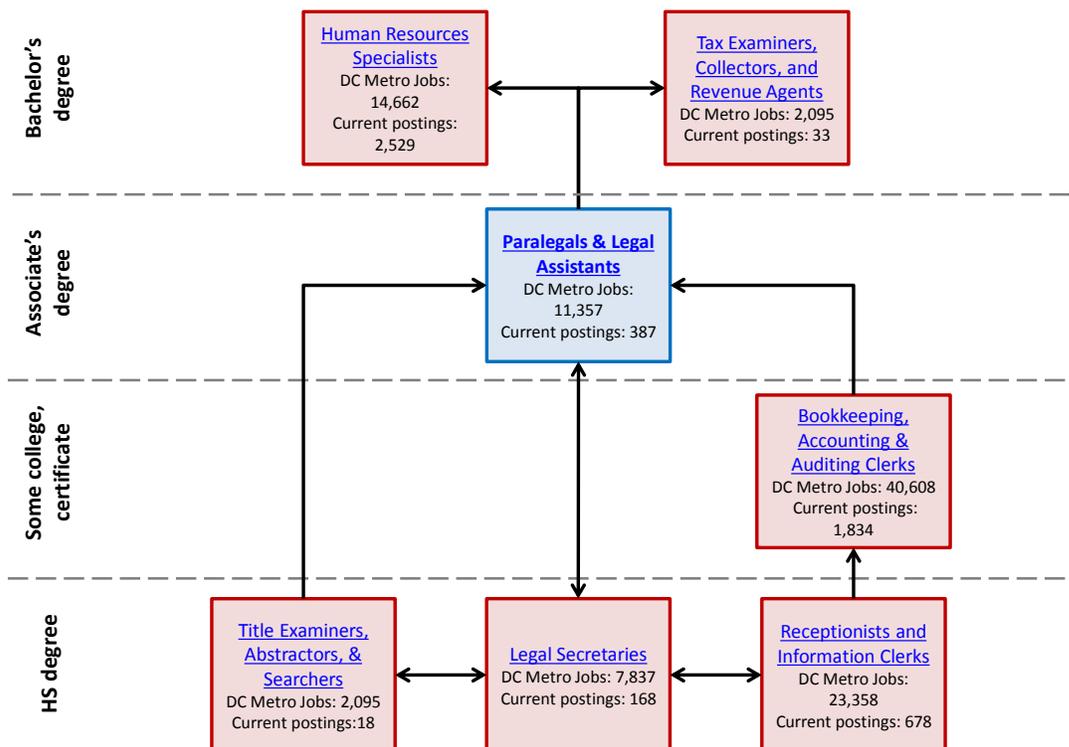
Many of the region's community colleges offer programs that can allow students to earn degrees or certificates that will enable them to advance in their careers as paralegals. Among the common certifications are the National Association of Legal Assistants (NALA) Certified Paralegal, the National Federation of Paralegal Associations Paralegal CORE Competency Exam (PCCE) and the Paralegal Advanced Competency Exam (PACE).

Within the occupation, there is a relatively large range of wages, from just over \$36,000 for entry-level wages to just over \$100,000 for more experienced workers or those at higher paying firms. While there is obviously a significant jump between paralegals and lawyers, continued education can allow paralegals to move into other professional or office related careers in fields such as human resources.

Recent monthly online job advertisements (2017)	Total jobs	Projected annual openings (2016-2021)
387	11,357	353
<p style="text-align: center;"><b>Educational Attainment Profile for Paralegals and Legal Assistants (Workers Age 25+)</b></p>  <p style="text-align: center;"><small>Source: Chmura Economics, JobsEQ</small></p>		
Top Certifications	Clearance NALA Certified Paralegal NFPA Paralegal CORE Competency Exam (PCCE) and the Paralegal Advanced Competency Exam (PACE)	
Sample Programs	NoVA Community College – Paralegal Studies AAS Montgomery College – Paralegal Studies Certificate Frederick Community College – Paralegal AAS	

Source: O\*Net; Employment from Chmura Economics JobsEQ, Average of 4 quarters ending in Q4 2016, recent monthly online job advertisements represent online job ads in 30 Days between 2/15/2017 and 3/16/2017.

## Career Pathways for Paralegals and Legal Assistants



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### General Maintenance and Repair Workers

General maintenance and repair workers (SOC 49-9071) perform work involving multiple maintenance or craft occupations in order to repair and maintain machines, mechanical equipment, or the structure of an establishment. Individuals employed within this occupation often have titles such as building maintenance mechanic, facilities manager, or maintenance supervisor. People working as general maintenance and repair workers have a median income of \$43,100 and can typically make anywhere from \$26,200 to \$66,810.

More so than many of the middle-skill jobs discussed above, general maintenance and repair workers are likely to rely on experience rather than post-secondary education. Over 80 percent of the workers in this occupation have less than an Associate's degree. Rather, these workers have developed skills and knowledge through experience and other related occupations such as groundskeepers, janitors or automotive technicians. Maintenance and repair workers are important contributors to regionally important industries such as residential and commercial real estate, utilities and transportation, as well as hotels and hospitality. Although the region's colleges may have programs related to automotive maintenance or welding, they do not have dedicated maintenance programs. That said, the Center for Employment and Training does offer building maintenance programs through their facilities in Alexandria and Prince George's County.

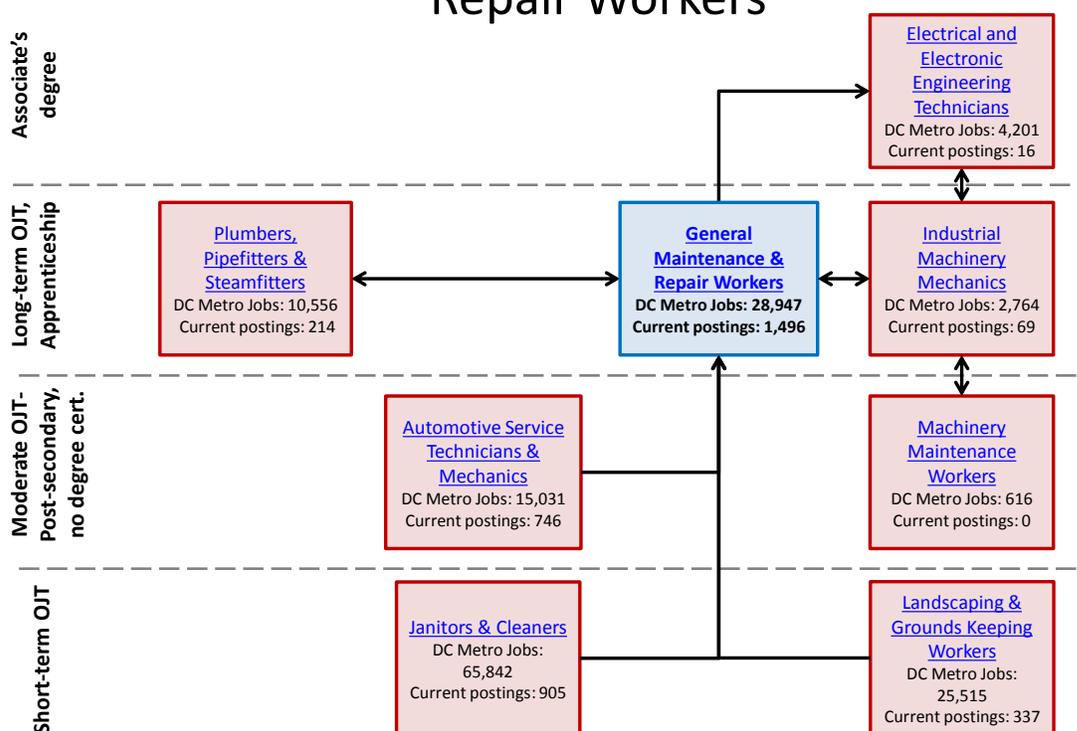
General maintenance and repair skills are applicable in other fields. Although, the Washington metro area does not have an extensive manufacturing sector, manufacturers are always in need of

people with these types of mechanical and problem solving skills. Therefore if these individuals cannot find opportunities within the region, they may be able to find these opportunities elsewhere. The Washington metro region is more likely to need people to work in skilled trades like plumbing or electricians, therefore with additional training, maintenance and repair workers could shift into these more specialized fields.

Recent monthly online job advertisements (2017)	Total jobs	Projected annual openings (2016-2021)												
1,496	28,947	1,054												
<p style="text-align: center;"><b>Educational Attainment Profile for General Maintenance and Repair (Workers Age 25+)</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>Educational Attainment Profile Data</caption> <thead> <tr> <th>Attainment Level</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>High School or less</td> <td>54.5%</td> </tr> <tr> <td>Some college, no degree</td> <td>27.8%</td> </tr> <tr> <td>Associate's Degree</td> <td>10.4%</td> </tr> <tr> <td>Bachelor's Degree</td> <td>6.2%</td> </tr> <tr> <td>Graduate or Professional Degree</td> <td>1.0%</td> </tr> </tbody> </table> <p style="text-align: center; font-size: small;">Source: Chmura Economics, JobsEQ</p>			Attainment Level	Percentage	High School or less	54.5%	Some college, no degree	27.8%	Associate's Degree	10.4%	Bachelor's Degree	6.2%	Graduate or Professional Degree	1.0%
Attainment Level	Percentage													
High School or less	54.5%													
Some college, no degree	27.8%													
Associate's Degree	10.4%													
Bachelor's Degree	6.2%													
Graduate or Professional Degree	1.0%													
Top Certifications	Drivers license EPA certification OSHA certification HVAC certification													
Sample Programs	Alexandria County Center for Employment & Training Prince George's County Center for Employment & Training Montgomery College Building and Construction Technology training													

Source: O\*Net; Employment from Chmura Economics JobsEQ, Average of 4 quarters ending in Q4 2016, recent monthly online job advertisements represent online job ads in 30 Days between 2/15/2017 and 3/16/2017.

# Career Pathways for General Maintenance and Repair Workers



Source: O\*Net; Employment from Chmura Economics JobsEQ. Average of 4 quarters ending in Q4 2016, Current postings represent online ads in 30 Days between 2/15/2017 and 3/16/2017.

## Meeting, Convention and Event Planners

Meeting, convention, and event planners (SOC 13-1121) coordinate activities of staff, convention personnel, or clients to make arrangements for group meetings, events, or conventions. Individuals employed within this occupation often have titles such as event coordinator, meeting planner, catering director, conference planner, or special events coordinator. People working as meeting, convention, and event planners have a median income of \$62,330 and can typically make anywhere from \$39,900 to \$97,360.

This occupation is relevant to the advocacy cluster, but is also an extension of the region's important hospitality industry. Meeting, convention and event planners typically require a minimum of a 4-year degree with over 62 percent having obtained this education level. However, important and relevant experience can be gained by working in occupations such as hotel desk clerks and customer service representatives.

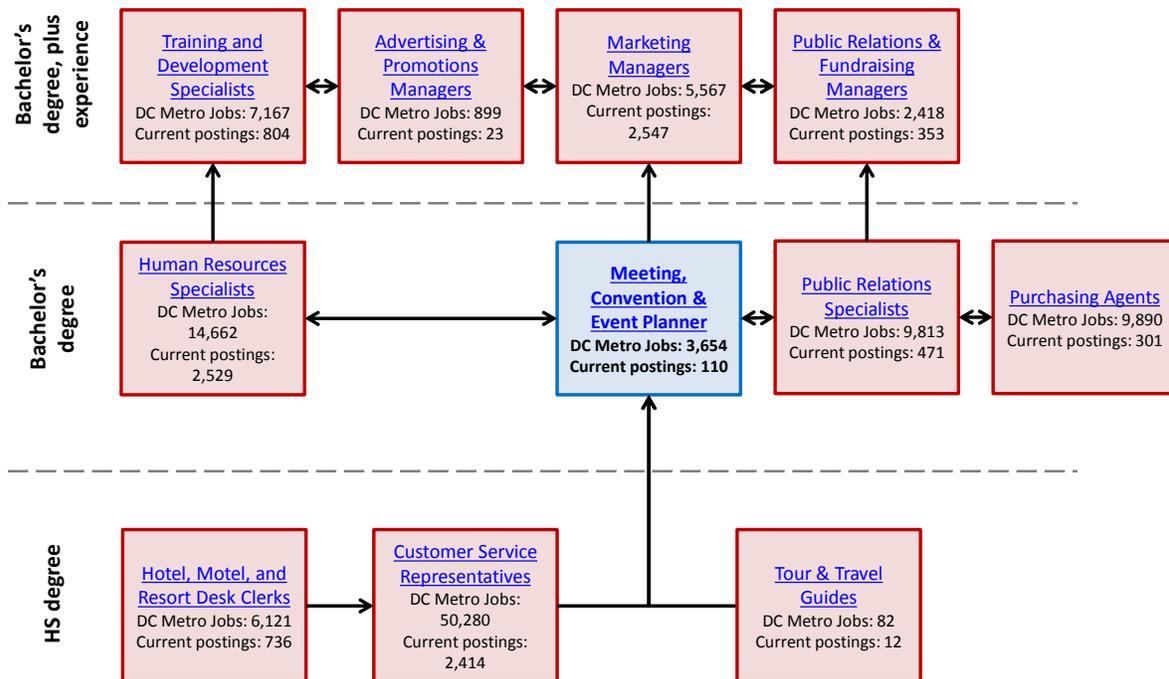
Within the region, George Washington University's School of Business has a program to help build event-planning skills. GW students can earn an Event and Meeting Management Certificate through GW's Executive Education Program. Through this program students not only learn best practices of putting on conventions and events, but also gain greater knowledge about the industry at large and valuable experience through internships. Montgomery College also offers a Meeting, Conference and Event Planning certificate.

Workers in this field can also bolster their careers by pursuing other relevant certifications such as the Certified Meeting Professional/Planner (CMP) Certification or becoming certified in Exhibition Management (CEM). Work in this career can position people for opportunities in other occupations such as training and development specialists, marketing managers, as well as public relations and fundraising managers that all tend to pay significantly higher wages.

Recent monthly online job advertisements (2017)	Total jobs	Projected annual openings (2016-2021)												
110	3,654	95												
<p style="text-align: center;"><b>Educational Attainment Profile for Meeting, Convention, and Event Planners (Workers Age 25+)</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>Educational Attainment Profile Data</caption> <thead> <tr> <th>Education Level</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Bachelor's Degree</td> <td>50.7%</td> </tr> <tr> <td>Some college, no degree</td> <td>18.5%</td> </tr> <tr> <td>Graduate or Professional Degree</td> <td>12.2%</td> </tr> <tr> <td>High School or less</td> <td>10.0%</td> </tr> <tr> <td>Associate's Degree</td> <td>8.6%</td> </tr> </tbody> </table> <p style="font-size: small; margin-top: 10px;">Source: Chmura Economics, JobsEQ</p>			Education Level	Percentage	Bachelor's Degree	50.7%	Some college, no degree	18.5%	Graduate or Professional Degree	12.2%	High School or less	10.0%	Associate's Degree	8.6%
Education Level	Percentage													
Bachelor's Degree	50.7%													
Some college, no degree	18.5%													
Graduate or Professional Degree	12.2%													
High School or less	10.0%													
Associate's Degree	8.6%													
Top Certifications	Clearance Certified Meeting Professional Planner Certification Certified in Exhibition Management													
Sample Programs	GWU - Event and Meeting Management Certificate; 4 year degree Meeting & Event Planning Montgomery College – Meeting, Conference and Event Planning Certificate													

Source: O\*Net; Employment from Chmura Economics JobsEQ, Average of 4 quarters ending in Q4 2016, recent monthly online job advertisements represent online job ads in 30 Days between 2/15/2017 and 3/16/2017.

## Career Pathway Options for Meeting, Convention & Event Planners



Source: O\*Net; Employment from Chmura Economics JobsEQ. Average of 4 quarters ending in Q4 2016, Current postings represent online ads in 30 Days between 2/15/2017 and 3/16/2017.

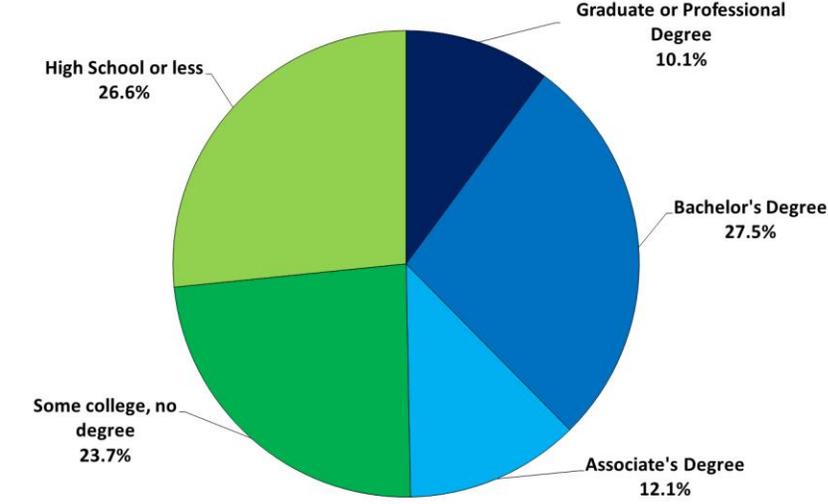
### Chemical Technicians

Chemical technicians (19-4031) assist scientists in making qualitative and quantitative analyses by conducting chemical and physical laboratory tests. Their work is often used to support research and development of new products or processes, quality control, or maintenance of environmental standards. Individuals employed within this occupation often have titles such as chemical analyst, chemical technician, formulation technician, or laboratory analyst. People working as chemical technicians have a median income of \$49,200 and can typically make anywhere from \$26,870 to \$78,240.

Within the biotechnology cluster, chemical technicians are the most representative middle-skill job. They often require a minimum of an associate's degree, and roughly half of the people working in this occupation have less than a 4-year degree. Jobs in this field can often be found in industries such as scientific research and development services, as well as pharmaceutical and basic chemical manufacturing industries. Employers in the former are more prominent in the region as opposed to those in the latter.

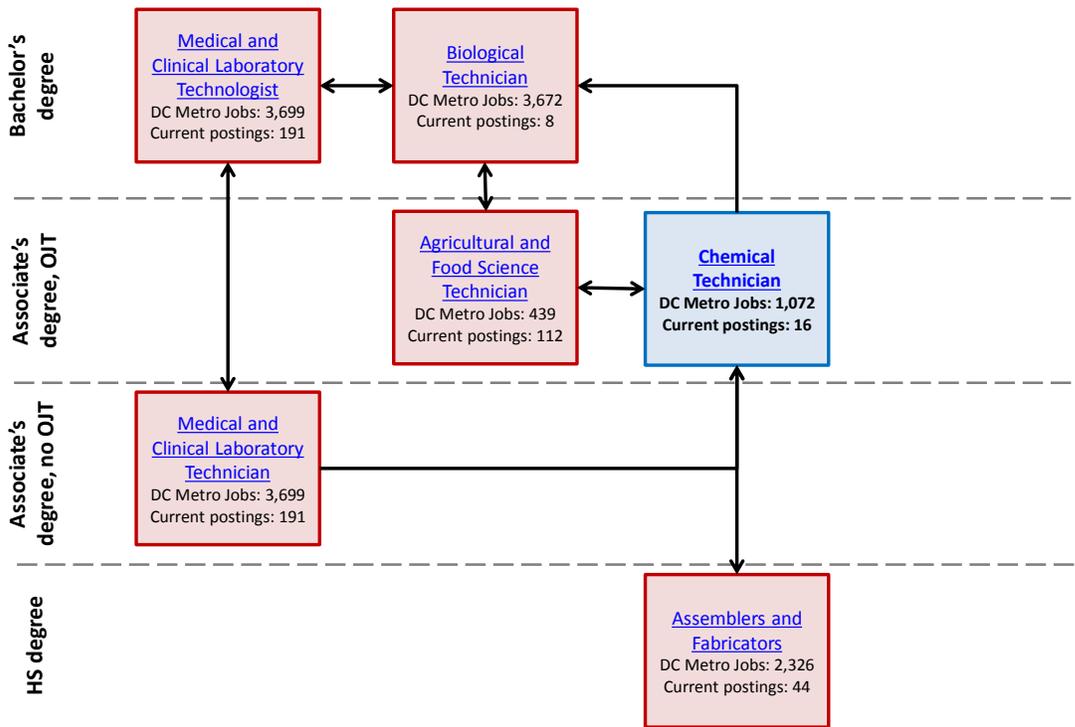
Additional education is often required to move into more advanced careers, and programs like the University of Maryland's biochemistry and biotechnology bachelors and master's programs provide one avenue for providing this education and training. Additional training can open up opportunities in occupations like biological technicians and medical and clinical laboratory

technologists. Medical and clinical laboratory technologists currently have relatively higher projected employment opportunities, in part because job opportunities may present themselves in a broader set of industries including hospitals, medical and diagnostic laboratories, and some doctor's offices.

Recent monthly online job advertisements (2017)	Total jobs (2016)	Projected annual openings (2016-2021)
16	1,072	45
<p style="text-align: center;"><b>Educational Attainment Profile for Chemical Technicians (Workers Age 25+)</b></p>  <p style="text-align: center;"><small>Source: Chmura Economics, JobsEQ</small></p>		
Top Certifications	HAZMAT	
Sample Programs	<a href="#">UMD -4 year, Biochemistry</a> Montgomery College – A.S. Chemical Engineering, A.S. Chemistry & Biochemistry	

Source: O\*Net; Employment from Chmura Economics JobsEQ, Average of 4 quarters ending in Q4 2016, recent monthly online job advertisements represent online job ads in 30 Days between 2/15/2017 and 3/16/2017.

# Career Pathways for Chemical Technicians



Source: O\*Net; Employment from Chmura Economics JobsEQ. Average of 4 quarters ending in Q4 2016, Current postings represent online ads in 30 Days between 2/15/2017 and 3/16/2017.

## Implications and takeaways

The information presented above has implications for job seekers, incumbent workers, and employers. For job seekers, looking at the jobs as linked or connected rather than in isolation allows them to think more broadly and long-term about their career opportunities. It is no surprise that many of the entry point occupations identified above have entry level wages that are lower than the median and might even be below the standard of living level (\$42,000). However, this does not mean they are bad jobs, especially if seen as a step along a pathway. This research illustrates what many of us have experienced: retail or customer service may or may not be our preferred lifetime occupation, but they are a helpful start. From the job seeker's perspective, these jobs can be seen as platforms for gaining experience and connections and ultimately leveraged to move on to sustaining, career-oriented work.

Another important implication for both job seekers and incumbent workers is the benefit of industry-recognized certifications. Some occupations have clear credentialing systems (IT); for others the pathway through workforce development is not as obvious (sales, maintenance & repair). However, in many instances obtaining relevant certifications may be as important, or even more important, than obtaining a 4-year college degree. Credentials send a clear signal to employers about what the certification holder knows and can do. They can not only help job

seekers differentiate themselves from the rest of field, but also position worker to advance both within their company or better compete for higher-skilled or better paying jobs elsewhere.

For employers, the information above provides some insight into some potentially untapped labor pools that might allow them to better fill their workforce gaps. For instance, some IT employers might wish to take a longer look at people with customer service experience as those workers may have the interpersonal skills to work in computer support, but need some technical training that can be undertaken in a reasonable timeframe. Similarly, employers should also continue to invest in the skills of their existing workforce as developing their in-place talent might be an important element in filling their talent gaps. Multiple resources—from boot camps to certification classes to two year degree programs—exist to meet this demand.

This section provides a snapshot of several middle-skill occupation characteristics, credential programs, and career pathways. A series of more detailed profiles with links to relevant training and credentialing programs by occupation is available and will be maintained as a resource on the Center for Regional Analysis website (<http://cra.gmu.edu/regional-workforce-research/>).

### **Conclusion and Next Steps**

Talent is a primary issue affecting the growth potential of businesses in the region's leading industry clusters. Public support for workforce development programs is high,<sup>25</sup> and the Washington region is rich in education, training, philanthropic and talent development resources. Still, many individuals without a college degree feel excluded from our region's highly skilled economy,<sup>26</sup> and the region's prosperity is not realized equally by all residents.<sup>27</sup>

58% of poll respondents indicated they are willing to pay more in taxes for workforce training and development programs

- 2017 Public Policy Poll: Economic Development and Workforce Training, Office of Public Policy Outreach in the Center for Public Policy at the L. Douglas Wilder School of Government and Public Affairs at Virginia Commonwealth University

This research report addresses these issues and provides a unique and accessible-to-all source of labor market information to anyone interested in talent development and economic opportunity in the Washington region. It complements existing resources by offering data and insight into the pathways into well-paying, middle-skill jobs in and across our region's leading industry clusters.

We specifically intend this report to be helpful for the Washington region's multiple workforce and talent development organizations, which benefit from high quality labor market and career pathway information to quantify the regional demand for talent as they implement their

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<sup>25</sup> Office of Public Policy Outreach in the Center for Public Policy at the L. Douglas Wilder School of Government and Public Affairs at Virginia Commonwealth University, *2017 Public Policy Poll: Economic Development and Workforce Training*, 2017.

<sup>26</sup> *Greater Washington Works*, 2016.

<sup>27</sup> *State of the Region, Human Capital Report*, 2017.

programs. The federal Workforce Innovation and Opportunity Act (WIOA) has led many such organizations to update their strategies to incorporate more industry partnerships and focus on high-demand jobs. The research approach is consistent with the WIOA emphases on helping job seekers access employment and training while matching employers with the skilled workers they need; fostering regional collaboration to meet the needs of local and regional employers; and helping job seekers acquire industry-recognized credentials for in-demand jobs.<sup>28</sup>

We also expect this information to be valuable to the individuals that the workforce councils serve. To answer the questions with which this report begins, the majority of adults in the Washington region who don't possess a college degree can use this information to see:

- promising career options within the region's leading industry clusters;
- pathways to good quality jobs that pay a sustaining wage; and
- available training, education, and credentials that can help get them there.

With this information in hand, we suggest three ways to share these findings in order to increase awareness of opportunities and make real connections between job seekers and businesses.

### **1. Deploy the data**

Multiple workforce councils serve the Washington region across DC, Maryland and Virginia. As a result, most consider the regional economic context in which they operate but focus on data from and implement programs within their more narrowly defined "workforce regions." However, the nature of the opportunities that middle-skill occupations provide only become apparent when viewed from the wider Washington regional perspective, especially since they cut across multiple clusters, and it may not make sense for each council to develop its own strategy to meet this demand. Further, businesses recruit from the regional talent pool, not just from individual jurisdictions.

Accordingly, several regional workforce leaders consulted during the course of this research suggested that the workforce councils convene to discuss the findings of this report and implications for programs region-wide. Such a workshop could take place under the aegis of MWCOG's ongoing work to "Partner with the Workforce Investment Boards (WIBs) and Workforce Investment Councils (WICs) . . . to implement workforce development strategies throughout the region."<sup>29</sup>

This type of convening could consider:

- Preparing a more comprehensive list of credential and training programs available across the region. This report highlights many of these programs in the course of providing occupational data, but it is far from complete. A full menu of programs tied to the career pathways could then be shared widely - with students, schools, counselors and job seekers. A workshop would also enable all participants to identify any gaps in existing training and credentialing programs that should be filled.
- Addressing ways to engage the business community with regional workforce councils and their partners to connect people pursuing appropriate credentials with specific job

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<sup>28</sup> <https://www.doleta.gov/wioa/Overview.cfm>

<sup>29</sup> *State of the Region, Human Capital Report, 2017*. p. 4.

openings. 2030 Group leaders might be able to draw on their networks to help build these connections.

- Tackling challenges specific to the Washington region, such as the requirement for security clearances and/or a college degree associated with federal contracts for what would otherwise be middle-skill positions. Identifying specific steps that could be taken consistently across the region to help individuals over these hurdles would be very valuable in expanding the talent pipeline for many types of in-demand jobs.

## **2. Tell the story**

### Provide a platform

It is easy to overlook the opportunities associated with middle-skill occupations given the dominance of both higher- and lower-skill jobs in the Washington regional economy. This is true even for those of us who have quite a bit of experience using labor market information. The 2030 Group can help address this issue by using its platform to draw attention to the topic and to highlight both the opportunities and value of middle-skill work in the Washington region. It is worth noting that the Greater Washington Works report<sup>30</sup> also includes “raise awareness” among its recommendations, suggesting the potential to collaborate with the Community Foundation for the National Capital Region and the Greater Washington Workforce Development Collaborative in this effort.

### Share widely via talent intermediaries

Regional workforce councils are the primary intermediary among job seekers, partners and employers in the workforce development system. Part of their mission is to share information on industry talent demand with job seekers and to use labor market information to meet the needs of regional businesses. The research team (BDA and CRA) can support this mission by synthesizing the information developed for this report into a user-friendly presentation that can be made available to workforce boards, committees, business organizations (such as chambers of commerce or tech councils), philanthropic organizations, workforce partners (such as community colleges, school systems, and career and technical education programs), and students, parents and job seekers that may benefit from access to this information.

## **3. Go deeper**

Challenging issues always reveal additional interesting research topics. In this case, one of the remaining open questions is the extent to which these middle-skill occupations – and the clusters in general – rely on freelance, gig or contract work instead of traditional full-time employment. Labor market information is based on jobs, not work. However, we expect that work in several of the middle-skill occupations (graphic designers come immediately to mind) is frequently done on a freelance basis or by self-employed individuals - and not in a full-time job with a single company. These are viable steps on a career path for middle-skill occupations that are not

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<sup>30</sup> *Greater Washington Works*, 2016.

captured in this data. Future research should examine what this “disruptive” force<sup>31</sup> in our economy means for middle-skill work and the industries they support.

Another question that has been raised is whether these jobs are at risk of being lost to advances in technology. For example, if everyone can create their own website, do we need a lot of new web developers? Labor market data projections are largely based on past trends and, again, do not account for truly disruptive change. The potential implications for the Washington region of these trends would be another worthwhile topic for further research.

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<sup>31</sup> The 2030 Group has previously considered how technology and business trends are changing the way work is performed. See 3. How We Work in <http://the2030group.com/wp-content/uploads//Megatrends.pdf>

## Appendix A: Common middle-skill jobs by economic cluster

Target Industry	More than 1 month of OJT, HS degree to Associates	More than HS, but less than 4-year required. NO OJT required.	4-year degree, but w/ no exp. or OJT required, relatively low wages
<b>Advocacy</b>	<ul style="list-style-type: none"> <li>• <b>General maintenance and repair workers</b></li> <li>• Bookkeeping, Accounting and auditing clerks</li> <li>• <b>Sales Representatives, Services</b></li> <li>• Advertising sales agents</li> </ul>	<ul style="list-style-type: none"> <li>• Bookkeeping, Accounting, and Auditing Clerks</li> <li>• Preschool Teachers, Except Special Education</li> <li>• Teacher Assistants</li> <li>• <b>Computer User Support Specialists</b></li> <li>• <b>Web Developers</b></li> </ul>	<ul style="list-style-type: none"> <li>• Social science research assistants</li> <li>• Meeting, convention and event planners</li> <li>• Child, family and school social workers</li> <li>• <b>Graphic designers</b></li> </ul>
<b>Information and Communications Technology</b>	<ul style="list-style-type: none"> <li>• Telecommunications Equipment Installers and Repairers, Except Line Installers</li> <li>• Bookkeeping, Accounting, and Auditing Clerks</li> <li>• Telecommunications Line Installers and Repairers</li> <li>• Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products</li> <li>• Data Entry Keyers</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Computer User Support Specialists</b></li> <li>• Telecommunications Equipment Installers and Repairers, Except Line Installers</li> <li>• Computer Network Support Specialists</li> <li>• <b>Web Developers</b></li> <li>• Bookkeeping, Accounting, and Auditing Clerks</li> <li>• Computer, Automated Teller, and Office Machine Repairers</li> </ul>	<ul style="list-style-type: none"> <li>• Market research analysts and marketing specialists</li> <li>• <b>Graphic designers</b></li> <li>• Cost estimators</li> </ul>
<b>Science and Security Technologies</b>	<ul style="list-style-type: none"> <li>• Security and Fire Alarm Systems Installers</li> <li>• <b>Sales Representatives, Services, All Other</b></li> <li>• Bookkeeping, Accounting, and Auditing Clerks</li> <li>• Construction and Building Inspectors</li> </ul>	<ul style="list-style-type: none"> <li>• Architectural and Civil Drafters</li> <li>• Civil Engineering Technicians</li> <li>• Bookkeeping, Accounting, and Auditing Clerks</li> <li>• Electrical and Electronic Engineering Technicians</li> </ul>	<ul style="list-style-type: none"> <li>• Social science research assistants</li> <li>• Biological technicians</li> <li>• All other teachers and instructors</li> <li>• Graphic designers</li> </ul>

Target Industry	More than 1 month of OJT, HS degree to Associates	More than HS, but less than 4-year required. NO OJT required.	4-year degree, but w/ no exp. or OJT required, relatively low wages
<b>Biotechnology</b>	<ul style="list-style-type: none"> <li>• Surveying and Mapping Technicians</li> <li>• Packaging and Filling Machine Operators and Tenders</li> <li>• Inspectors, Testers, Sorters, Samplers, and Weighers</li> <li>• Mixing and Blending Machine Setters, Operators, and Tenders</li> <li>• Team Assemblers</li> <li>• <b>Chemical Technicians</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Computer User Support Specialists</b></li> <li>• Bookkeeping, Accounting, and Auditing Clerks</li> <li>• Life, Physical, and Social Science Technicians, All Other</li> <li>• Engineering Technicians, Except Drafters, All Other</li> </ul>	<ul style="list-style-type: none"> <li>• Biological technicians</li> <li>• Graphic designers</li> </ul>
<b>Business and Financial Services</b>	<ul style="list-style-type: none"> <li>• Bookkeeping, Accounting, and Auditing Clerks</li> <li>• <b>Sales Representatives, Services, All Other</b></li> <li>• Billing and Posting Clerks</li> <li>• Tax Preparers</li> </ul>	<ul style="list-style-type: none"> <li>• Bookkeeping, Accounting, and Auditing Clerks</li> <li>• <b>Computer User Support Specialists</b></li> <li>• Architectural and Civil Drafters</li> <li>• Environmental Science and Protection Technicians, Including Health</li> <li>• <b>Paralegals and Legal Assistants</b></li> <li>• <b>Web Developers</b></li> <li>• Computer Network Support Specialists</li> <li>• <b>Medical Records and Health Information Technicians</b></li> </ul>	<ul style="list-style-type: none"> <li>• Market research analysts and marketing specialists</li> <li>• <b>Graphic designers</b></li> <li>• Interior designers</li> <li>• Social Science Research Assistants</li> </ul>
<b>Media and Information</b>	<ul style="list-style-type: none"> <li>• Advertising Sales Agents</li> <li>• <b>Sales Representatives, Services, All Other</b></li> <li>• Printing Press Operators</li> </ul>	<ul style="list-style-type: none"> <li>• Broadcast Technicians</li> <li>• Telecommunications Equipment Installers and Repairers, Except Line Installers</li> <li>• <b>Web Developers</b></li> </ul>	<ul style="list-style-type: none"> <li>• Reporters and correspondents</li> <li>• <b>Graphic designers</b></li> <li>• Market research analysts and marketing specialists</li> <li>• Film and video</li> </ul>

Target Industry	More than 1 month of OJT, HS degree to Associates	More than HS, but less than 4-year required. NO OJT required.	4-year degree, but w/ no exp. or OJT required, relatively low wages
	<ul style="list-style-type: none"> <li>• Telecommunications Equipment Installers and Repairers, Except Line Installers</li> </ul>	<ul style="list-style-type: none"> <li>• Bookkeeping, Accounting, and Auditing Clerks</li> <li>• <b>Computer User Support Specialists</b></li> </ul>	<ul style="list-style-type: none"> <li>editors</li> <li>• Proof readers and copy markers</li> </ul>
<b>Business and Leisure Travel</b>	<ul style="list-style-type: none"> <li>• Flight Attendants</li> <li>• <b>Maintenance and Repair Workers, General</b></li> <li>• Travel Agents</li> <li>• <b>Sales Representatives, Services, All Other</b></li> <li>• Bookkeeping, Accounting, and Auditing Clerks</li> </ul>	<ul style="list-style-type: none"> <li>• Aircraft Mechanics and Service Technicians</li> <li>• Bookkeeping, Accounting, and Auditing Clerks</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Meeting, convention and event planners</b></li> <li>• Market research analysts and marketing specialists</li> <li>• Coaches and scouts</li> <li>• Set and exhibit designers</li> <li>• Museum technicians and conservators</li> </ul>