Profiles of Fifteen High Growth Health Occupations in Massachusetts

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Introduction

The health care industry in Massachusetts has undergone sizable shifts in size and industry composition. Our previous paper, *Health Care Employment, Structure, and Trends in Massachusetts* presented a detailed account of the changes in the health care industry employment in the state and the occupational impacts of these changes in employment across the state's health care sectors.[1] Over the 2001 to 2012 period, total health care industry employment in Massachusetts rose by one-third. Across the four health care industry sectors, employment in the individual and family services sector rose by 124 percent, while nursing and residential care facilities saw employment rise just 15% over the same time period—the decade prior to the passage of Chapter 224 cost containment legislation. Hospital employment rose by 27%, while the ambulatory sector added 32 percent to its workforce over the 2001-2012 period. These large differences in the pace of job creation can mean potentially large changes in the nature of health care employment if occupational staffing structures and closely related skills requirements differ across the four health care industry sub-sectors. And the different staffing and skill requirements often signal differences in the characteristics of jobs including hourly pay, hours of work and other traits important to both workers and public policy leaders.

This research brief presents a profile of 15 occupations in the Massachusetts health care industry. These occupations were selected on the basis of their importance within the state's health care industry; either because of strong growth in employment or because of the emerging importance of the role that workers in these occupations play in the changing health care service delivery environment in the state. A comparison of employment by occupation in the Massachusetts health care industry between 2000 and 2012-2014 was used to identify strong growth occupations. Some occupations like Nurse Practitioners and Medical Assistants that have gained prominence in the new health care environment were merged with other occupations and not individually identified in the 2000 occupational classification. Since these occupations were not individually identified in 2000, we were unable to assess employment growth for these occupations. These occupations are classified individually in the 2012-2014 data, so levels of recent employment can be reported for them. We conducted extensive interviews and focus

[1] "Health Care Employment, Structure, and Trends in Massachusetts," Chapter 224 Baseline Study, Prepared by Commonwealth Corporation and the Center for Labor Markets and Policy, Drexel University, July 15, 2014.

groups with several employers, individuals, health care professionals, health care workers, and staff from professional organizations, to identify emerging important occupations in the health care industry. The list of these 15 occupations is presented in Table 1. In 2012-14, these 15 occupations represented nearly half (46.3%) of the total health care employment in Massachusetts.

The occupational profiles presented in this paper include the following information: the distribution of workers in each occupation across the four health care industry sectors; the demographic and socioeconomic traits and labor market outcomes of incumbent workers in these occupations; and the skills, abilities, behavioral traits and knowledge areas that are designated by incumbent workers and occupational experts to be most critical to the performance of work in each occupation.

The demographic and socioeconomic profiles and the industry distribution of workers in each occupation are based on the authors' analysis of the combined 2012, 2013, and 2014 public use data files of the American Community Survey (ACS). Three years of ACS data were combined to increase the sample sizes sufficiently to be able to produce statistically reliable estimates for each of the 15 occupations. In seven out of these fifteen occupations, the three-year ACS sample size of workers in Massachusetts was sufficiently large for statistically reliable estimates. For seven occupations we expanded the geography to the New England region to increase the sample size for statistically reliable estimates. For just one occupation, Community Health Workers, we had to expand the geography beyond Massachusetts and New England to include the entire nation, as anything below national-level data did not yield a sufficiently large sample of Community Health Workers for statistically reliable estimates.

In addition to the demographic and socioeconomic traits and labor market outcomes, the occupational profiles presented in this paper also include the skills, abilities, behavioral traits and knowledge areas of workers in these occupations. The traits critical to each of the 15 occupations are based on the author's analysis of the U.S. Department of Labor/Employment and Training Administration's Occupational Information Network data, more commonly known as O*NET data. The O*NET database contains information on several hundred standardized descriptors across different domains of over 900 occupations. We have utilized descriptors in four domains for the occupational profiles in this paper: *Abilities* and *Work Styles* (behavioral characteristics)

that represent worker characteristics to perform the tasks and activities in each occupation; and *Skills* and *Knowledge* that represent worker requirements to perform the tasks and activities in each occupation. Every occupation requires workers to possess a different mix of these abilities, knowledge areas, skills, and behaviors to perform a variety of activities and tasks while working in that occupation.

The O*NET database provides *Importance* and *Level* ratings for these descriptors based on responses to O*NET surveys by sampled incumbent workers in each occupation and by occupational analysts. The Importance rating is based on the assessment by respondents in each occupation of the importance of the descriptor in the performance of the tasks in that occupation. Importance is rated on a five-point Likert scale with 1 representing "not important" and 5 representing "extremely important." The Level rating is based on the rating by respondents in each occupation of the level at which the descriptor is used in the performance of the tasks in that occupation. The level is rated on a seven-point Likert scale with 7 representing the highest level.

In our analysis we have computed the product of the mean importance and level ratings (IM*LV) for each descriptor in each of the occupations in this paper. This number which measures the relevance (importance and level) of the descriptor for the occupation has a minimum value of 1 and a maximum value of 35 (7*5). Descriptors in the Work Styles domain (behavioral and personal traits) are rated for Importance and not for Level. Therefore behavioral and personal traits are measured by their importance rating with a maximum of 5.

The O*NET database is continually updated. The O*NET based findings in this paper are based on the O*NET 20.1 database that was released on October 15, 2015. The four O*NET domains included in the occupational profiles presented in this paper are defined below:
Abilities: defined as enduring characteristics of workers that may influence how they approach tasks and how they acquire work-related knowledge and skills. O*NET measures 52 abilities in four general areas: cognitive, psychomotor, physical, and sensory.

Knowledge: organized sets of principles and facts applying to general domains. O*NET measures 33 knowledge items in eight general areas: business and management, manufacturing and production, engineering and technology, mathematics and science, health services, education and training, arts and humanities, law and public safety, communications, and transportation.

Skills: The O*NET data base gathers data on two types of skills; basic skills and cross-functional skills. Basic skills are developed capacities that facilitate learning or the more rapid acquisition of knowledge. O*NET measures 10 basic skills in two general areas: content skills and process skills. Cross-functional skills are developed capacities that facilitate performance of activities that occur across jobs. O*NET measures 25 cross-functional skills in five general areas: social skills, complex problem-solving skills, technical skills, system skills, and resource management skills.

Work Styles (behavioral characteristics): are personal characteristics that can affect how well someone performs a job. O*NET measures 16 work style items in seven broad areas: achievement orientation, social influence, interpersonal orientation, adjustment, conscientiousness, independence, and practical intelligence.

The list of these 15 occupations along with the total number of Massachusetts health care industry workers employed in each occupation in the year 2000 and 2012-14 is presented in Table 1. The titles of these occupations are based on the titles used in the 2000 decennial Census and the 2012-14 ACS data and may be slightly different from the occupational titles in the O*NET database. The occupation with the largest absolute employment growth in the state is that of personal care aides, which added 18,300 workers between 2000 and 2012-14, representing a nearly four-fold increase in employment. Nursing assistants and home health aides increased employment by 12,200 workers over the same time period. Social workers, medical and health service managers, and social and community service managers added 6,600, 4,300, and 3,600 workers, respectively, over the 2000 to 2012-14 period. The remaining five occupations in the Massachusetts health care industry added between 1,000 and 1,700 jobs over the 12-14 year period.

The profiles of these occupations are presented for groups of occupations. The grouping of these occupations is based on their O*NET Job Zone classification which represents the education and training requirements for these jobs. Since these occupations, which are based on the Census classification could not be matched perfectly with O*NET occupations, we have used the Job Zone classification as a guide to cluster the occupations into groups.

Based on the educational, training, and work experience requirements to do work in an occupation, the O*NET database classifies over 900 occupations into one of the following five Job Zones:

- Job Zone One--Little or No Preparation Needed: Some occupations in Job Zone 1 may require a high school diploma. These occupations need little (few days to a few months) or no previous work-related skill, knowledge, or experience. Examples include taxi drivers, amusement and recreation attendants, counter and rental clerks, nonfarm animal caretakers, continuous mining machine operators, and waiters/waitresses.
- Job Zone Two--Some Preparation Needed: These occupations usually require a high school diploma and some previous work-related skill, knowledge, or experience. Employees in these occupations need anywhere from a few months to one year of working with experienced employees. Examples include sheet metal workers, forest fire fighters, customer service representatives, physical therapist aides, salespersons (retail), and tellers.
- Job Zone Three--Medium Preparation Needed: Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Previous work-related skill, knowledge, or experience is required for these occupations. Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. Examples include food service managers, electricians, agricultural technicians, legal secretaries, occupational therapy assistants, and medical assistants.

  Job Zone Four--Considerable Preparation Needed: Most of these occupations require a four-year bachelor's degree, but some do not. A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training. Examples include accountants, sales managers, database administrators, teachers, chemists, art directors, and cost estimators.
- Job Zone Five--Extensive Preparation Needed: Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree). Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. Employees may need some on-the-job training, but most of these occupations assume that the person will already have

the required skills, knowledge, work-related experience, and/or training. Examples include librarians, lawyers, sports medicine physicians, wildlife biologists, school psychologists, surgeons, treasurers, and controllers.

Table 1: Number of Workers Employed in 15 Selected Occupations in the Health Care Industry, Massachusetts, 2000 and 2012-14

Job Zone	Occupation (Census and ACS Titles)	Number Employed in MA Health Care Industry		Absolute Change	Relative Change
		Year 2000	Year 2012-14		
2	Personal care aides	4,681	22,969	18,288	391%
2	Nursing and home health aides	49,676	61,844	12,168	24%
3	Registered nurses*	N/A	73,509		
3	Licensed practical and licensed vocational nurses	11,299	12,358	1,059	9%
3	Medical assistants	N/A	11,167		
4	Emergency medical technicians and paramedics	3,312	4,340	1,028	31%
4	Social and community service managers	2,810	6,404	3,594	128%
4	Social and human service assistants	N/A	2,665		
4	Miscellaneous community and social service specialists, including health educators and community health workers	N/A	679		
5	Social workers	12,404	19,046	6,642	54%
5	Medical and health services managers	14,242	18,495	4,253	30%
5	Physical therapists	5,130	6,849	1,719	34%
5	Occupational therapists	1,763	2,805	1,042	59%
5	Physician assistants	1,575	2,721	1,146	73%
5	Nurse practitioners and nurse midwives	N/A	4,288		
	Total, 15 Occupations		250,139		
	Total, all health care industry occupations		540,554		

Source: 2000 Decennial Census PUMS Data (Public Use Microdata Samples), and 2012-2013-2014 American Community Survey PUMS Data (Public Use Micro Data Samples); tabulations by Center for Labor Markets and Policy.
N/A: Occupations not individually identifiable in 2000 data.
*In 2012-14 the registered nursing occupation was split into three separate occupations--registered nurses, nurse anesthetists, and nurse practitioners/nurse midwives. In 2000 the registered nurse occupation included these four occupations. Employment in the comparable 'registered nurse' occupation (4 occupations combined in 2012-14) in Massachusetts had increased from 67,311 in 2000 to 78,274 in 2012-14, an increase of nearly 11,000 or 16%.

The 15 occupations included in this paper are distributed across the following four Job Zones (JZs): two occupations are classified in JZ 2, four occupations in JZ 3, three occupations in JZ 4, and six occupations in JZ 5. None of these occupations belong to JZ 1. The Job Zone classification of these 15 occupations is presented in the first column in Table 1.

Job Zone Two Occupations: Personal Care Aides; Nursing and Home Health Aides

The first occupation group consists of two occupations that are classified by O*NET as belonging to Job Zone Two: personal care aides and nursing and home health aides. Job Zone Two occupations require some but not a lot of education, training and experience from workers. These jobs usually require a high school diploma and some previous work-related skill, knowledge, or experience. Employees in these occupations need anywhere from a few months to one year of working with experienced employees. Workers can perform tasks in Job Zone Two occupations with relatively low levels of education and training.

Personal care aides help clients (elderly, convalescents, or persons with disabilities) with self-care and everyday tasks at the person's home or in a care facility. They provide social supports and assistance that enable clients to participate in their communities.[2] In 2012-14, according to the ACS, there were nearly 23,000 personal care aides employed in the health care industry in Massachusetts; up from just 4,680 in 2000, a nearly 4-fold increase (Table 1). Nationwide this occupation is projected to increase employment by 26% between 2014 and 2024; considerably higher than the 7% projected increase in the nation's total employment over the same time period.

It must be noted that the personal care aide occupation in the 2000 decennial census and 2012-14 ACS PUMS data files is not exactly the same as the MassHealth-based Personal Care Attendant occupation. The decennial census and ACS are household surveys. Occupations in the decennial census and ACS data files are determined from the job title and job description provided by respondents to the surveys. It is likely that MassHealth based PCAs were classified

[2] Definitions of all occupations in this paper are from the *Standard Occupational Classification* (http://www.bls.gov/soc/) and *The Occupational Outlook Handbook (http://www.bls.gov/soc/),* Bureau of Labor Statistics, U.S. Department of Labor.

as personal care aides as well as home health aides, CNAs, nurses, or other service occupations based on the self-reported description of their job by respondents.

Nursing aides sometimes called nursing assistants or certified nursing assistants (CNAs) help provide basic care for patients in hospitals and residents of long-term care facilities, such as nursing homes. Home health aides help people with disabilities, chronic illnesses, or cognitive impairments with activities of daily living. They often help older adults who need assistance. Home health aides may also be able to give a client medication or check the client's vital signs under the direction of a nurse or other health care practitioner. Nursing and home health aides employed in the Massachusetts health care industry increased by 12,200 or 24% between 2000 and 2012-14; up from 49,700 workers in 2000 to 61,800 in 2012-14. Nationwide between 2014 and 2024, employment of nursing aides is expected to grow by 17 percent; much higher than the overall projected employment growth of 7%. Employment of home health aides in the nation is projected to increase by 38% between 2014 and 2024; more than twice the projected rate of increase in the employment of nursing aides. These increases reflect the changes in the delivery of health care services with a focus on "aging at home" that shifts much of the delivery of health care services from nursing homes to home care.

The 2012-14 ACS survey-based employment patterns by health care industry sector are presented in Table 2. Although both groups of workers were similarly likely to work in the ambulatory care sector (29%, 32%), most likely in outpatient settings and home care agencies, personal care aides were much less likely than nursing and home health aides to work in a hospital (3% versus 27%) or nursing and residential care facility (23% versus 39%). Personal care aides were much more likely to work in the individual and family services sector (42% versus 5%).

Table 2: Percentage Distribution of Health Care Industry Workers in Selected Job Zone Two Occupations, by Health Care Industry Sector, Massachusetts, 2012-14

Health Care Industry Sector	Personal Care Aides	Nursing, Psychiatric, and Home Health Aides	Total Health Care Industry Employment
Total Employment in Massachusetts, 2012-14 Average	22,969	61,844	540,554
Percentage Distribution by Health Care Industry Sector			

Health Care Industry Sector	Personal Care Aides	Nursing, Psychiatric, and Home Health Aides	Total Health Care Industry Employment
Ambulatory Care	32%	29%	34%
Hospitals	3%	27%	40%
Nursing and Residential Care Facilities	23%	39%	16%
Individual and Family Services	42%	5%	10%

Source: 2012-2013-2014 American Community Survey PUMS Data (Public Use Microdata Samples); Tabulations by Drexel University Center for Labor Markets and Policy.

The distribution of all Massachusetts health care industry workers in 2012-14 reveals that 40% of workers were employed in hospitals, 34% in ambulatory care organizations, 16% in nursing homes and residential care facilities, and the remaining 10% in the individual and family service sector. This latter sector includes establishments providing assistance to the elderly and persons with disabilities in their homes, including establishments providing home care and homemaker services.

Demographic and Socioeconomic Traits, Hours of Employment and Earnings

The 2012-14 demographic and socioeconomic traits of workers in Massachusetts who were employed in these two occupations are quite similar (Table 3). Although a large majority of workers in both occupations, women comprised a somewhat higher share of personal care aides (87%) than of nursing, psychiatric, and home health aides (79%) in Massachusetts. Female workers were also a majority across all occupations in the Massachusetts health care industry (76%); but accounted for a little under half of workers in all industries in Massachusetts in 2012-14.

The race-ethnicity characteristics of workers in these two occupations were also different from that of the entire health care industry and the state's workforce. Just over one half of the personal care aides and nursing and home health aides in Massachusetts were non-Hispanic Whites; a much lower share compared to all occupations in the state's health care industry (72%) and the state's entire workforce (77%). About one-fifth of personal care aides were non-Hispanic Black and another one-fifth were Hispanic. The Black share was somewhat higher among nursing and home health aides (27%) while Hispanics accounted for 14% of the state's nursing

and home health aides in 2012-14. Sizable shares of workers in these two occupations were born abroad; 31% and 39%, respectively among personal care aides and nursing and home health aides versus 21% across all occupations in the health care industry and 19% across all workers in the state.

The age distribution of workers in the two occupations was somewhat different from that of all workers in the health care industry. Personal care aides and nursing and home health aides tended to be younger than workers in the state's health care industry. One in six employees in the two occupations was under 25 years old compared to one in ten workers under the age of 25 among workers in all occupations in the state's health care industry. At the other end of the age

Table 3: Percentage Distribution of Health Care Industry Workers in Selected Job Zone Two Occupations by their Demographic and Socioeconomic Characteristics and their Employment Hours and Earnings, Massachusetts, 2012-14

	Personal Care Aides	Nursing, Psychiatric, & Home Health Aides	Health Care Industry*	All Industries
Total Employment in Massachusetts, 2012-14 average	22,969	61,844	540,554	3,791,763
Job Zone Classification	2	2	N/A	N/A
Percentage Distribution				
Gender				
Male	20.9	12.8	23.6	50.8
Female	79.1	87.2	76.4	49.2
Race-Ethnicity				
White	54.9	53.0	72.3	77.4
Black	19.2	27.0	11.1	5.9
Hispanic	20.0	13.9	9.0	8.6
Other Races	5.9	6.1	7.6	8.1
Nativity				
Foreign-Born	31.4	39.0	21.4	19.2
Native Born	68.6	61.0	78.6	80.8
Age				
Under 25	15.7	15.7	9.6	16.0
25-34	21.3	21.8	22.3	20.5
35-44	15.6	18.8	19.2	18.9
45-54	25.3	22.7	22.7	21.8
55+	22.2	21.1	26.1	22.8
Educational Attainment				
<12 or 12, No H.S. Diploma	16.6	12.0	4.7	7.5
H.S. Graduate/GED	30.6	35.8	16.7	22.5
Some College, no Degree	29.3	30.0	19.5	20.2

	Personal Care Aides	Nursing, Psychiatric, & Home Health Aides	Health Care Industry*	All Industries
Total Employment in Massachusetts, 2012-14 average	22,969	61,844	540,554	3,791,763
Job Zone Classification	2	2	N/A	N/A
Associate's Degree	9.1	9.2	13.0	7.6
Bachelor's Degree	11.1	9.6	23.3	24.5
Master's or Higher	3.2	3.4	22.7	17.8
Poverty and Public Assistance Receipt				
Poverty Rate	16.1	12.3	5.0	5.9
Percent receiving public assistance	49.9	38.8	17.1	16.8
Employment Hours and Earnings				
% Working 35 hours or more per week	42.7%	58.6%	68.4%	71.6%
Mean Annual Hours	1,341	1,582	1,745	1,720
Mean Annual Earnings	$19,125	$26,832	$58,279	$53,464

Source: American Community Surveys, 2012, 2013, & 2014, Public Use Microdata Samples (PUMS) Data files; tabulations by Drexel University Center for Labor Markets and Policy.
*The health care industry includes the following four industry sectors: ambulatory care, hospitals, nursing homes and residential facilities, and individual and family services.

distribution, 22% of workers in the two occupations were 55 and older, while this age group accounted for 26% of workers across all occupations in the state's health care industry.

Personal care aides and nursing and home health aides working in the state's health care industry had much lower levels of education compared to other health care industry workers and all workers in the state. Nearly 17% of personal care aides and 12% of nursing and home health aides had failed to complete high school compared to just 5% of the state's health care workforce. At the higher end, workers employed in these two occupations were about three times less likely to have a bachelor's degree or higher compared to all health care workers in the state (13-14% versus 46%) and workers across all industries in the state (42%).

Personal care aides and nursing and home health aides employed in the Massachusetts health care industry had higher rates of poverty and public assistance receipt than the overall workforce. The poverty rate in 2012-14 was 16% among personal care aides and 12% among nursing and home health aides, compared to just 5% among all health care industry workers and 6% among all workers in the state. Reliance on public assistance was also very high among workers employed in these two occupations in the state's health care industry. Nearly half of health care industry workers employed as personal care aides and 40% of those working as nursing and home health aides had received one or more of the following sources of public

assistance in 2012-14: Medicaid, food stamps, Social Security Income (SSI), and cash public assistance income. This represents a level of public assistance receipt that was greater than two times higher than the rate of public assistance receipt among all health care industry workers or among all workers in the state (about 17%).

The occupational profile presented in Table 3 also contains three labor market outcomes—share of workers in these occupations that were employed on a full-time basis (35+ hours per week), their mean annual hours of work, and their mean annual earnings. Among personal care aides, just 43% were working full-time, meaning that 57% were employed less than 35 hours per week. The ACS data files contain information on the usual number of weekly hours of employment and number of weeks of employment during the year prior to the survey. Annual hours of employment were computed as a product of weekly hours and annual weeks of employment during the prior year. The mean annual hours of work among personal care aides was just 1,340 hours; a low intensity of employment yielding mean earnings of just $19,100 per year on average during the 2012-14 period.

The employment intensity (hours of work) and earnings were somewhat higher among nursing and home health aides, albeit much lower than that of all health care industry workers and all workers in the state. Fewer than 60% of nursing and home health aides were employed on a full-time basis, much lower than the 68% rate of full-time employment among all health care industry workers and nearly 72% full-time employment among all workers in the state. The mean annual hours of work among nursing and home health aides was 1,580, nearly 200 hours or 9% lower than the mean annual hours of all heath care industry workers in the state (1,745 hours). The mean annual earnings of workers in this occupation were $26,830, less than half as much as the mean annual earnings of all health care workers, $58,280.

Abilities, Knowledge, Skills, and Behavioral Characteristics

A comparison of the five top elements from the O*NET domains for abilities, knowledge areas, skills, and behavioral and personal characteristics for personal care aides, nursing assistants, and home health aides are presented in Table 4. Also presented in the table is the relevance score for each of the five top elements in the four domains. As described in a previous section, the relevance score is the product (IM*LV) of the mean importance rating (IM) and the mean level rating (LV) assigned to the element in the O*NET database by incumbent workers in

the occupation and by occupational experts and analysts. The relevance score (IM*LV) ranges from 1-35 for abilities, knowledge, and skills domains. Behavioral and personal traits were just rated for importance on a scale of 1-5, and not for level.

Findings in Table 4 reveal a high degree of overlap across abilities, knowledge areas, skills and behavioral characteristics required for employment in each of these occupations. For example, oral comprehension, oral expression, and problem sensitivity are the top three abilities in all three occupations.[3] Customer service, English language skills and psychology are knowledge areas that are essential to perform work in these occupations. One exception was health-related knowledge (medicine and dentistry) that appeared among the top 5 knowledge areas for the nursing assistant occupation but not for personal care and home health aide occupations. Skill requirements also were quite similar across the three occupations with service orientation, social perceptiveness, and active listening skills appearing among the top five skills in all three occupations, and with about the same IM*LV relevance scores. The most important behavioral and personal traits also appear to be similar across these three occupations, with dependability, concern for others, and self-control among the five most important traits.

Table 4: Top Five Abilities, Knowledge, Skills and Behavioral Traits for Selected Job Zone Two Occupations

Personal Care Aides		**Nursing Assistants**		**Home Health Aides**	
Job Zone 2		Job Zone 2		Job Zone 2	
Elements	**Score**	**Elements**	**Score**	**Elements**	**Score**
Abilities (IM*LV, scale 1-35)					
Oral Comprehension	13.6	Oral Comprehension	14.0	Oral Expression	15.1
Oral Expression	12.2	Oral Expression	13.1	Oral Comprehension	14.1
Problem Sensitivity	10.5	Problem Sensitivity	12.7	Problem Sensitivity	13.1
Deductive Reasoning	9.4	Near Vision	11.8	Near Vision	12.3
Near Vision	9.4	Speech Recognition	11.8	Inductive Reasoning	10.5
Knowledge Areas (IM*LV, scale 1-35)					
Customer and Personal Service	16.3	Customer and Personal Service	19.0	Customer and Personal Service	14.5
Psychology	10.1	Psychology	15.7	English Language	10.0
English Language	9.0	English Language	12.8	Psychology	7.5
Education and Training	6.2	Medicine and Dentistry	10.7	Education and Training	5.8
Administration and Management	5.8	Education and Training	9.3	Administration and Management	5.8
Skills (IM*LV, scale 1-35)					
Service Orientation	14.6	Service Orientation	14.0	Active Listening	13.6

[3] Nursing assistants and home health aides are combined into one occupation in the American Community Survey, but are reported separately in the O*NET database.

Personal Care Aides		Nursing Assistants		Home Health Aides	
Job Zone 2		Job Zone 2		Job Zone 2	
Elements	**Score**	**Elements**	**Score**	**Elements**	**Score**
Social Perceptiveness	11.3	Social Perceptiveness	11.3	Service Orientation	12.2
Active Listening	10.1	Active Listening	10.9	Social Perceptiveness	11.4
Monitoring	9.7	Speaking	10.6	Critical Thinking	11.0
Speaking	9.4	Monitoring	9.8	Reading Comprehension	10.6
Behavioral Characteristics (IM, scale 1-5)					
Dependability	4.5	Dependability	4.8	Integrity	4.6
Integrity	4.5	Concern for Others	4.7	Self-Control	4.6
Concern for Others	4.5	Cooperation	4.6	Dependability	4.6
Cooperation	4.4	Stress Tolerance	4.6	Concern for Others	4.5
Self-Control	4.4	Self-Control	4.6	Attention to Detail	4.5

Source: O*NET 20.1 Database, Released October 2015; tabulations by Drexel University Center for Labor Markets and Policy.

There are considerable similarities across these three occupations. Analysis of the demographic, socioeconomic and educational traits of workers in these occupations (presented in the previous section), the O*NET Job Zone Two designation for all three occupations, and the abilities, knowledge, skills requirements and important behavioral and personal characteristics shared by these occupations suggests potential for occupational mobility among these fields. Nursing assistants may be readily able to work as personal care aides and home health aides but the mobility of home health aides and personal care aides into the nursing assistant job may be restricted by the need for a third-party certification. Nursing assistants often must engage in a formal certification process to become certified nurse assistants (CNAs) to be employed, though no such certification exists for home health aides and personal care aides. While we are unaware of studies of mobility across these occupations, we have some anecdotal evidence that suggests some mobility of CNAs into home health aide and personal care attendant occupations. If, as we suspect, incumbent workers in these occupations are good substitutes for one another in the eyes of employers, then factors like wages and working conditions may play a role in causing labor supply problems.

Job Zone Three Occupations: Registered Nurses, Licensed Practical Nurses, Medical Assistants, and Emergency Medical Technicians

The second occupation group consists of the following four occupations that are classified by O*NET as Job Zone Three occupations: registered nurses, licensed practical and licensed vocational nurses, medical assistants, and emergency medical technicians and

paramedics. O*NET defines Job Zone Three occupations as usually requiring training in vocational schools, related on-the-job experience, or an associate's degree. Previous work-related skill, knowledge, or experience is required for these occupations. Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. Job Zone Three occupations require moderate levels of education and training preparation from workers.

The registered nurses occupation (RN) consists of workers that provide and coordinate patient care, educate patients and the public about various health conditions and provide emotional support to patients and their family members. The combined 2012-14 ACS survey found 73,500 registered nurses among employed Massachusetts residents (Table 1). The RN occupation was reported as one occupation in the 2000 decennial census data, but was split into the following three occupations in the 2012-14 ACS data: registered nurses, nurse anesthetists, and nurse practitioners/nurse midwives. Therefore, we have not presented a comparison of the level of RN employment in Massachusetts between 2000 and 2012-14. However, when we combined 2012-14 employment in these three occupations (registered nurses, nurse anesthetists, and nurse practitioners/midwives) and compared the combined employment with the comparable employment in 2000, we in found an increase in employment of nearly 11,000 or 16% for these three nursing occupations together. The Bureau of Labor Statistics (BLS) projects a 16% nationwide increase in employment of RNs between 2014 and 2024; a rate of growth that is more than twice as high as the 7% projected increase in the nation’s total employment over the same time period.

Licensed practical nurses and licensed vocational nurses (LPNs/LVNs) provide basic nursing care under the direction of registered nurses and doctors. In 2012-14 there were 12,400 LPNs/LVNs in Massachusetts, up from 11,300 in the year 2000, representing an increase of 1,060 or 9% (Table 1). The BLS projects a 16% increase in LPN/LVN employment in the nation between 2014 and 2024.

The medical assistant occupation has gained prominence in Massachusetts, particularly after the passage of Chapter 224. A total of 11,200 employed Massachusetts residents were working as medical assistants in 2012-14. The medical assistant occupation was grouped in with several other health care support occupations in 2000. Therefore, we have not presented a

comparison of the level of medical assistant employment in Massachusetts between 2000 and 2012-14. Medical assistants perform administrative and certain clinical duties under the direction of a physician. Administrative duties may include scheduling appointments, maintaining medical records, billing, and coding information for insurance purposes. Clinical duties may include taking and recording vital signs and medical histories, preparing patients for examination, drawing blood, and administering medications as directed by physician. Employment of medical assistants is projected to grow rapidly. The BLS projects a 23% increase in medical assistant employment nationwide between 2014 and 2024.

Emergency medical technicians (EMT) and paramedics assess injuries, administer emergency medical care, extricate trapped individuals and transport injured or sick persons to medical facilities. The role of EMTs and paramedics has been evolving in community-based health care innovations. EMTs and paramedics play a central role in a practice called "community paramedicine" in which EMTs and paramedics check up on groups of patients that are frequent users of emergency rooms for non-emergency care, whose health conditions are manageable with regular doctor visits and preventive care. The role of EMTs and paramedics is evolving to include helping high risk patients manage chronic conditions by keeping scheduled doctor visits, engaging in preventive care, taking their medication regularly, enrolling in insurance coverage, and accessing social services. The goals of these community-based paramedicine programs are to improve individual and community health, reduce unnecessary hospitalizations and visits to the emergency rooms, and reduce health care costs. Although small in number, the employment of EMTs and paramedics in Massachusetts increased from 3,300 in 2000 to 4,340 in 2012-14, an increase of 1,028 or 31%. Nationally, employment of EMTs and paramedics is projected to grow by 24% from 2014 to 2024.

The distribution of workers in these four occupations across the four health industry sectors in Massachusetts is presented in Table 5. RN employment was concentrated in hospitals, whereas LPNs/LVNs were more likely to work in nursing and residential care facilities. Hospitals employed two-thirds of RNs in Massachusetts and 28% of LPNs/LVNs. In contrast, nursing homes employed 41% of LPNs/LVNs and only 11% of RNs. Medical assistant employment was concentrated in the ambulatory care sector, which includes offices of physicians and other health care practitioners and outpatient care centers; 64% of medical assistants were employed in this sector. About one-third of medical assistants were employed in

Table 5: Percentage Distribution of Health Care Industry Workers Employed in Selected Job Zone Three Occupations by Health Care Industry Sector, Massachusetts, 2012-14

Health Care Industry Sector	Registered Nurses	Licensed Practical and Licensed Voc. Nurses	Medical Assistants	Emergency Medical Technicians and Paramedics*	Total Health Care Industry Employment
Total Employment in Massachusetts, 2012-14 Average	73,509	11,167	12,358	4,340	540,554
Percentage Distribution by Health Care Industry Sector					
Ambulatory Care	21%	28%	64%	75%	34%
Hospitals	66%	28%	32%	25%	40%
Nursing and Residential Care Facilities	11%	41%	4%	1%	16%
Individual and Family Services	2%	4%	0%	0%	10%

Source: 2012-2013-2014 American Community Survey PUMS Data (Public Use Micro Data Samples); Tabulations by Drexel University Center for Labor Markets and Policy.
*The total employment of EMTs is based on Massachusetts data, but due to a smaller sample of EMTs in the 2012-14 ACS data for Massachusetts, the industry distribution of EMTs is based on 2012-14 ACS data for New England.

hospitals. EMTs and paramedics in Massachusetts were most likely to be employed in the ambulatory care sector, including ambulance services and other outpatient care centers. Three-quarters of EMTs were employed in the ambulatory care sector and the remaining one-quarter were employed in hospitals.

Demographic and Socioeconomic Traits, Hours of Employment and Earnings

The gender composition of workers in these occupations presented in Table 6 reveals that RN, LPN/LVN and medical assistant occupations were largely staffed with female workers (90-95%), whereas EMTs and paramedics were much less likely to be females (36%). RN's and EMT's were more likely than LPNs/LVNs and medical assistants to be non-Hispanic White. The share of White workers was 89% among the state's EMTs and 85% among RNs, compared to less than 70% among LPNs/LVNs, and just 65% among medical assistants. The composition of race-ethnic minorities was quite different across these occupations. Non-Hispanic Black workers accounted for one-fifth of the LPN/LVN workforce and 12% of medical assistants, while Hispanic workers accounted for just 6% of LPNs/LVNs and one-fifth of medical assistants in the state. The difference in the race-ethnicity of workers is also reflected in their nativity status. The

highest share of foreign-born workers was among medical assistants (28%), followed by LPNs/LVNs (24%) and RNs (12%). Only 6% of EMTs were born abroad.

EMTs and medical assistants were much younger than RNs and LPNs. Nearly 57% of EMTs and 47% of medical assistants were under 35 years old in 2012-14 compared to only one-quarter of LPNs/LVNs and RNs. The state's nursing workforce was much older. Over 31% of RNs and LPNs/LVNs were 55 years or older compared to 14% of medical assistants and only 7% of EMTs.

All four occupations—RNs, LPNs, medical assistants, and EMTs—are classified in the O*NET data as Job Zone Three occupations, which consist of occupations requiring medium preparation in the form of education, training, and work experience. However, there are some differences in the educational attainment of workers in these four occupations. According to 2012-14 ACS data, the educational attainment of RNs was higher than LPNs/LVNs, medical assistants, and EMTs. Nearly 65% of the state's RNs had a bachelor's or a higher college degree and another 29% had an associate's degree. Among LPNs/LVNs, 15% had an associate's degree

Table 6: Percentage Distribution of Health Care Industry Workers in Selected Job Zone Three Occupations by their Demographic and Socioeconomic Characteristics and their Employment Hours and Earnings, Massachusetts, 2012-14

	Registered Nurses	Licensed Practical and Licensed Voc. Nurses	Medical Assistants	Emergency Medical Tech & Paramedics*
2012-14 Employment in Massachusetts	73,509	11,167	12,358	4,340
Job Zone Classification	3	3	3	3
Percentage Distribution				
Gender				
Male	8.9	10.1	4.9	63.6
Female	91.1	89.9	95.1	36.4
Race-Ethnicity				
White	85.2	69.7	64.8	89.3
Black	7.2	20.1	12.5	1.1
Hispanic	3.0	6.2	19.5	6.4
Other Races	4.7	3.9	3.3	3.3
Nativity				
Foreign-Born	12.4	23.7	28.5	5.9
Native Born	87.6	76.3	71.5	94.1
Age				
Under 25	3.0	7.3	11.9	25.4
25-34	20.3	18.5	34.8	31.5

	Registered Nurses	Licensed Practical and Licensed Voc. Nurses	Medical Assistants	Emergency Medical Tech & Paramedics*
2012-14 Employment in Massachusetts	73,509	11,167	12,358	4,340
Job Zone Classification	3	3	3	3
35-44	19.6	18.0	22.3	24.7
45-54	25.6	24.8	17.0	11.6
55+	31.5	31.4	14.1	6.8
Educational Attainment				
<12 or 12, No H.S. Diploma	0.2	1.5	2.3	0.8
H.S. Graduate/GED	1.2	17.7	21.0	21.0
Some College, no Degree	6.5	61.4	43.6	41.5
Associate's Degree	28.6	14.6	17.6	11.2
Bachelor's Degree	51.7	4.0	12.3	24.1
Master's or Higher	11.9	0.8	3.2	1.4
Poverty and Public Assistance Receipt				
Poverty Rate	0.9	2.9	3.2	3.3
Percent receiving public assistance	5.1	22.3	35.0	7.2
Employment Hours and Earnings				
% Working 35 hours or more per week	61.1%	62.6%	76.8%	73.2%
Mean Annual Hours	1,701	1,696	1,760	1,852
Mean Annual Earnings	$70,846	$43,890	$31,472	$33,982

Source: American Community Survey, 2012, 2013, & 2014, Public Use Microdata Samples (PUMS) Data files; tabulations by Drexel University Center for Labor Markets and Policy.
*The total employment of EMTs is based on Massachusetts data but due to a smaller sample of EMTs in the 2012-14 ACS data for Massachusetts, the demographic and socioeconomic traits, and hours and earnings of EMTs are based on 2012-14 ACS data for New England.

and 61% had some college education without a degree. The educational attainment of medical assistants was quite dispersed. One in five medical assistants were high school graduates without any college education, 44% had some college education without a degree, 18% had an associate's degree and 12% had a bachelor's degree. EMTs are similarly dispersed across educational levels—21% high school graduates, 42% some college without a degree, 11% associate's degree, and 24% bachelor's degree.

The poverty rate among workers in these four occupations was very low, ranging from under 1% among RNs to about 3% among workers in the remaining three occupations. Reliance on public assistance (Medicaid, food stamps, SSI or cash public assistance income) was high among medical assistants (35%) and LPNs/LVNs (22%) but quite low among EMTs (7%) and RNs (5%). A majority of workers in each of the four occupations worked a full-time week (35+ hours per week). Three-quarters of medical assistants and EMTs and 61% of RNs and

LPNs/LVNs worked full-time during the 12 months preceding the ACS surveys. The mean annual hours of work was 1,700 hours among RNs and LPNs/LVNs, 1,760 hours among medical assistants, and 1,852 hours among EMTs. Workers in these occupations were employed quite intensively during the year with their annual hours close to a full-time and year-round schedule (35 hours per week for 50 weeks per year; 35*50=1,750 hours per year). The annual earnings of workers in these occupations were quite different ranging from $70,800 among RNs and $43,900 among LPNs/LVNs to $34,000 among EMTs and $31,500 among medical assistants. These earnings differentials reflect differences in the educational attainment of workers employed in these occupations.

Abilities, Knowledge, Skills, and Behavioral Characteristics

A comparison of the five highest-rated abilities, knowledge areas, skills, and behavioral characteristics and the relevance scores for RNs, LPNs/LVNs, medical assistants, and EMTs are presented in Tables 7 and 8. As described in a previous section, the relevance score is the product (IM*LV) of the mean importance rating (IM) and the mean level rating (LV) assigned to the element in the O*NET database by incumbent workers in the occupation and by occupational experts and analysts. The relevance score (IM*LV) ranges from 1-35 for abilities, knowledge, and skills domains. Behavioral and personal traits were just rated for importance on a scale of 1-5, and not for level.

The findings show similarities between the top five abilities of RN and LPN/LVN occupations, albeit on each ability the IM*LV relevance score is higher for the RN occupation than for the LPN/LVN occupation. Four out of the top five abilities are common to both occupations. The reasoning ability is different; the RN occupation has inductive reasoning as the third highest ability requirement with a 19.5 relevance score (IM*LV) while the LPN/LVN

Table 7: Top Five Abilities, Knowledge Areas, Skills and Behavioral Traits for Selected Job Zone Three Occupations

Registered Nurses		**Licensed Practical & Licensed Vocational Nurses**	
Job Zone 3		Job Zone 3	
Elements	**Score**	**Elements**	**Score**
Abilities (IM*LV score, scale 1-35)			
Problem Sensitivity	20.6	Oral Comprehension	16.0
Oral Comprehension	19.6	Oral Expression	16.0
Inductive Reasoning	19.5	Problem Sensitivity	16.0

Registered Nurses		Licensed Practical & Licensed Vocational Nurses	
Job Zone 3		Job Zone 3	
Elements	**Score**	**Elements**	**Score**
Oral Expression	19.0	Written Comprehension	16.0
Written Comprehension	17.0	Deductive Reasoning	14.6
Knowledge Areas (IM*LV score, scale 1-35)			
Psychology	24.7	Customer and Personal Service	23.5
Customer and Personal Service	22.0	Psychology	23.2
Medicine and Dentistry	17.9	Medicine and Dentistry	19.7
Therapy and Counseling	17.1	English Language	15.6
Education and Training	15.9	Therapy and Counseling	14.9
Skills (IM*LV score, scale 1-35)			
Social Perceptiveness	18.0	Service Orientation	16.5
Reading Comprehension	16.5	Speaking	16.0
Active Listening	16.5	Social Perceptiveness	16.0
Speaking	16.0	Active Listening	15.5
Service Orientation	16.0	Critical Thinking	15.5
Behavioral Characteristics (IM score, scale 1-5)			
Attention to Detail	4.8	Dependability	4.8
Integrity	4.8	Attention to Detail	4.8
Cooperation	4.7	Self-Control	4.8
Stress Tolerance	4.7	Integrity	4.8
Dependability	4.6	Stress Tolerance	4.7

Source: O*NET 20.1 Database, Released October 2015; tabulations by Drexel University Center for Labor Markets and Policy.

occupation has deductive reasoning as the fifth highest ranked ability requirement with a 14.6 relevance score (IM*LV). Inductive reasoning ability is the ability to combine pieces of information to *form* general rules, representing a more complex ability in comparison to deductive reasoning which is defined as the ability to *apply* general rules to specific problems.

The top five required knowledge areas for the RN and LPN/LVN occupations show considerable overlap, as well. Four out of the five top knowledge areas are common to the RN and the LPN/LVN occupations. The only non-overlapping knowledge areas are education and training among RNs and English language among LPNs/LVNs. There is also considerable overlap between the top skills and behavioral characteristics of RNs and LPNs/LVNs. However, similar to the abilities scores, the IM*LV scores on the top five skills is higher for the RN occupation than for the LPN/LVN occupation.

For the medical assistant occupation, the top five abilities include oral and written comprehension, oral expression, problem sensitivity, and near vision. These abilities match most of the job functions of medical assistants including taking vital signs and obtaining other

information from the patient in preparation for their visit with the provider. The highest rated knowledge requirement for the medical assistant occupation is customer and personal service (IM*LV=21) followed by knowledge of clerical tasks, medicine, the English language, and computers and electronics. Speaking, reading, active listening, social perceptiveness and critical thinking skills are key skill requirements for the medical assistant occupation. The most important behavioral traits for medical assistants are similar to those of most occupations—dependability, integrity, cooperation, and self-control. Attention to detail is one trait that is not as common across all occupations but is among the top five important behavioral and personal traits for the medical assistant occupation.

The top ranking ability requirements for the EMT and paramedics occupation include problem sensitivity, oral comprehension and expression, and inductive and deductive reasoning. Individuals employed in this occupation have strong knowledge requirements based on their higher IM*LV scores for the top five knowledge elements—customer and personal service, medicine, English language, education and training and public safety. The work of EMTs and paramedics requires critical thinking, listening, speaking, coordinating, and active learning skills. Besides the three behavioral traits that are among the most important personal traits across most occupations—integrity, self-control, and dependability—concern for others and stress tolerance rise among the most important behavioral and personal traits for individuals employed as EMTs and paramedics.

Table 8: Top Five Abilities, Knowledge Areas, Skills and Behavioral Traits for Selected Job Zone Three Occupations

Medical Assistants		**Emergency Medical Technicians and Paramedics**	
Job Zone 3		Job Zone 3	
Elements	**Score**	**Elements**	**Score**
Abilities (IM*LV score, scale 1-35)			
Oral Comprehension	16.5	Problem Sensitivity	17.0
Oral Expression	14.5	Oral Comprehension	16.5
Problem Sensitivity	14.0	Oral Expression	16.5
Written Comprehension	14.0	Deductive Reasoning	16.0
Near Vision	13.1	Inductive Reasoning	16.0
Knowledge Areas (IM*LV score, scale 1-35)			
Customer and Personal Service	21.1	Customer and Personal Service	28.2
Clerical	14.1	Medicine and Dentistry	21.5
Medicine and Dentistry	14.0	English Language	21.0

English Language	13.2	Education and Training	20.6
Computers and Electronics	12.9	Public Safety and Security	19.8
Skills (IM*LV score, scale 1-35)			
Speaking	16.0	Critical Thinking	16.0
Reading Comprehension	15.1	Active Listening	15.1
Active Listening	15.1	Speaking	15.1
Social Perceptiveness	14.0	Coordination	15.1
Critical Thinking	13.6	Active Learning	14.5
Behavioral Characteristics (IM score, scale 1-5)			
Attention to Detail	4.8	Concern for Others	4.7
Dependability	4.8	Stress Tolerance	4.7
Integrity	4.7	Integrity	4.7
Cooperation	4.5	Self-Control	4.7
Self-Control	4.5	Dependability	4.7

Source: O*NET 20.1 Database, Released October 2015; tabulations by Drexel University Center for Labor Markets and Policy.

Job Zone Four Occupations: Social and Community Service Managers, Social and Human Service Assistants, and Community Health Workers, Health Educators and other Social Service Specialists

The third occupation group profiled in this paper includes the following three occupations that are classified as Job Zone Four occupations in the O*NET database: social and community service managers, social and human service assistants, and community health workers/heath educators/other social service specialists. According to the O*NET description, Job Zone Four occupations require considerable preparation. Most of Job Zone Four occupations require a four-year bachelor's degree as well as a considerable amount of work-related skill, knowledge, and experience. Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training. All three occupations are closely connected with community-based organizations. The rise in community-based health care is expected to increase the importance of these occupations in the delivery of health care in Massachusetts.

Social and community service managers plan, direct, and coordinate the activities of social service programs and community outreach organizations. They oversee the program or organization's budget and policies regarding participant involvement, program requirements, and benefits. Their work may involve directing and supervising social workers, counselors, or probation officers. In 2012-14, Massachusetts had about 6,400 workers that were employed as social and community service managers in the health care industry, up from just 2,810 in the year

2000, representing a sharp increase of nearly 3,600 or 128% (Table 1). Nationwide, employment in this occupation is projected to increase by 10% between 2014 and 2024, slightly higher than the 7% projected increase in total employment over the same time period.

The second occupation in this group of Job Zone Four occupations consists of social and human service assistants. Individuals employed in this occupation assist in providing client services, including support for families, in a wide variety of fields, such as psychology, rehabilitation, and social work. They assist other workers, such as social workers, and help clients find benefits or community services. According to 2012-14 ACS data there were 2,665 social and human service assistants employed in the Massachusetts health care industry (Table 1). The 2000 decennial census data did not identify the social and human service assistant occupation separately. Therefore, we could not measure employment growth in this occupation over the 2000 to 2012-14 period. However, national employment projections reveal above average employment growth for this occupation. The nationwide employment of social and human service assistants is projected to grow by 11% between 2014 and 2024.

Occupational classification in the ACS includes the community health worker (CHW) occupation along with health educators and miscellaneous social service specialist occupations. In 2012-14, among workers in the health care industry, just 679 workers in Massachusetts, 1,760 in New England, and 30,844 workers across the nation were employed in this occupational group. We could not measure the change in employment of CHWs, health educators and miscellaneous social service specialist occupations since 2000 because a comparable occupation or occupational group is not available in the occupational classification of the 2000 decennial census data. However, national employment projections for the CHW and health educator occupation reveal a bright outlook. Employment in these occupations is projected to grow by 13% between 2014 and 2024.

According to the standard occupational classification, CHWs assist individuals and communities to adopt healthy behaviors. They conduct outreach for medical personnel or health organizations to implement programs in the community that promote, maintain, and improve individual and community health. They may provide information on available resources, provide social support and informal counseling, and advocate for individuals and community health needs. The CHW occupation is often combined with the health educator occupation. Health

educators collect and analyze data to identify community needs prior to planning, implementing, monitoring, and evaluating programs designed to encourage healthy lifestyles, policies, and environments. Health educators teach people about behaviors that promote wellness. They develop and implement strategies to improve individual and community health.

The employment of workers in these three occupations across the four health care industry sectors in Massachusetts is presented in Table 9 and reveals that each of the three occupations had a large share of employment in the individual and family services sector. Among social and community service managers more than eight out of ten were employed in the individual and family services industry and another 15% worked in the nursing and residential care sector in 2012-14. Social and human service assistants were also concentrated in the individual and family services sector. Two-thirds of these workers were employed in the individual and family services sector, 17% worked in the ambulatory care sector in outpatient care settings and home care providers, and 8% to 9% were employed in hospitals and the nursing and residential care sector. Among community health workers, health educators and other social service specialists, over half were employed in the individual and family services sector and the other half were spread across the remaining three sectors of the health care industry: ambulatory care including physicians' offices and other ambulatory care providers (27%), hospitals (11%) and nursing and residential care facilities (7%).

Table 9: Percentage Distribution of Health Care Industry Workers Employed in Selected Job Zone Four Occupations by Health Care Industry Sector, Massachusetts, 2012-14

Health Care Industry Sector	Social and Community Service Managers*	Social and Human Service Assistants*	Community Health Workers, Health Educators, Other Social Service Specialists**	Total Health Care Industry Employment
Employment in Massachusetts	6,404	2,665	679	540,554
Percentage Distribution by Health Care Industry Sector				
Ambulatory Care	1%	17%	27%	34%
Hospitals	1%	9%	11%	40%
Nursing & Res. Care Facilities	15%	8%	7%	16%
Individual and Family Services	82%	66%	54%	10%

Source: 2012-2013-2014 American Community Survey PUMS Data (Public Use Micro Data Samples); Tabulations by Drexel University Center for Labor Markets and Policy.

* The total employment for these occupations is based on 2012-14 ACS data for Massachusetts. However, due to a smaller sample size in the 2012-14 ACS data for Massachusetts, the industry distribution of workers in these occupations is based on 2012-14 ACS data for New England.
** The total employment for this occupation is based on 2012-14 ACS data for Massachusetts. However, due to a smaller sample size in the 2012-14 ACS data for Massachusetts and New England, the industry distribution of workers in this occupation is based on 2012-14 ACS data for the U.S.

Demographic and Socioeconomic Traits, Hours of Employment and Earnings

Each of the three occupations was predominantly staffed with women (72% to 77%). White workers accounted for three-quarters of social and community service managers, two-thirds of social and human service assistants and 56% of CHWs and health educators. Black and Hispanic workers respectively comprised 20% and 16% of CHWs and health educators, 12% and 16% of social and human service assistants, and 10% and 9% of social and community service managers. The nativity status of workers in the three occupations was quite similar. The majority of workers were native-born. Only between 10% and 13% of workers in these occupations were born abroad.

The social and community service manager workforce was much older; nearly 55% of these workers were 45 years and older, compared to 40% of social and human service assistants, and 37% of CHWs and health educators. In 2012-14, the share of workers under 35 years old was twice as large among CHWs/health educators and social and human service assistants as it was among social and human service managers (42% versus 20%).

Table 10: Percentage Distribution of Health Care Industry Workers Employed in Selected Job Zone Four Occupations by their Demographic and Socioeconomic Characteristics and their Employment Hours and Earnings, Massachusetts, 2012-14

	Social and Community Service Managers*	Social and Human Service Assistants*	CHWs, Health Educators, Other Social Service Specialists**
Employment in Massachusetts, 2012-14	6,404	2,665	679
Job Zone Classification	4	4	4
Gender			
Male	26.4%	23.4%	28.5%
Female	73.6	76.6	71.5
Race-Ethnicity			
White	76.5%	66.9%	55.9%
Black	10.3	12.2	20.0
Hispanic	9.0	15.6	16.2
Other Races	4.2	5.3	7.9
Nativity			
Foreign-Born	12.4%	10.2%	13.2%
Native Born	87.6	89.8	86.8

	Social and Community Service Managers*	Social and Human Service Assistants*	CHWs, Health Educators, Other Social Service Specialists**
Age			
Under 25	2.7%	15.1%	12.2%
25-34	17.3	26.8	30.2
35-44	25.7	18.3	20.7
45-54	21.9	26.0	17.3
55+	32.5	13.8	19.5
Educational Attainment			
<12 or 12, No H.S. Diploma	0.5%	4.7%	2.5%
H.S. Graduate/GED	7.3	10.3	13.1
Some College, no Degree	15.6	33.5	25.4
Associate's Degree	6.4	11.6	10.8
Bachelor's Degree	37.1	33.1	31.3
Master's or Higher	33.2	6.9	16.9
Poverty and Public Assistance Receipt			
Poverty Rate	1.6%	9.6%	8.2%
Percent receiving public assistance	9.1	26.4	22.7
Employment Hours and Earnings			
% Working 35 hours or more per week	84.6%	66.2%	73.8%
Mean Annual Hours	2,017	1,559	1,707
Mean Annual Earnings	$60,245	$27,039	$31,165

Source: American Community Surveys, 2012, 2013, & 2014, Public Use Microdata Samples (PUMS) Data files; tabulations by Drexel University Center for Labor Markets and Policy.
*The total employment for these occupations is for Massachusetts. However, due to a smaller sample size for Massachusetts, their demographic & socioeconomic traits, hours, and earnings are based on New England data.
**The total employment for this occupation is for Massachusetts. However, due to a smaller sample size for Massachusetts & New England, their demographic & socioeconomic traits, hours, and earnings are based on U.S. data.

All three occupations are classified in the O*NET data in Job Zone Four which consists of occupations requiring considerable levels of education, training, and experience. The educational attainment of workers in these Job Zone Four occupations reveals high shares of college graduates. Over 70% of social and community service managers held a college degree; 37% had a bachelor's degree, and another third had a master's degree or higher. College-educated workers (bachelor's or higher) comprised nearly one-half of CHWs and health educators and 40% of social and human service assistants employed in the health care industry.

The 2012-14 economic status of workers across these three occupations varied widely. Social and community service managers were employed quite intensively; 85% worked in full-time jobs averaging over 2,000 hours per year with mean earnings of $60,200. The poverty rate among social and community service managers was very low (1.6%), and 9% reported receipt of public assistance in the form of Medicaid, food stamps, SSI or cash public assistance income.

Among CHWs and health educators, work over the year was somewhat less intensive than social and community service managers: 74% were employed on a full-time basis with 1,700 mean annual hours of work yielding mean earnings of $31,200 per year. The poverty rate was a little higher (8%) among CHWs and health educators, as was reliance on public assistance, 23%. Health care workers employed as social and human service assistants had much lower work intensity and earnings, and much higher rates of poverty and receipt of public assistance. Only two-thirds of workers in this occupation worked a full-time work week, yielding 1,560 mean hours of work during the year. With mean annual earnings of just $27,000, the poverty rate of social and human service assistants was 10%, and over 26% relied on one or more of the following four sources of public assistance-Medicaid, food stamps, SSI, or cash public assistance income.

Abilities, Knowledge, Skills, and Behavioral Characteristics

A comparison of the five highest-rated abilities, knowledge areas, skills, and behavioral characteristics and the relevance score for the three Job Zone Four occupations are presented in Table 11. As described in a previous section, the relevance score is the product (IM*LV) of the mean importance rating (IM) and the mean level rating (LV) assigned to the element in the O*NET database by incumbent workers in the occupation and by occupational experts and analysts. The relevance score (IM*LV) ranges from 1-35 for abilities, knowledge areas, and skills domains. Behavioral and personal traits were just rated for importance on a scale of 1-5, and not for level.

The findings show that three out of five top rated abilities were common to all three occupations: oral expression, speech clarity and oral comprehension, representing the importance of oral communication in these occupations. The IM*LV scores that represent the relevance of these abilities to the performance of work in these occupations are much higher among social and community service managers than among social and human service assistants or CHWs.

Table 11: Top Five Abilities, Knowledge Areas, Skills and Behavioral Traits for Selected Job Zone Four Occupations

Social and Community Service Managers		**Social and Human Service Assistants**		**Community Health Workers**	
Job Zone 4		Job Zone 4		Job Zone 4	
Elements	**Score**	**Elements**	**Score**	**Elements**	**Score**
Abilities (IM*LV score, scale 1-35)					
Oral Comprehension	19.7	Oral Expression	16.5	Oral Comprehension	16.5
Oral Expression	19.7	Oral Comprehension	15.5	Oral Expression	16.0
Speech Clarity	19.7	Problem Sensitivity	15.1	Speech Clarity	14.6
Written Comprehension	17.5	Speech Clarity	14.6	Written Comprehension	14.6
Deductive Reasoning	17.0	Written Expression	14.6	Problem Sensitivity	14.1
Knowledge Areas (IM*LV score, scale 1-35)					
Customer and Personal Service	26.5	Psychology	23.2	Customer and Personal Service	24.2
Psychology	21.6	Customer and Personal Service	21.3	Education and Training	17.4
Therapy and Counseling	20.6	Therapy and Counseling	19.5	Clerical	16.1
English Language	20.0	English Language	15.7	Psychology	15.5
Administration and Management	19.8	Sociology and Anthropology	14.3	Administration and Management	14.9
Skills (IM*LV score, scale 1-35)					
Active Listening	19.1	Social Perceptiveness	17.5	Social Perceptiveness	17.5
Social Perceptiveness	19.0	Active Listening	16.0	Active Listening	16.5
Speaking	18.0	Speaking	16.0	Speaking	16.5
Time Management	18.0	Service Orientation	16.0	Reading Comprehension	15.5
Management of Personnel Resources	18.0	Writing	14.1	Writing	15.5
Behavioral Characteristics (IM score, scale 1-5)					
Integrity	4.9	Integrity	4.9	Dependability	4.7
Dependability	4.7	Dependability	4.7	Integrity	4.7
Concern for Others	4.6	Self-Control	4.7	Cooperation	4.6
Cooperation	4.6	Concern for Others	4.6	Independence	4.5
Leadership	4.5	Cooperation	4.6	Adaptability/Flexibility	4.5

Source: O*NET 20.1 Database, Released October 2015; tabulations by Drexel University Center for Labor Markets and Policy.

Customer and personal service and psychology rank among the top five knowledge areas for all three occupations. Knowledge of therapy and counseling and the English language are important to social and community service managers and social and human service assistants while education and training and clerical knowledge stand among the top five knowledge areas for community health workers. The fifth highest IM*LV scoring knowledge area consists of administration and management among social and community service managers and community health workers, and the knowledge of sociology and anthropology among social and human service assistants.

Three out of the five top skill requirements—active listening, social perceptiveness, and speaking skills—are common to the three occupations. These skills are very important and are performed at high levels by workers employed in these three occupations. Additionally, social and community service managers require time management and human resource management skills. Similar to most occupations, integrity, dependability, and cooperation are among the five most important behavioral traits for each of the three occupations. Leadership traits are important to social and community service managers while independence and adaptability/flexibility are among the five most important behavioral and personal traits for CHWs.

Job Zone Five Occupations: Social Workers, Medical and Health Services Managers, Physical Therapists, Occupational Therapists, Physician Assistants, and Nurse Practitioners

The final group of occupations profiled in this paper consists of the following six occupations that are classified by O*NET as Job Zone Five occupations: social workers, medical and health services managers, physical therapists, occupational therapists, physician assistants, and nurse practitioners. O*NET defines Job Zone Five occupations as needing extensive preparation and high levels of education and training. Most occupations in Job Zone Five require graduate school education; for example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree). Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.

Social workers in the health care sector provide individuals and families with psychosocial support to cope with chronic, acute, or terminal illnesses. They provide a wide variety of services including advising family care givers, providing patient education and counseling, and making referrals to other services. Social workers may also provide case management or interventions designed to promote health, prevent disease and address barriers to health care. Between 2000 and 2012-14, employment of social workers in Massachusetts increased from 12,400 to 19,000, representing an increase of 54% (Table 1). National employment projections of social workers by the BLS show faster than average growth for the future. Employment of social workers is projected to increase by 12% between 2014 and 2024.

Medical and health service managers plan, direct, or coordinate medical and health services in facilities such as hospitals, clinics, managed care organizations, public health agencies, and other similar organizations. In 2012-14 there were 18,500 medical and health service managers in Massachusetts, up from 14,200 in 2000, representing an increase of 30% (Table 1). The BLS projects a 17% increase in the employment of medical and health service managers in the nation between 2014 and 2024; a rate of growth that is more than two times the projected growth in employment across all occupations (7%) over the same 10-year time period.

Physical therapists assess, plan, organize and participate in rehabilitative programs that improve mobility, relieve pain, increase strength, and improve or correct disabling conditions resulting from disease or injury. Between 2000 and 2012-14, the number of physical therapists employed in Massachusetts increased from 5,130 to 6,850; increasing by 1,720 or 34%. Employment of physical therapists is expected to increase sharply as the demand for physical therapy services increases with aging baby boomers and increased problems in mobility from chronic conditions such as obesity and diabetes. The BLS projects employment of physical therapists to grow by 34% between 2014 and 2024.

Occupational therapists treat injured, sick, or disabled patients through therapeutic use of everyday activities. They help patients develop, recover and restore, or improve vocational, homemaking, or daily living skills and general independence. Although small in number, the occupational therapist workforce in Massachusetts has increased by 59% from 1,760 workers in 2000 to 2,800 in 2012-14 (Table 1). Employment of occupational therapists is projected to grow rapidly. The BLS projects a 27% increase nationwide in the employment of occupational therapists between 2014 and 2024.

The last two Job Zone Five occupations that are profiled in this paper, physician assistants (PAs) and nurse practitioners (NPs) are often called advanced practitioners. The passage of Chapter 224 as well as the Affordable Care Act and the focus on health care cost containment has raised the prominence of advanced practitioners as they increasingly examine, diagnose and treat patients under the supervision of a physician, thereby releasing the time of these physicians to perform other duties at the top of their license.

Physician assistants (PAs) provide some of the health care services that are typically performed by a physician, under the supervision of a physician. They conduct complete

physicals, provide treatment, and counsel patients. They may also in some cases prescribe medication. They practice medicine on teams with physicians, surgeons, and other health care workers. Physician assistants must graduate from an accredited program for physician assistants and are required to be licensed. Although still small in number, PA employment in Massachusetts grew sharply between 2000 and 2012-14, from 1,575 to 2,720, representing a growth of 1,146 PAs or 73%. Employment projections by the BLS point to a much faster than average rate of employment growth in the PA occupation. Between 2014 and 2024, the BLS projects PA employment in the nation to increase by 30%.

Nurse Practitioners (NPs), also referred to as advanced practice registered nurses (APRNs), must be registered nurses who have specialized graduate education. They must also be licensed in their state and pass a national certification exam. NPs coordinate patient care and may provide primary and specialty health care. NPs may order, perform, or interpret diagnostic tests such as lab work or x-rays and may prescribe medicine. NPs could provide care independently or as part of a team. Their scope of practice varies across states. In Massachusetts, NPs are restricted to practice under physician supervision and are not allowed to practice independently. Since the NP occupation was merged in with the RN occupation in 2000 it is not possible to measure employment growth in the NP occupation between 2000 and 2012-14. However, the NP occupation was identified separately on the 2012-14 ACS surveys which found 4,290 employed NPs in Massachusetts. According to national employment projections, NP employment is projected to grow very rapidly, from 170,400 in 2014 to 224,000 in 2014, representing an increase of 31%; a rate of employment growth that is over 4 times faster than the overall employment growth projection of 7% over the same time period.

A distribution of the employment of workers in the six Job Zone Five occupations across the four sectors of the health care industry is presented in Tables 12 and 13. Health care industry employment presented in Table 12 reveals that about half of workers employed as social workers in the Massachusetts health care industry were employed in the individual and family services sector, 19% in hospitals, 17% in nursing and residential care facilities, and 15% in the ambulatory care sector. Medical and health service managers, in contrast, had no employment in the individual and family services sector. One half of these workers were employed in hospitals, 39% worked in the ambulatory care sector, and the remaining 11% were employed in nursing homes and other residential care facilities. Physical and occupational therapists were more likely

to work in ambulatory care settings or hospitals; nearly 80% of workers in these two occupations were employed in these two sectors (Table 12).

Table 12: Percentage Distribution of Health Care Industry Workers Employed in Selected Job Zone Five Occupations by Health Care Industry Sector, Massachusetts, 2012-14

Health Care Industry Sector	Social Workers	Medical and Health Services Managers	Physical Therapists*	Occupational Therapists*	Total Health Care Industry Employment
Total Employment in Massachusetts, 2012-14 average	19,046	18,495	6,849	2,805	540,554
Percentage Distribution by Health Care Industry Sector					
Ambulatory Care	15%	39%	54%	40%	34%
Hospitals	19%	50%	29%	40%	40%
Nursing and Residential Care Facilities	17%	11%	14%	15%	16%
Individual and Family Services	49%	0%	2%	6%	10%

Source: 2012-2013-2014 American Community Survey PUMS Data (Public Use Micro Data Samples); Tabulations by Drexel University Center for Labor Markets and Policy.
* The total employment for these occupations is for Massachusetts. However, due to a smaller sample size in the 2012-14 ACS data for Massachusetts, the industry distribution of these occupations is based on 2012-14 ACS data for New England.

Distribution of the employment of PAs and NPs across health care sectors is presented in Table 13. NPs were highly concentrated (58%) in the ambulatory care sector, working in physician's offices and other settings to provide care under physician supervision. Almost all of the remaining NPs worked in hospitals (39%). Physician assistants also had a large share of employment hospitals (54%) and the ambulatory care sector (44%).

Table 13: Percentage Distribution of Health Care Industry Workers Employed in Selected Job Zone Five Occupations by Health Care Industry Sector, Massachusetts, 2012-14

Health Care Industry Sector	Physician Assistants*	Nurse Practitioners, Midwives*	Total Health Care Industry Employment
Total Employment in Massachusetts, 2012-14 average	2,721	4,288	540,554
Percentage Distribution by Health Care Industry Sector			
Ambulatory Care	44%	58%	34%
Hospitals	54%	39%	40%
Nursing and Residential Care Facilities	1%	2%	16%

Individual and Family Services	1%	1%	10%

Source: 2012-2013-2014 American Community Survey PUMS Data (Public Use Micro Data Samples); Tabulations by Drexel University Center for Labor Markets and Policy.
* The total employment for these occupations is for Massachusetts. However, due to a smaller sample size in the 2012-14 ACS data for Massachusetts, the industry distribution for these occupations is based on 2012-14 ACS data for New England.

Demographic and Socioeconomic Traits, Hours of Employment and Earnings

Although a large majority of these six Job Zone Five health care occupations were staffed by women, the female share of workers differs somewhat in each occupation. Physician assistants had the smallest share of female workers (65%) while NPs and occupational therapists consisted of almost all females (94%). Female workers comprised 72% of medical and health service managers, 76% of physical therapists, and 81% of social workers in the health care industry (Table 14).

An examination of the race-ethnicity of workers employed in these occupations reveals that in 2012-14, over nine out of ten workers employed as physical or occupational therapists, PAs or NPs were White. The White share of the workforce employed as medical and health services managers and social workers was relatively smaller; 81% and 77%, respectively. Nearly 11% of the state's social workers in the health care industry were staffed by Black workers, and another 10% by Hispanic workers. The medical and health service manager workforce consisted of 8% Black workers and 5% Hispanic workers. Physical and occupational therapists as well as PAs and NPs had small shares of non-White workers. The share of foreign-born workers ranged from 14% among social workers and medical and health service managers, 9% among NPs, and between 5% and 6% of physical and occupational therapists and PAs.

NPs, social workers, and medical and health service managers were much older than PTs, OTs, and PAs. Nearly one in three NPs, 28% of medical and health service managers, and one-quarter of social workers were 55 years and older; considerably larger than the 13% to 15% share of 55+ workers among the two therapist occupations (PT and OT) and PAs. At the other end of the age spectrum, workers employed as social workers had a large share under age 35 compared to the other five occupations in Table 14. The under 35 population comprised 38% of social workers, 34% of PAs, 28-30% of occupational and physical therapists, 24% of NPs, and less than 22% of medical and health service managers.

As noted above, occupations classified in Job Zone Five need extensive preparation and high levels of education and training, and extensive skills, knowledge, and experience. In fact, employers of workers in most Job Zone Five occupations assume that the employee will already have the required skills, knowledge, work-related experience, and/or training.

A look at the educational attainment of workers in the six Job Zone Five occupations presented in Table 14 reveal very high levels of education among them. Almost all NPs had a master's degree or higher level of education (94%) and only 3% had just a bachelor's degree. Among PAs, more than 61% had a master's degree or higher level of education and another 21% had just a bachelor's degree. A majority had a bachelor's degree or higher, although physical therapists were more likely than occupational therapists to have a graduate degree; 57% versus 45%, reflecting differences in the licensing requirements to practice in the two professions.

The educational attainment of medical and health service managers, while also quite high, was more dispersed. Two-thirds of medical and health service managers were college graduates; about equally distributed between bachelor's (32%) and graduate degrees (35%). About 9% had an associate's degree and 16% had completed some college without earning a degree or were working towards earning a degree. Among individuals employed as social workers nearly one-half had a graduate degree (48%), another 34% had a bachelor's level education, and 12% had completed some college education below the bachelor's degree level.

The poverty rate was very low among workers employed in these occupations, between 1% and 3.7%. Reliance on public assistance (Medicaid, food stamps, SSI or cash public

Table 14: Percentage Distribution of Health Care Industry Workers in Selected Job Zone Five Occupations by their Demographic and Socioeconomic Characteristics and their Employment Hours and Earnings, Massachusetts, 2012-14

	Social Workers	Medical and Health Services Managers	Physical Therapists*	Occupational Therapists*	Physician Assistants*	Nurse Practitioners, Midwives*
Employment in MA, 2012-14 average	19,046	18,495	6,849	2,805	2,721	4,288
Job Zone Classification	5	5	5	5	5	5
Percentage Distribution						
Gender						
Male	18.9	28.0	24.3	6.5	35.4	6.5
Female	81.1	72.0	75.7	93.5	64.6	93.5
Race-Ethnicity						
White	77.0	81.3	91.4	94.1	91.4	90.6

	Social Workers	Medical and Health Services Managers	Physical Therapists*	Occupational Therapists*	Physician Assistants*	Nurse Practitioners, Midwives*
Black	10.5	7.9	2.7	2.1	4.3	5.7
Hispanic	9.8	5.1	1.7	1.8	2.4	2.4
Other Races	2.7	5.8	4.2	2.0	1.8	1.2
Nativity						
Foreign-Born	13.3	13.7	5.8	4.6	6.0	9.3
Native Born	86.7	86.3	94.2	95.4	94.0	90.7
Age						
Under 25	7.2	1.4	1.8	2.3	6.1	0.5
25-34	30.8	21.0	26.0	28.4	27.5	23.4
35-44	16.9	20.9	33.2	35.7	25.4	17.8
45-54	20.3	28.8	24.7	20.3	24.6	26.4
55+	24.8	27.9	14.3	13.3	16.4	31.9
Educational Attainment						
No H.S. Diploma	0.3	0.4	0.2	0.0	0.0	0.3
H.S. Graduate/GED	5.4	8.7	2.5	1.6	4.8	0.6
Some College, no Degree	8.1	16.3	2.8	0.4	6.6	1.2
Associate's Degree	4.2	8.5	3.8	3.2	6.8	0.3
Bachelor's Degree	34.1	31.5	33.9	50.2	20.6	3.2
Master's or Higher	47.8	34.6	56.9	44.7	61.2	94.4
Poverty and Public Assistance Receipt						
Poverty Rate	2.5	1.7	1.2	2.6	3.7	0.0
Percent receiving public assistance	11.3	7.5	2.8	4.8	4.6	4.9
Employment Hours and Earnings						
% Working 35+ hours per week	78.1%	91.2%	68.7%	56.2%	78.9%	69.6%
Mean Annual Hours	1,866	2,089	1,775	1,611	1,895	1,804
Mean Annual Earnings	$43,766	$84,414	$67,560	$53,127	$86,216	$86,127

Source: American Community Surveys, 2012, 2013, & 2014, Public Use Microdata Samples (PUMS) Data files; tabulations by Drexel University Center for Labor Markets and Policy.

* The total employment for these occupations is for Massachusetts. However, due to a smaller ACS 2012-14 sample size for Massachusetts, the demographic & socioeconomic traits, hours and earnings of these occupations is based on New England data.

assistance income) varied across these occupations and was somewhat higher among social workers (11%) and medical and health service managers (7%) than workers in the remaining four occupations, among whom less than 5% had received public assistance.

The intensity of employment and the level of earnings of workers in these occupations reveals that the share of workers who usually worked a full-time week (35+ hours per week) during the 12 months preceding the 2012-14 ACS surveys varied from 56% among OTs and 70% among PTs and NPs, to 78% among social workers and PAs and 91% among medical and

health service managers. The variation in mean annual hours of work closely followed the variation in share of workers with a full-time workweek, ranging from 1,600 hours among OTs to nearly 2,100 hours among medical and health service managers. The mean annual hours of employment among PAs (1,890) and social workers (1,860) were slightly higher than the mean annual hours of employment among NPs (1,800) and PTs (1,775).

The mean annual earnings of NPs and PAs were about the same, $86,200, while the mean salary of medical and health service managers was slightly lower at $84,400. The mean annual earnings of PTs were $67,500 while OTs, who also worked fewer hours during the year, earned on average an annual salary of $53,100. Social workers had much lower mean annual earnings, $43,800, despite working on average 1,860 hours during the year, which amounts to full-time (35+ weekly hours) and year-round (50+ annual weeks) employment.

Abilities, Knowledge, Skills, and Behavioral Characteristics

A comparison of the five highest-rated abilities, knowledge areas, skills, and behavioral characteristics and the relevance score for the six Job Zone Five occupations are presented in sets of two occupations per table in Tables 15 through 17. As described in a previous section, the relevance score is the product (IM*LV) of the mean importance rating (IM) and the mean level rating (LV) assigned to the element in the O*NET database by incumbent workers in the occupation and by occupational experts and analysts. The relevance score (IM*LV) ranges from 1-35 for abilities, knowledge, and skills domains. Behavioral and personal traits were just rated for importance on a scale of 1-5, and not for level.

The top five abilities of the social worker occupation include oral comprehension and oral expression, representing the ability to communicate and comprehend oral communication. Social workers also need to be attuned to the problems of people. Problem sensitivity is among the top five abilities of social workers, as well as deductive reasoning which is the ability to apply general rules to specific problems, and written comprehension.

The relevance score of the top five knowledge areas required in performing the work tasks of social workers is very high. Therapy and counseling has an IM*LV score of 34.2 on a range of 35. The IM*LV score measures the importance of that knowledge and the level at which the knowledge is used on the job. Psychology ranks as the second highest knowledge area for social workers with an IM*LV score of 32. The knowledge of customer and personal service,

English language, as well as education and training are among the top five areas of knowledge required to perform the job of social workers.

Table 15: Top Five Abilities, Knowledge Areas, Skills and Behavioral Traits for Social Workers and Medical and Health Service Managers

Social Workers		**Medical and Health Service Managers**	
Job Zone 5		Job Zone 5	
Elements	**Score**	**Elements**	**Score**
Abilities (IM*LV score, scale 1-35)			
Oral Comprehension	18.5	Oral Comprehension	18.6
Oral Expression	18.0	Oral Expression	18.6
Problem Sensitivity	17.5	Written Comprehension	18.0
Deductive Reasoning	17.0	Written Expression	17.5
Written Comprehension	17.0	Problem Sensitivity	17.0
Knowledge Areas (IM*LV score, scale 1-35)			
Therapy and Counseling	34.2	Administration and Management	26.3
Psychology	32.1	Customer and Personal Service	23.8
Customer and Personal Service	27.2	Personnel and Human Resources	20.1
English Language	23.3	English Language	20.0
Education and Training	19.4	Economics and Accounting	18.8
Skills (IM*LV score, scale 1-35)			
Social Perceptiveness	21.6	Reading Comprehension	17.0
Active Listening	20.2	Speaking	17.0
Speaking	17.5	Coordination	16.5
Reading Comprehension	16.5	Active Listening	16.0
Critical Thinking	16.5	Critical Thinking	16.0
Behavioral Characteristics (IM score, scale 1-5)			
Concern for Others	5.0	Integrity	4.8
Integrity	4.9	Leadership	4.8
Dependability	4.9	Initiative	4.7
Cooperation	4.8	Dependability	4.7
Stress Tolerance	4.8	Stress Tolerance	4.5

Source: O*NET 20.1 Database, Released October 2015; tabulations by Drexel University Center for Labor Markets and Policy.

The skills most relevant to the work performed by social workers are social perceptiveness, active listening, speaking, reading comprehension and critical thinking. As noted in previous sections of this paper, the following four behavioral traits—integrity, dependability, cooperation, and self-control—rise among the five most important behavioral and personal traits for most occupations. In the case of social workers, besides integrity, dependability, and cooperation, concern for others is ranked number one in personal and behavioral traits with an importance score of 5 on a scale of 1-5. The trait of stress tolerance is also among the top five important behavioral and personal traits to effectively work as a social worker.

The top five abilities relevant to the occupation of medical and health service managers are oral and written comprehension and expression, and problem sensitivity. The list of top five abilities as well as the IM*LV scores associated with these abilities for medical and health service managers are very similar to that of social workers. However, unsurprisingly, the knowledge requirements of medical and health service managers are quite different from that of social workers. The top knowledge area for medical and health service managers is the knowledge of administration, followed by customer and personal service, and personnel and human resources management. Workers in the medical and health service manager occupation also need to have a good knowledge of Economics and Accounting, and the English language (Table 15).

The top five skills that are most relevant to the job of medical and health service managers include reading comprehension, speaking, coordination, active listening and critical thinking. The five most important behavioral and personal traits for the medical and health service manager occupation include leadership, initiative and stress tolerance; all traits that one would expect to perform well in a high level managerial position. Also important are the traits of integrity and dependability (Table 15).

Table 16 contains the top five abilities, knowledge, skills and behavioral traits for physical and occupational therapist occupations. The top five abilities required for effectively working in the PT and OT occupations are the same, albeit in a slightly different order. Four out of the top five knowledge areas are also common to both occupations. The knowledge of customer and personal service, therapy and counseling, psychology, and education and training are among the five most important knowledge areas for workers in the physical therapist and occupational therapist occupations. The one difference is medical knowledge which is among the top five knowledge areas for PTs but not for OTs. Instead, English language appears among the top five knowledge areas for OTs.

Considerable overlap is also evident in the top five skills and behavioral traits for the PT and OT occupations. Reading comprehension, speaking, active listening, and critical thinking skills are among the top five skills required to work in the physical therapist and occupational therapist occupations. Additionally in the top five skills is the skill of social perceptiveness among physical therapists, and monitoring skill among occupational therapists.

Table 16: Top Five Abilities, Knowledge Areas, Skills and Behavioral Traits for Physical Therapists and Occupational Therapists

Physical Therapists		**Occupational Therapists**	
Job Zone 5		Job Zone 5	
Elements	**Score**	**Elements**	**Score**
Abilities (IM*LV score, scale 1-35)			
Oral Expression	19.0	Problem Sensitivity	17.0
Inductive Reasoning	17.5	Deductive Reasoning	16.0
Oral Comprehension	17.5	Inductive Reasoning	16.0
Deductive Reasoning	17.0	Oral Comprehension	16.0
Problem Sensitivity	17.0	Oral Expression	16.0
Knowledge Areas (IM*LV score, scale 1-35)			
Customer and Personal Service	21.4	Psychology	26.6
Therapy and Counseling	20.0	Therapy and Counseling	26.6
Psychology	19.8	Education and Training	20.7
Medicine and Dentistry	19.2	English Language	18.4
Education and Training	19.1	Customer and Personal Service	17.9
Skills (IM*LV score, scale 1-35)			
Reading Comprehension	18.5	Critical Thinking	16.5
Speaking	16.5	Reading Comprehension	16.0
Active Listening	16.0	Active Listening	16.0
Critical Thinking	15.5	Speaking	16.0
Social Perceptiveness	15.5	Monitoring	16.0
Behavioral Characteristics (IM score, scale 1-5)			
Concern for Others	4.9	Integrity	5.0
Integrity	4.8	Adaptability/Flexibility	4.7
Social Orientation	4.7	Concern for Others	4.7
Dependability	4.7	Dependability	4.7
Self-Control	4.6	Self-Control	4.6

Source: O*NET 20.1 Database, Released October 2015; tabulations by Drexel University Center for Labor Markets and Policy.

The most important behavioral and personal traits for the PT and OT occupations are also quite similar. Integrity, dependability, concern for others and self-control traits are among the five most important behavioral and personal traits for these occupations. For PTs, the trait of social orientation is among the five most important traits and the adaptability/flexibility trait is among the top five traits for OTs.

Physician assistants and nurse practitioners have assumed an important role in the health care cost containment efforts after the passage of Chapter 224 and the Affordable Care Act. Roles of health care workers are changing in the direction of practicing at the top of their license. In Massachusetts, workers in these two advanced practitioner occupations practice at the top of their license by providing, under the supervision of a physician, primary care and other health

care services including examining, diagnosing and treating patients; services that were traditionally provided by physicians.

Table 17: Top Five Abilities, Knowledge Areas, Skills and Behavioral Traits for Physician Assistants and Nurse Practitioners

Physician Assistants		**Nurse Practitioners**	
Job Zone 5		Job Zone 5	
Elements	**Score**	**Elements**	**Score**
Abilities (IM*LV score, scale 1-35)			
Oral Comprehension	21.1	Oral Comprehension	21.3
Problem Sensitivity	19.5	Problem Sensitivity	21.1
Inductive Reasoning	19.0	Inductive Reasoning	20.1
Oral Expression	18.5	Written Comprehension	19.0
Deductive Reasoning	18.0	Oral Expression	18.0
Knowledge Areas (IM*LV score, scale 1-35)			
Medicine and Dentistry	28.4	Psychology	27.4
Psychology	24.1	Medicine and Dentistry	27.3
Biology	24.0	Therapy and Counseling	24.6
Therapy and Counseling	21.4	Customer and Personal Service	23.7
Customer and Personal Service	21.2	Biology	21.2
Skills (IM*LV score, scale 1-35)			
Reading Comprehension	20.1	Reading Comprehension	19.6
Critical Thinking	18.5	Active Listening	18.5
Active Listening	18.0	Social Perceptiveness	18.5
Social Perceptiveness	17.5	Critical Thinking	18.0
Speaking	17.5	Active Learning	17.0
Behavioral Characteristics (IM score, scale 1-5)			
Integrity	4.9	Integrity	4.9
Attention to Detail	4.7	Dependability	4.8
Concern for Others	4.7	Concern for Others	4.8
Dependability	4.6	Attention to Detail	4.8
Cooperation	4.5	Cooperation	4.6

Source: O*NET 20.1 Database, Released October 2015; tabulations by Drexel University Center for Labor Markets and Policy.

Table 17 presents the top five abilities, knowledge areas, skills, and behavioral/personal traits that are most important and relevant for PAs and NPs. The abilities of oral comprehension and oral expression as well as problem sensitivity are among the top five abilities for PAs and NPs. Inductive reasoning, which is the ability to combine pieces of information to *form* general rules, is also a required ability to perform work as a PA and NP. Deductive reasoning ability, the ability to *apply* general rules to specific problems, is among the top five abilities for PAs, whereas written comprehension rises to the top five abilities for NPs.

The same knowledge areas rank among the top five for PAs and NPs. However, for PAs, more scientific knowledge of medicine, psychology and biology rank at the top in that order, while the top three knowledge areas for NPs are psychology, medicine, and therapy and counseling, in that order. There is also a lot of overlap between the top five skills required to work as PAs and NPs. Four out of the top five skills are common to both occupations, albeit in a slightly different order—reading comprehension, critical thinking, active listening, and social perceptiveness skills. The most important behavioral and personal traits for the two occupations are the same—integrity, attention to detail, concern for others, dependability and cooperation. The importance score of each of the five behavioral and personal traits and the ranking of these traits are slightly different for the two occupations.