



# STATE OF THE HEALTHCARE WORKFORCE IN MASSACHUSETTS CHALLENGES, OPPORTUNITIES, AND FEDERAL FUNDING



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## LETTER FROM THE FUNDERS

The Barr Foundation, the Blue Cross Blue Shield of Massachusetts Foundation, the Boston Foundation, and the Tufts Health Plan Foundation joined with ADS Ventures and commissioned Jobs for the Future to examine how the Commonwealth can maximize federal resources on behalf of its residents, particularly low- and middle-income individuals. Jobs for the Future researched challenges and opportunities for the Commonwealth, and released an initial report in February 2015 that provided a short list of potential areas in which Massachusetts can receive new or increased reimbursement for ongoing programs. That report also identified previously untapped federal grant programs and sought to assist State House leaders in the design of an infrastructure that will more effectively import federal resources while exporting Massachusetts' public policy innovations.

Since the initial report, JFF has developed two subsequent reports. The second report in the series, issued separately, focuses on another critical topic for low- and middle-income residents, juvenile justice reform, and resources that the Commonwealth can access to help support these efforts. This report, the third in the series, addresses the healthcare workforce, an industry that provides career opportunities across the state for low- and middle-income residents.

All three reports are intended as the beginning of a conversation, and we are encouraged that the Legislature has already signaled its willingness to participate. Both the House and Senate have created committees on intergovernmental affairs, and we hope that this research and the discussion it engenders will be a valuable tool to these committees as they work to address the opportunities and challenges moving forward. In addition, Massachusetts has long been the beneficiary of a federal delegation in the U.S. Congress that has been the most effective and influential in the nation. We continue to have outsized influence due to the talent of the current delegation in Washington D.C., and this asset can and should be fully utilized by ensuring that the state has the necessary resources and infrastructure.

While all three reports focus on how our state legislature can better partner with the federal government, the process reminds us how important it is for government to partner effectively with philanthropy. Philanthropy has the ability to take on issues in a nonpartisan, nonpolitical manner in order to foster a conversation around a shared goal—improving the lives of the people in the Commonwealth we call home. We are all rightfully proud of our state, but we share the challenge of providing resources and opportunity to those whom our economic recovery is leaving behind. It is our hope that working together we can ensure that Massachusetts maximizes every opportunity to provide the services our residents deserve.



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# I. INTRODUCTION

This report is the third in a series designed to highlight potential ways for the Commonwealth of Massachusetts (the Commonwealth) to work more effectively with the federal government. The first report in this series, entitled “Maximizing Federal Support and Opportunity for the Commonwealth of Massachusetts,” examined a number of opportunities by which Massachusetts might work with the federal government to receive additional federal funding, more effectively utilize existing funding, or improve efficiencies in various state-federal partnerships. In contrast to the first report, this report focuses on the healthcare workforce, based on its importance to the Commonwealth’s overall economy, as well as opportunities that careers in healthcare can provide low-income and lower-skilled youth and adults. It identifies opportunities for enhancing programs that are supported with federal resources; additional federal resources that can support healthcare workforce development, education, and training; and other potential strategies for addressing healthcare workforce challenges.

The Commonwealth is fortunate to have a variety of strong leaders who have been working intensively on healthcare workforce challenges since the early 2000s with many significant accomplishments to show for their efforts. This paper highlights the promising work the state has already done, and proposes solutions that can build on and expand this work where possible.



The 2016 presidential and congressional elections took place prior to the release of this report. The priorities of the incoming Administration and Congress and their impact on specific federal funding opportunities cannot yet be fully determined. In the meantime, the report's recommendations remain current.

JFF spoke with a wide array of healthcare industry stakeholders as it prepared this report, and is very appreciative of their input. While this information was helpful, the recommendations presented in this report are JFF's own conclusions regarding workforce challenges and opportunities facing the healthcare industry.

This paper is divided into three sections. The first describes the Commonwealth's healthcare industry. It explains in detail challenges such as the increasing demand for healthcare workers, skills gaps facing the industry, and the importance of diversifying the workforce. The second section outlines specific workforce challenges, describes existing efforts underway aimed at addressing those challenges, and makes recommendations to build on these efforts. The third identifies several specific federal funding sources that can help address healthcare workforce challenges in the state. This section is not designed to be comprehensive, but illustrative of some of the federal funding sources that could be used to address healthcare workforce challenges in the state.

## SETTING THE STAGE: OVERVIEW OF THE HEALTHCARE INDUSTRY

Since the mid-1990s, the healthcare industry has confronted labor challenges driven by an aging workforce rapidly approaching retirement age, an increasingly diverse population, and demand for care that is predicted to expand as the large baby boom population ages. The average age of a nurse in Massachusetts was 45 years old in 2010<sup>1</sup> compared to the Commonwealth's median workforce age of 42 (2007).<sup>2</sup> The "healthcare support" occupation (including most healthcare aides and orderlies such as certified nursing assistants, home health aides, and medical assistants) was the oldest of any occupation in Massachusetts with 13 percent over the age of 60.<sup>3</sup> Workers over 45 years of

age represent 43.4 of the healthcare workforce.<sup>4</sup> Meanwhile, every day between 2011 and 2030, 10,000 new baby boomers turned or will turn 65.<sup>5</sup> Baby boomers comprise 26 percent of the total U.S. population. Because people consume the majority of healthcare services as they age,<sup>6</sup> demand is widely predicted to increase as this cohort ages.

Healthcare reform has caused rapid transformation of the industry, altering the business of healthcare and its service delivery models. Best understood through the lens of the Institute for Healthcare Improvement's (IHI) Triple Aim,<sup>7</sup> reform intends to improve health, reduce costs, and increase patient satisfaction. While healthcare organizations formerly competed based on market share, they are now increasingly competing based on their ability to control costs and improve quality.<sup>8</sup> As a result, consolidations are increasing as organizations seek to manage the health of larger patient populations and leverage lower costs from vendors. Reimbursement for care delivery is changing from fee for service, which incentivized additional services, to managed care (sometimes called value-based care), which incentivizes keeping populations healthy.

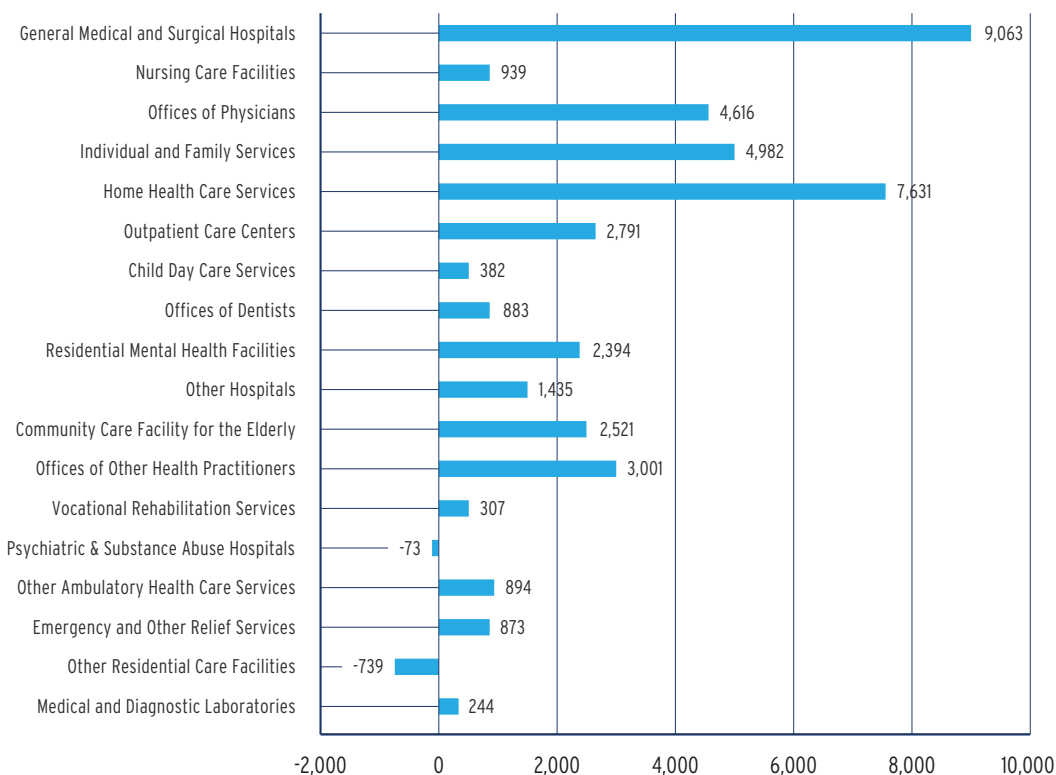
The laws and regulations guiding the healthcare industry may change significantly in the next few years, based in part on the results of the recent presidential and congressional elections. This includes the potential repeal and replacement of some or all of the Affordable Care Act. While these changes are to still to be determined, controlling costs appears to be a key goal for many elected officials. For this reason, the IHI's Triple Aim appears to still be in play and driving the healthcare market toward managed care.

From a workforce perspective, the demand for the types of workers needed is beginning to shift. Demand is increasing for workers who provide care in reduced-cost settings such as primary, long-term, or home-based care. Demand is also increasing for workers who can impact population health (care coordinators, behavioral health workers, and workers who can manage and analyze large health data sets) or efficiency (anesthesia technicians, quality coordinators).

## II. CURRENT STATE OF THE HEALTHCARE INDUSTRY IN MASSACHUSETTS

### INCREASING LONG-TERM DEMAND FOR HEALTHCARE WORKERS

Like other states across the country, Massachusetts has and will continue to face growing demand for healthcare workers. Recent history shows how important the industry has been to the Commonwealth's economy. Between 2007 and 2011, employment in the healthcare and social services sector increased by over 42,000 jobs, more than any other industry in Massachusetts and during a time when the Commonwealth shed 45,000 jobs overall. The following chart displays changes within industry groups in the sector between 2007 and 2011. The largest growing segments include hospitals, home health, and behavioral health (i.e., "general medical and surgical hospitals, home health services, and individual and family services").<sup>9</sup>



**Figure 1. Changes in the Number of Jobs within Healthcare Industry Groups, 2007-2011**

Source: Commonwealth Corporation and Massachusetts Department of Higher Education, "Massachusetts Healthcare Chartbook", 2013

By 2016, Massachusetts' <sup>10</sup> healthcare practitioner and support occupations (81 total occupations) accounted for 10.6 percent (or 424,219) of the total 4 million jobs in the state. <sup>11</sup>

This trend is expected to continue. Healthcare occupations in Massachusetts are expected to grow 14.1 percent between 2015 and 2020, slightly outpacing the national healthcare growth rate of 12.6 percent. Healthcare occupations in the state are also expected to grow more than 8 percent faster than the average growth rate for all occupations through 2020 (14 percent for healthcare versus 5.5 percent for all occupations). The state's fastest growing subsectors, in terms of employment growth, are in healthcare (home healthcare services, services for the elderly and persons with disabilities, and general medical and surgical hospitals).

Table 1 shows the top healthcare industry subsectors (4-digit NAICS) by projected employment. <sup>12,13</sup>

Massachusetts' top three fastest growing occupations fall into the healthcare sector (personal care aides, registered nurses, and home health aides). The largest healthcare occupation by far is registered nurses, accounting for 24 percent of the total sub-master's level healthcare workforce in 2015. However, as others have mentioned, <sup>14</sup> the direct care workforce—nursing assistants, personal care aides, home health aides, and medical assistants—make up 37 percent of the sub-master's level healthcare

workforce and are among the fastest growing occupations in all of healthcare. See Table 2 for the Top 10 Occupations by Employment, where the typical education requirement is below a master's level. <sup>15</sup> For additional information on healthcare job opportunities at varying levels of education requirements, please refer to tables in the appendix, "Opportunities at a Wide Variety of Educational Requirements".

In the healthcare industry, average earnings overall total \$63,070 per worker, with nearly 80 percent of the workforce comprised of women. Only two of the top 10 occupations typically require less than a high school diploma and pay less than \$13 per hour on average. However, these two occupations, personal care and home health aides, are the two jobs expected to experience the highest growth through 2020. Many of these workers are employed in settings that provide less expensive care than hospitals, such as long-term care, primary care, or home-based care. For this reason, employers indicate that the direct care worker growth rate may increase as payment and quality reforms occurring in Massachusetts come online and emphasize direct care services provided by primary and long-term care organizations.

Recent attention has focused on the recruitment and retention of the direct care workforce, focusing on the low pay, difficult working conditions, and the vulnerable status of the poor, largely immigrant workforce. <sup>16</sup> Direct care workers, especially personal care and home care aides, are largely women aged

**Table 1. Top 5 Healthcare Industry Subsectors by Projected Employment**

SUBSECTOR	2015 JOBS	2020 JOBS	% CHANGE
General Medical & Surgical Hospitals	164,254	180,415	10%
Individuals & Family Services	91,204	114,168	25%
Office of Physicians	60,430	64,348	7%
Nursing Care Facilities (Skilled Nursing Facilities)	55,035	58,203	6%
Home Health Care Services	41,131	52,869	29%



**Table 2. Top 10 Occupations by Employment (Sub-Master's Degree Only)**

OCCUPATION	2015 JOBS	2015-2020 % CHANGE	AVG. HOURLY EARNINGS	TYPICAL MINIMUM EDUCATION
Registered Nurses	83,930	13%	\$41.35	Bachelor's Degree <sup>18</sup>
Nursing Assistants	42,806	10%	\$14.48	Postsecondary non-degree award
Personal Care Aides	42,475	33%	\$12.44	Less than high school
Home Health Aides	26,152	34%	\$12.78	Less than high school
Licensed Practical & Licensed Vocational Nurses	17,352	11%	\$25.78	High school diploma or equivalent
Medical Assistants	17,017	10%	\$17.97	Postsecondary non-degree award
Pharmacy Technicians	8,722	3%	\$15.29	High school diploma or equivalent
Dental Assistants	7,712	10%	\$20.21	Postsecondary non-degree award
Psychiatric Technicians	7,263	5%	\$18.29	Postsecondary non-degree award
Emergency Medical Technicians & Paramedics	6,975	13%	\$19.55	Postsecondary non-degree award

25-54, a demographic projected to decline 7 percent between 2006 and 2011.<sup>17</sup> More than half of direct care workers have a high school degree or less. Nearly half live in households earning less than 200 percent of the federal poverty level and receive some form of public assistance.

## INCREASING AND EVOLVING SKILLS GAPS AFFECT CARE DELIVERY

In addition to projections showing an increasing demand for healthcare workers, the industry consistently faces skills shortages within its current workforce. Payment and quality reforms are currently exacerbating this issue. A few examples<sup>19</sup> of skill shortages include:

- The nearly 7,500 Massachusetts nurses requiring additional education to gain their baccalaureate and help the state approach the 80 percent baccalaureate nurse recommendation from the Institute of Medicine.<sup>20</sup>
- Health information technology workers needing to keep pace with constantly evolving health IT projects. According to the Health Information Management Society's 2014 Workforce Survey, nearly 70 percent of providers nationwide said that the lack of qualified talent was the biggest challenge to achieving a fully staffed department, and 30 percent said they scaled back or put an IT project on hold due to a shortage.<sup>21</sup> Health IT skills gaps are broadening as once sought-after skills become outdated. New required skills

include data science, analytics, cybersecurity, and consumer engagement. These skill shortages are more pronounced in smaller and/or underresourced organizations such as community health centers or rural hospitals.

- Medical assistants who are increasingly asked to take on new roles. Medical assistants are considered one of the most rapidly transforming occupations in healthcare.<sup>22</sup> As primary care practices increasingly move into population health management, they are turning to medical assistants to take on health coaching, managing disease registries, and providing patient education.

Key workforce stakeholders in the state have taken critical steps to enhance the skills of the current workforce. In early 2015, the Commonwealth Corporation issued \$12.5 million in training grants primarily to healthcare employers across Massachusetts.<sup>23</sup> The vast majority of these funds are being used to upgrade the skills of existing employees to meet the needs of the rapidly evolving

healthcare service delivery system. These projects range from improving skills of staff being exposed to behavioral and medical health integration to updating medical assistants' skills so they can provide better and more uniform patient care.

## DIVERSIFYING THE WORKFORCE

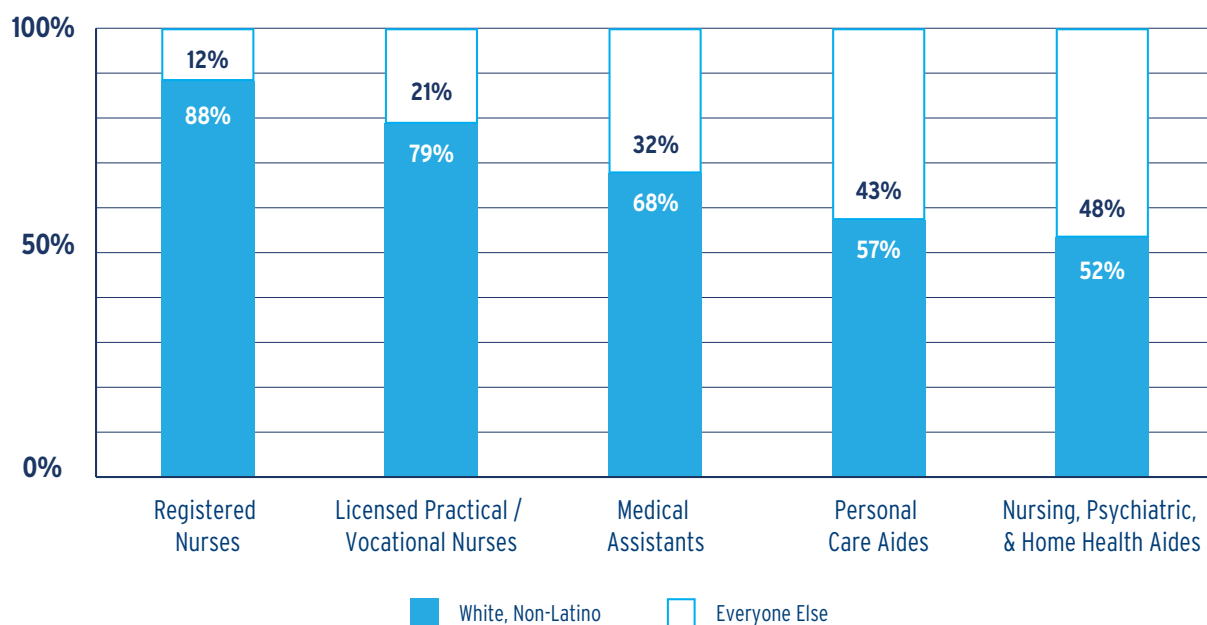
Because Massachusetts' labor force and patient population is diversifying, the industry must diversify as well. Massachusetts is the fastest growing state in the Northeast, projected to grow by almost 12 percent by 2035, a total of 771,000 new residents.<sup>24</sup> The factors driving this growth include more births than deaths and more migrants into Massachusetts than those leaving. As in other fast-growing regions across the country, the non-white portion of Massachusetts' population is growing faster than the white portion and will account for all of the population growth through 2020. See the appendix for a table of estimated demographic changes for Massachusetts from 2015-2020.

**Table 3. Current (2016) Race/Ethnicity Breakdown of Massachusetts Healthcare Workforce**

RACE / ETHNICITY	2016 WORKFORCE	2016 % OF WORKFORCE
White, Non-Hispanic	322,348	74%
White, Hispanic	26,759	6%
Black, Non-Hispanic	60,153	14%
Asian, Non-Hispanic	23,157	5%
Two or More Races	4,120	1%
American Indian or Alaskan Native	N / A	N / A
Native Hawaiian or Pacific Islander	N / A	N / A

**Figure 2. Workforce Diversity by Healthcare Occupation, Massachusetts**

Percent Latino or Non-White



In 2015, the Commonwealth's population was 74 percent white, non-Hispanic, and 26 percent people of color. Table 3 shows the diversity of Massachusetts' healthcare workforce in 2016.<sup>25</sup>

The Massachusetts' healthcare workforce appears to mirror the diversity of the Commonwealth's population, but upon closer examination it is clear that much of this diversity is concentrated at lower-skilled positions. Figure 2 breaks out 2010 nursing and direct care occupations by white-non Hispanic and non-white.<sup>26</sup> The direct care workforce is significantly more diverse than the nursing workforce, which remains predominantly white.

It's important to understand Massachusetts' growing diversity for two reasons. First, because the non-white component of the population is growing faster than the white population, non-whites are making up a growing portion of the labor force over time. For this reason, it will become increasingly important for the healthcare industry to recruit and retain non-white workers.

Second, increasing the diversity of Massachusetts' workforce at all education levels will help ensure the workforce better resembles the linguistic and cultural diversity of the patient population. Diverse providers are more likely to increase access and improve patient satisfaction.<sup>27</sup> Most educators agree that cultural competency is best learned in diverse working environments that reflect the diversity of patients.<sup>28</sup> Furthermore, when patients observe staff of different racial and ethnic backgrounds working collaboratively, they see that the organization is a safe place where all values and beliefs are respected and appreciated.<sup>29</sup> For these reasons, recruiting and promoting a diverse healthcare workforce is a priority for a broad host of organizations including the American Hospital Association, the National Association of Community Health Centers, all national nursing associations, and many others.<sup>30</sup>



### III. SPECIFIC WORKFORCE CHALLENGES

Massachusetts is fortunate to have an active workforce community that has invested considerable resources to help address the healthcare workforce challenges facing the state's industry. Some of these initiatives are highlighted in each of the following sections. These existing efforts provide a strong platform on which more can be built.

Massachusetts is not alone in facing the challenges described; every state in the nation faces these to some degree. These challenges point to the need for a range of strategies affecting new and existing workers all along the career continuum. Youth and other new workers will need to gain the necessary skills required to work in the healthcare field, while frontline healthcare workers need career advancement strategies that will help them move into more skilled positions. To help them be successful, both populations need clear advancement pathways, improved career navigation, and better readiness for college-level coursework and healthcare careers. Meeting these challenges will require enhanced levels of coordination between the education communities, workforce development providers, unions, and employers.

## ENSURING A WORKFORCE FOR THE FUTURE

Given the estimated increase in healthcare positions for the foreseeable future, the industry requires a steady pipeline of young, adequately trained, increasingly diverse individuals who are prepared for these future jobs. However, after a period of sustained growth of high school graduates, Massachusetts' declining number of births will create a 9 percent drop in high school graduates between 2009 and 2020. The number of white students will drop by 15 percent. The number of Asian/Pacific Islander and Hispanic graduates will grow, but not enough to meet the gap.<sup>31</sup>

Massachusetts' science, technology, engineering, and math (STEM) reforms are focused on boosting students' academic abilities. The STEM emphasis on science, math, and analytical reasoning provides important foundational skills for future healthcare workers. For this reason, primary and secondary school investments in successful STEM strategies positively impact the ability of students to become healthcare workers.

The Governor's STEM Council has helped organize the Commonwealth's efforts to address some of these challenges by setting goals related to ensuring an adequate number of competent workers in the STEM fields, and is measuring progress toward achieving those goals.<sup>32</sup> This has led to overall increases in student interest in STEM fields, improved math and science academic achievement,<sup>33</sup> and increases in the number of students achieving postsecondary STEM degrees or certificates. Massachusetts' public school students consistently outperform students from other states and most countries in math and science.<sup>34</sup>

While there has been progress, none of the state's STEM goals were achieved in 2016, and some of the indicators underlying these measures are concerning, particularly to the healthcare industry.

In 2014, 16 percent of SAT test-takers indicated the health professions was their first choice of college major (though relatively unchanged from 2009). Of these, 22 percent of African Americans chose the health professions, 18 percent of Hispanics, and 18 percent of Asians. African-American and Latino SAT test-takers were more interested in healthcare professions than all other STEM fields.<sup>35</sup>

However, Massachusetts high schools reporting the highest level of interest in STEM fields have the lowest levels of academic performance (Massachusetts' STEM Goals track this by tenth grade math achievement)—these schools often are largely composed of populations underrepresented in STEM fields. Further, African-American and Latino students' math and science proficiency is lower than their white and Asian peers by up to 35 percent.<sup>36</sup>

## ACCOMPLISHMENTS TO BUILD ON

A multitude of programs and policies, supported by state and private investments, have made significant improvements in Massachusetts. These programs have ensured high-quality STEM instruction, ensured opportunities to begin pursuing healthcare careers and related postsecondary instruction while in high school, and provided an intensive introduction to STEM fields for those transitioning between high school and college.

**Massachusetts vocational technical schools** are considered among the best in the country.<sup>37</sup> State law requires every school district to offer vocational technical education, embeds this instruction within the overall state academic standards, makes explicit the connection between the academic standards and the occupation (e.g., a math lesson within a health sciences context), and connects instruction to career pathways that result in industry-recognized credentials. Massachusetts vocational technical students have a lower dropout rate than the state average, higher overall performance on the Massachusetts Comprehensive Assessment System test, and more than half of the graduates go on to pursue postsecondary education.

**The Massachusetts Math and Science Partnership** (MMSP) has provided intensive, high-quality professional development to almost 4,000 elementary, middle, and high school teachers through partnerships between their school districts and local university faculty with content expertise. These partnerships resulted in almost 450 math and/or science professional development courses. Almost 70 percent of participating teachers worked at "high-needs schools"<sup>38</sup> (low-performing schools based on grades and graduation rates).<sup>39</sup> As described earlier, non-white students at high-needs schools are quite interested in healthcare careers, but are often underprepared to successfully pursue them.

Massachusetts makes use of the **Dual Enrollment Partnership**, which provides opportunities for high school students to take college-level courses free of charge and simultaneously earn high school and college credit. Students in good standing may take any course of three credits or more that qualifies under the MassTransfer Gen Ed Foundation (math, English, humanities, or science), or within the disciplines of computer science, technology or engineering. Dual enrollment results in a 16 percent better college enrollment rate and a 50 percent reduction in remedial instruction. Research also shows that high school students earning at least 12 college credits while in high school, in both academic courses required for further college study and in technical courses, are more likely to enter college, persist, and complete a postsecondary degree or credential.<sup>40</sup>

**The Pathways to Prosperity Network** works with four Early College High School partnerships in Massachusetts (in the Brockton, Marlborough, and West Springfield school districts, as well as Charlestown High School). Early College High Schools enable more students, particularly low-income and minority students, to experience rigorous high school and college coursework that leads to improved outcomes. These schools, in close partnership with local colleges or universities, offer curriculum and instruction aligned with college standards, student-centered learning environments, proximity to a local college that allows students to take courses on campus, and the ability to simultaneously earn high school and college credit. For example, in Brockton, Marlborough, and West Springfield, the partnerships are in the advanced stages of building out existing Pathways to Prosperity work by developing integrated and fully supported career pathways, aligned with labor market demand, in grades 9 through 14. Early college students are outperforming their peers nationwide.<sup>41</sup>

- 90 percent graduate high school vs. 78 percent of students nationally;
- 94 percent earn free college credit while in high school; and
- 30 percent earn an associate's degree or other postsecondary credential while in high school.

Those high school students (and others) that choose to begin their postsecondary education at a community college campus have access to the **STEM Starter Academy**. This Academy uses a variety of interventions (dependent on the particular college) to increase student awareness, readiness, retention, and completion in STEM programs of study, including the health professions.

STEM Starter Academies have directly served over 6,000 people in the first two years of the program and continue to attract new participants despite funding cuts in the second year. Seventy percent of the below-baccalaureate degrees and certificates awarded to Academy participants have been in a STEM field, compared to 45 percent of the statewide total STEM degrees and certificates.<sup>42</sup>

## RECOMMENDED STRATEGIES

To ensure a well-trained and diverse future workforce, the healthcare industry requires achievable pathways into healthcare careers for a wide variety of students. Massachusetts has strong programs and policies aimed at helping students access healthcare career paths, serving as building blocks for further improvement. These programs should be strengthened and scaled—to expand the pool of health workforce candidates, to reach more students, and to ensure graduates' skills match employers' needs—while aligning them more closely with specific industry sectors.

### Dual Enrollment/Early College High Schools

The Commonwealth can broaden and sustain access to dual enrollment in career-aligned courses through dedicated funding streams and other state-level supports.

While the full Early College High School model may not be scalable across the Commonwealth, certain elements of the model can boost college success and improve the healthcare professions pipeline. For example, broadening dual enrollment beyond the MassTransfer Gen Ed Foundation and computer science courses could increase its impact among high school students able to enroll in college directly after high school by enabling them to pursue health professions certificates. Washington State's version of dual enrollment, called Running Start, allows high school students to take any college course



without paying tuition. One program in Washington, called Bright Future,<sup>43</sup> uses Running Start to help at-risk high school students pursue technical certificates while in high school. Coupling intensive case management with academic support, in 2013, 85 percent of Bright Future students completed high school and 69 percent earned a college certificate upon high school graduation. Two-thirds of these students pursued certificates in the health professions.

Broadening dual enrollment in this manner would require improving linkages between the program and appropriate career pathway information. Ideally career pathway information would map healthcare (and other) pathways backwards beginning with labor market information and ending with an aligned course sequence that stacks toward a secondary credential. As described earlier, existing early college programs have coursework aligned to healthcare and other industry sectors. They provide a compelling, research-based model upon which the Commonwealth can build.

For example, dual enrollment can reach more students by developing targeted early college models for students who are underrepresented in higher-skilled healthcare jobs. These can be placed on firmer financial footing if the state dedicated funds and targeted special appropriations for these programs. The Commonwealth should allow both districts and postsecondary institutions to claim per-pupil funding allocations to guide dual enrollment policy. Finally, high school students who complete college courses should be counted as indicators of college success in performance-based funding formulas for higher education.

### Work-Based Learning

The Commonwealth can promote expanded access to work-based learning experiences that benefit both youth and healthcare employers.

Work-based learning integrates academic learning with real-world experiences to allow young people the opportunity to apply classroom lessons in real-world settings. Because providing work-based learning experiences in the healthcare setting can be challenging, working closely with healthcare employers while building this strategy is important. Privacy regulations and liability concerns can create barriers to incorporating high school students into

the workplace. Providing the staff necessary to coordinate these experiences can be challenging in this increasingly cost-conscious industry. Perhaps the biggest challenge is how the unrelenting pace of change impacts healthcare officials' ability to take on new ventures.

### Health IT Careers

High school students would also benefit by being exposed to and prepared for growing and interesting health information technology careers. The growing use of electronic health records has created significant opportunities for health organizations to collect and analyze patient data in new ways to improve care. However, the field is new and occupations are evolving. Today, health IT jobs focus on:

- Developing and maintaining hardware technologies;
- Designing and using databases; and
- Using and interpreting data to improve healthcare.

High schools interested in this field could partner with local healthcare organizations to learn about these careers, create opportunities for students to explore them, and develop educational pathways that would rapidly accelerate students' ability to begin these careers.

## ACCESSIBLE CAREER PATHWAYS FOR ADULTS

### College for Working Adults

In 2012, the Boston Healthcare Careers Consortium shared a view in their report, *Critical Collaboration: Improving Education and Training Pathways to Careers in Healthcare*, that is popular within the healthcare industry and largely relevant today:

*People who are already working in healthcare are one of the most important sources of potential workers for critical vacancies within the healthcare system. Many healthcare providers like to promote from within, as this enables them to advance those employees who have already demonstrated soft skills, knowledge of the workplace culture, specific linguistic skills or other desirable skills, and avoids the costs associated with onboarding new employees.*<sup>44</sup>

Community colleges have long been helping healthcare workers (and other working adults) advance their careers. Nationally, 44 percent of all community college students and 35 percent of full-time students are 25 years of age or older.<sup>45</sup> Almost 70 percent of community college students work, and nearly one-third both work and have children.

In a comprehensive literature review, Wendy Erisman and Patricia Steele found that the majority of adult learners drop out of college for personal, not academic reasons. Over half cite difficulties balancing school, work, other adult commitments, and finances.<sup>46</sup>

Ruffalo Noel Levitz annually measures adult student satisfaction with community colleges (using a national sample).<sup>47</sup> The 2015-16 study highlighted areas that colleges could address to enhance student satisfaction, confirming and expanding upon Erisman and Steele's findings:

- Pacing studies to fit life and work schedules;
- Employing advisors knowledgeable about program requirements;
- Offering sufficient available courses each term;
- Allowing credit for prior learning (students with prior learning credits are 2.5 times more likely to persist to graduation and saved up to 4.5 months of time earning their associate degrees<sup>48</sup>); and
- Providing adequate information about financial aid.

In Massachusetts, "adult students persist in their studies and earn credit at lower rates than younger students, most likely due to competing family and job related pressures."<sup>49</sup>

As described in *Critical Collaboration*, healthcare employers are concerned that their employees juggle work and school schedules by taking courses at multiple community colleges in an attempt to balance personal schedules while fulfilling prerequisite degree requirements. According to the Massachusetts Board of Higher Education Transfer Advisory Group, 30 percent of community college students transfer between community colleges.<sup>50</sup> Other studies have found that 13 to 25 percent of community college students are enrolled simultaneously in more than one community college

during the academic career.<sup>51,52</sup> Stakeholders interviewed for this study shared concerns that their employees are having to retake courses because transferability for required health sciences prerequisites outside the MassTransfer Gen Ed Foundation is not abundantly clear.

In addition to *how* instruction is offered, its worth examining *what* instruction is offered. In career pathway programs, schools offer stackable certificates, a sequence of certificates tied to employer-recognized credentials that can be accumulated over time and move an individual up a career pathway.

Healthcare is often used as an example of an industry with stackable certificates and career pathways, particularly the nursing pathway: nursing assistant; licensed practical nurse; and associate degree nurse/registered nurse. Nursing is a well known, respected, and well-paying profession and many people are interested in it. However, there are challenges to this pathway that can raise barriers for some adult workers. Healthcare workers attempting to access this pathway with a non-nursing healthcare certificate can be required to retake similar courses. For example, the education requirements for medical assisting are different than the nursing requirements: medical assisting requires a survey-level course of anatomy and physiology, while nursing requires anatomy and physiology with a lab. For this reason, medical assistant transfers often must begin with few, if any, nursing prerequisite courses waived (and must take the full anatomy and physiology course with lab).

For working adults with no prior postsecondary education, the nursing academic pathway can be a challenge. The prerequisites required for associate degree nursing programs can take up to a year of full-time study to complete, and require intensive math and science preparation. Most full-time nursing programs recommend students work no more than 16 hours per week, a recommendation backed by research.<sup>53</sup> Many Massachusetts' community colleges offer part-time nursing programs, but even part-time students will face a significant reduction in working hours and income. Finally, nursing education requires clinical education—experiential training that helps students incorporate classroom lessons in real-world settings. Students may not be

paid during this training and clinical education spots can be scarce, resulting in even less flexibility and unpredictability in schedules.

Because of the popularity and prevalence of the nursing pathway, some employees lack awareness and/or information about other healthcare pathway options. They may need help learning about the other pathways available to them.

## ACCOMPLISHMENTS TO BUILD ON

**Accessibility.** Community colleges have been and are continuing to address the accessibility of their programs for working adults. All schools offer online/hybrid options for their most popular courses, making these courses more accessible for some students. Some schools offer weekend or evening versions of their programs, which can help working students who need more direction and/or help to be successful. However, most colleges charge additional fees to participating students, making it more difficult for those most in need of the additional flexibility.

**Ability to Benefit.** For many low-skilled adults, financial assistance is the key to making postsecondary education feasible, but most financial aid requires a high school credential. However, the federal Ability to Benefit financial aid program (see more information on page 23) provides the necessary financial assistance to students without a high school credential who pursue programs designed to help them be successful. A number of community college programs in Massachusetts are taking advantage of the Ability to Benefit provision. These programs offer innovative strategies that enable lower-skilled students to enroll in adult and postsecondary education simultaneously, so they can begin to earn postsecondary occupational credit at the same time they are developing basic educational and English language skills. These co-enrollment strategies minimize the time required to earn credentials that meet employers' skill needs. Recent studies show that students in these programs outperformed similar students in earning college credits and certificates, and in persisting to program completion and good jobs.<sup>54</sup>

## The MassTransfer<sup>55</sup> Pathways initiative and common course numbering projects in

Massachusetts are helping standardize course requirements and make it easier for community college transfer students to identify equivalent courses between state community colleges and universities.

**Internal Resources.** Several healthcare organizations are using internal resources (or leveraging internal resources to gain external funding) to develop career pathways for internal, entry-level healthcare workers. For example, Partners HealthCare is a not-for-profit healthcare system that includes community and specialty hospitals, a managed care organization, a physician network, community health centers, home care and other health-related entities.

Recognizing that advancement in healthcare typically requires postsecondary education credentials, senior leaders at Partners HealthCare championed the development of a series of programs under its Advancing Careers through Education (ACE) initiative, focusing on reducing barriers and expanding access to higher education for employees. ACE activities include: outreach and information for employees; coaching for career, educational, and financial planning; college readiness programming including on-site College Placement testing and preparation for online learning through their innovative Online College Preparation Program; and longitudinal, active coaching support for employees enrolled in online college-level work through initiatives developed with higher education partners.

The initiative, now in its seventh year, has been very successful in engaging employees and has been expanded to include all interested employees across the network to advance in non-clinical as well as clinical roles. There were 182 employees enrolled in one of the four formal ACE program offerings in calendar year 2013. Of these:

- 60 percent completed college readiness programs;
- 22 percent gained college credits; and
- 13 percent are on track to complete an associate degree program within three years.

All participants are receiving support to complete their career goals and have been given study plans and additional coaching to expedite their progress.

**The Department of Higher Education funded two projects aimed at creating career pathways for the direct care workforce** in 2015. The first, headed by Worcester State University, UMass Memorial Health Care (UMMHC), and the State Healthcare and Research Employees' Union (SHARE), will create seamless academic and career pathways for direct care workers to progress in their careers through higher levels of education. Worcester State University will incentivize UMMHC employees to participate in the programming by offering: credits for prior learning and work experience; a comprehensive suite of support services to promote recruitment, retention, and completion; and other methods for progression through the program.

The second grant was awarded to a consortium of 13 healthcare and postsecondary organizations headed by the University of Massachusetts Medical School to create a competency-based, employer-codified curriculum with stackable academic pathways from certificate to baccalaureate levels, with a full suite of wraparound and support services.

**TAACCCT.** Massachusetts' community colleges were awarded two Trade Adjustment Assistance Community College and Career Training grants, in 2011 and 2014, to develop industry-aligned programs for adults. Several community colleges developed career pathway programs in healthcare as a result, working in collaboration with local employers. Some of these programs helped to create greater access to healthcare certificate and degree programs through a variety of mechanisms. For example, Middlesex Community College has mapped healthcare programs to make an education pathway tool that simply but effectively helps students navigate the courses they need to complete certificates, then shows how those certificates stack to degrees.

Another strategy used in the TAACCCT grants is to create articulations between noncredit and credit-bearing programs. Quinsigamond Community College has aligned for- and noncredit curricula wherever possible so that noncredit students can easily articulate into credit programs as their academic goals evolve.

## RECOMMENDED STRATEGIES

**Creating and marketing additional career paths for direct care and other adult workers.** Part of the Quality Jobs discussion around the direct care workforce, highlighted by the Massachusetts' Senior Care Association's report, *Quality Jobs for Quality Care: The Path to a Living Wage for Nursing Home Workers*, includes career progression opportunities for these workers. Direct care workers face low pay and difficult working conditions, contributing to high turnover among these workers. Recruiting and retention would be easier if employers were able to offer pathways into higher-paying, higher-skilled jobs. With these pathways, employers could market careers, not simply jobs. Developing career pathways for this workforce to move into higher-skilled jobs is a critical component of quality jobs. Nursing is an obvious career pathway, but as discussed previously, nursing is a rewarding career with high demand and is challenging to pursue. More options are needed, and they need to be publicized.

For example, medical assistants could benefit from learning about alternative pathways. Compared to other direct care workers, medical assistants face unique challenges moving into nursing careers. They are a little different than other direct care workers because have they have typically completed a one-year college certificate, while other direct care occupations require much less preparation. Typical medical assisting prerequisites and courses do not articulate into nursing. This is a barrier created by the certification and regulatory bodies of medical assisting and nursing and is not within the power of individual colleges to address.

Healthcare reform is creating new career paths. Identifying and publicizing these career paths, coupled with career guidance will help improve their accessibility for medical assistants and other direct care workers. As described earlier, health information technology is a rapidly growing field that offers a variety of interesting careers.<sup>56</sup> Incumbents in these positions maintain electronic health records and have the ability to extract health information from these records. In Massachusetts there are over 6,000 jobs in this category, projected to grow almost 10 percent by 2020. The average wage is \$18.72 per hour. Experienced health information technicians expand in their roles to become involved in staff education, workflow design, and, with additional education, analytics.

The Commonwealth can help create and market additional career paths by working with healthcare industry stakeholders and education and training providers to identify healthcare career pathways for targeted healthcare occupations, especially in the quality and health IT fields. The Commonwealth Corporation can play a lead role in this effort given its deep experience and success in developing sector strategies in a range of industries.

**Improving transferability between community colleges courses.** MassTransfer is currently being revised to improve its ability to help college students transfer between public colleges and universities. However, the state's community colleges also need to improve transferability between health sciences prerequisites. Efforts to standardize this work with the state universities should create a structure on which to build.

One way to help reduce problems with ineligible transferred courses is to develop a common core for allied health programs. A core curriculum is a set of interdisciplinary courses and experiences designed to provide allied health students at different levels of education with the common knowledge, skills, and abilities necessary to perform their job effectively.<sup>57</sup> A core curriculum:<sup>58</sup>

- Exposes students to a wider variety of career options;
- Better prepares students for the rigor of health profession programs, improving retention and completion rates;
- Improves mastery in their discipline; and
- Provides a vehicle to integrate developmental education into career pathways.

As envisioned by the Department of Higher Education's Allied Health Workforce Development Plan,<sup>59</sup> a statewide core could bring together existing core competencies in Massachusetts, be competency-based, and align with employer needs. JFF supports DHE's strong vision of a statewide core, and recommends that the Commonwealth take the next steps for developing these critical competencies. National efforts, supported by the TAACCCT initiative, provide curricula upon which to expand. The Health Professions Pathway Program, under the leadership of El Centro College, has helped 33 colleges across the United States develop common core curricula for allied health.<sup>60</sup>

### **Creating resources that maximize students' capacity to pursue Ability to Benefit (ATB).**

Massachusetts has a number of successful programs and statewide initiatives that offer healthcare (and other) career pathways, build students' foundational skills in the context of technical training, and offer accelerated access to credentials and employment. With ATB, a far greater number of Massachusetts' residents without a high school credential may be able to gain access to these programs. A variety of other initiatives, including the new Career Readiness Initiative in the Executive Office of Labor and Workforce Development, are designed to build foundational skills in preparation for career training and employment. The potential these programs have to broaden access to postsecondary education and training can be enhanced with a structured link to the ATB provision.

In order to assist Massachusetts' residents in successful use of ATB, the Commonwealth could develop and publicize a list of current healthcare (and other) career pathways programs serving students without a high school credential in college-level courses. DHE could develop this list, then work with these programs to develop strategies to increase Free Application for Federal Student Aid (FAFSA) completion and submission rates to increase the number of eligible students receiving federal financial aid through Pell benefits.

## **Developmental Education**

For some adults, the lack of foundational skills is a barrier to launching or advancing in a healthcare career. Despite the thousands of talented, committed teachers and leaders of developmental education in Massachusetts (and across the country), structural issues have limited the effectiveness of developmental education programs:

- More than 60 percent of first-time degree-seeking community college students are determined to require some type of developmental education;<sup>61</sup>
- Less than 25 percent of students who enroll in developmental education complete a gateway course (such as required entry-level math) within two years;<sup>62</sup> and
- Only 17 percent of full-time students and 6 percent of part-time students who begin in developmental education earn any degree or certificate within four years.<sup>63</sup>



This is not a Massachusetts problem; nationally, only 29 percent of students who take up to two remedial courses graduate within eight years.<sup>64</sup>

Through the past decade (or more) of organized efforts to upgrade the skills of their workforce, some healthcare organizations have discovered that a significant number of their employees lack the basic academic skills to enter college-level healthcare professions programs. Employers commonly underestimate the lack of basic academic skills of their workforce. Some reports indicate that the national average adult reading level is stuck at eighth grade or lower,<sup>65</sup> while work-related reading material requires tenth or eleventh grade reading comprehension.<sup>66</sup>

## ACCOMPLISHMENTS TO BUILD ON

**BHE Initiatives.** Recognizing the severity of this problem, the Massachusetts Board of Higher Education launched an initiative in 2012 to address shortcomings in developmental math education in the Commonwealth's community colleges. The BHE researched<sup>67</sup> successful alternative assessment initiatives occurring in other states. Based on this research, the BHE developed strategies to improve the success of students requiring additional supports in math. These efforts continue today, focusing on two areas: assessment and remediation. The first strategy is aimed at more accurately measuring students' ability to complete their program of choice. It encourages colleges to use high school grade point average, rather than a standardized test called the Accuplacer,<sup>68</sup> as a math placement tool. If students have a high enough GPA that meets certain conditions, such as being no more than three years old, they can skip developmental math education. Using GPA in place of, or in addition to, a single, high-stakes assessment, is intended to help avoid placing students into developmental education who would be successful at a college-level course. While initial pilots of this strategy are small, they are finding that students are completing entry-level math courses at the same, if not higher, rate as students placed using the Accuplacer. Because this strategy is focused on recent high school GPA, it is unlikely to touch many adults already working in healthcare.

The second BHE strategy focuses on a concept called corequisites. Colleges using this strategy test student math ability using the Accuplacer. Students who do not score high enough to be placed into college-level math are enrolled in those courses anyway but must

also take a required corequisite course to provide extra academic math support. The plan is to scale this strategy across Massachusetts by 2020.

Beginning September 2016, the Department of Higher Education (DHE) joined the Mathematics Pathways to Completion (MPC) project, a two-year initiative in partnership with Massachusetts institutions of public higher education. The project aims to establish effective math pathways that will increase student success, modernize entry-level mathematics programs across two- and four-year public institutions of higher education, and improve alignment with K-12 mathematics.

**TAACCCT.** In 2011, the Commonwealth's 15 community colleges received a \$20 million TAACCCT grant from the U.S. Department of Labor to implement the Transformation Agenda. One of the strategies of the initiative was to develop contextualized developmental education courses focused on healthcare and other targeted industries. These courses teach basic math and English skills using examples from the industry students are interested in pursuing—for example, incorporating medical terminology into English preparatory courses. These modules are available to all colleges in Massachusetts.

**Private Initiatives.** In addition to the Commonwealth's efforts, a few healthcare organizations have launched private efforts to address academic deficits in their workforce. Organizations such as Partners Healthcare, Boston Children's Hospital, and the Massachusetts 1199 SEIU Training and Upgrading Fund realized they had significant numbers of entry-level employees that required developmental education to advance their careers. As they developed their individual workforce strategies, they recognized that they could use their resources to create customized developmental education programs that better served their employees.

Developmental education is instruction and support for students who are assessed by their institution of choice as being academically underprepared for postsecondary education (also variously described as remedial education, college prep, basic skills education and other terms, all referring to pre-collegiate work).



Examples of these customized programs include contracting with local community colleges to provide specialized instruction at a time and place more convenient to their employees. Others contract with private third parties, such as Jewish Vocational Services (JVS), to provide a separate program for their employees. The goal of these programs is to help their employees bypass the regular college developmental education program altogether. These organizations are closely monitoring the results of these efforts and rapidly adjusting strategies as they learn more about what works and what does not.

## RECOMMENDED STRATEGIES

**Modify the Performance Incentive Fund to scale current efforts more quickly.** The Department of Higher Education has dedicated staff working directly with local community colleges to drive change, but the current pace anticipates a 10-year plan. Massachusetts should modify the Performance Incentive Fund to generate additional incentives for colleges to more rapidly adapt these alternative methods and create local accountability for

improving success of developmental education. As stated previously, less than 25 percent of Massachusetts students enrolled in developmental education complete a gateway course within two years. The state could modify the Performance Incentive Fund to provide incentive funding to community colleges when students complete gateway courses within one year. For example, Indiana provides incentive funding for both “outcomes” (e.g., degree completion) and “progress” (e.g., remediation success).<sup>69</sup>

### Re-envision developmental education.

Massachusetts could expand on important strategies already underway to create a system that more finely assesses students and provides a greater range of needed supports. The strategies here, which have been adopted in other states, provide a range of academic supports and would help adults move into healthcare profession programs as quickly as possible. These could include:<sup>70</sup>

- » **Use multiple measures** (e.g., assessment tests coupled with data that includes academic

## CORE PRINCIPLES FOR TRANSFORMING REMEDIAL EDUCATION

In 2015, JFF, Achieving the Dream, American Association of Community Colleges, the Charles A. Dana Center, Complete College America, and the Education Commission of the States developed the following Core Principles for Transforming Remedial Education.<sup>71</sup> These principles were developed based on a review of research and emerging best practices and should be used as an overarching guide to reforms in Massachusetts.

**Principle 1:** Every student’s postsecondary education begins with an intake process to choose an academic direction and identify the support needed to pass relevant credit-bearing gateway courses in the first year.

**Principle 2:** Enrollment in college-level math and English courses or course sequences aligned with the student’s program of study is the default placement for the vast majority of students.

**Principle 3:** Academic and nonacademic support is provided in conjunction with gateway courses in the student’s academic or career area of interest through co-requisite or other models with evidence of success in which supports are embedded in curricula and instructional strategies.

**Principle 4:** Students for whom the default college-level course placement is not appropriate, even with additional mandatory support, are enrolled in rigorous, streamlined remediation options that align with the knowledge and skills required for success in gateway courses in their academic or career area of interest.

**Principle 5:** Every student is engaged with content of required gateway courses that is aligned with his or her academic program of study—especially in math.

**Principle 6:** Every student is supported to stay on track to a college credential, from intake forward, through the institution’s use of effective mechanisms to generate, share, and act on academic performance and progression data.

skills, interests, goals, work ethic) to determine needed academic supports.<sup>72</sup> To the extent colleges rely on assessment tests, they should use a placement *range*, rather than a cut score, to determine the type of remediation most appropriate for the individual student. This range would identify students who would benefit from the corequisite courses—which will be scaled by 2020—as well as those requiring more intensive support who could benefit from the more intensive strategies listed as follows. It is worth noting that changes to assessment policy must be linked to appropriate remedial supports (e.g., corequisites, parallel remediation).

- » **Expand gateway course(s) supports** for students with more significant remedial needs. Some colleges are using gateway courses. These are courses that are required to advance into a program of study, for example Biology 101 or Anatomy and Physiology. The additional supports enhance college-level courses aligned to a program of study by providing remedial instruction delivered in a just-in-time manner over the course of a year. One-year gateway courses linked with appropriate supports have eliminated the need for developmental math and English in two pilots in California.<sup>73</sup> Students in course pathways in statistics and quantitative literacy have completed gateway courses at rates two to four times greater than their peers in traditional remediation sequences.<sup>74</sup>
- » **Develop programs offering parallel remediation**, an intensive approach for students in certificate or applied degree programs. In the Washington State I-BEST model (currently being scaled in seven states through JFF's Accelerating Opportunity Initiative), parallel remediation pairs a remedial instructor in the vocational course. This instructor team teaches the course with the vocational instructor, pulling groups of students together to apply remedial instruction principles to a complicated lesson, and/or teach part of the lesson. Parallel remediation “ensures students are able to immerse themselves in the content that was the purpose of the postsecondary enrollment in the first place.”<sup>75</sup> Compared to students in traditional remediation programs, I-BEST students are three times more likely to earn college credits and nine times more likely to earn a workforce credential.

## Improve Alignment Between Regional Industry Needs and Education Programs

*The current system is challenged by out of date regulations governing care-delivery by practice setting, inconsistent curriculum and student outcome expectations across training and education providers, varying competency expectations by employers for similar occupational categories, and portability of credentials across training and education providers.*

—The Vision Project, June 2014<sup>76</sup>

Postsecondary education institutions must provide education and training that is aligned with industry needs, but systems established to help them do this (e.g., licensing regulations, independent program reviews, industry advisory committees, independent certification processes) are struggling to keep up. For example, the Cecil B. Sheps Center at the University of North Carolina has called the medical assistant “one of the most rapidly evolving roles in redesigned healthcare delivery models.”<sup>77</sup> In addition, the industry is creating new career pathways in information technology and quality improvement. While the evolving nature of these pathways makes training more complicated, the positions are unregulated which could make them more attractive to potential students and relatively easier to adapt to industry change.

At the local level, colleges can face employer silos that make identifying needs, and scaling change, difficult. Individual community colleges must react to the needs of multiple employers, who often represent different industry segments each responding to change in unique ways. The resulting silos can create a barrier for colleges trying to meet the needs of multiple employers.

Because of the decentralized nature of Massachusetts' individually controlled community colleges, scaling change is difficult. Efforts such as statewide grants that involve all 15 Massachusetts community colleges and the collaborative development of the state Performance Incentive Fund are serving as structures to scale change. However, they are infrequent.

Regional sector partnerships are one strong potential solution for improving alignment between industry needs and education programs.

Sector partnerships are collaborations, staffed by an intermediary organization, where multiple employers within a targeted sector regularly convene to identify their shared workforce challenges and then partner with education and training providers, local workforce boards, and other key stakeholders to develop workforce solutions to address these shared challenges.

The Commonwealth Corporation plays a critical, multifaceted role in supporting the state's sector strategy. It develops requests for proposals, administers grants to regional partnerships, provides these partnerships with technical assistance, and facilitates peer learning. Since 2006, the Commonwealth Corporation has administered multiple programs to develop sector partnerships. Most notable are the Workforce Competitiveness Trust Fund (WCTF) to support regional sector partnerships focused on creating a training pipeline in industries with skills gaps; and the Healthcare Workforce Transformation Fund, focusing on training incumbent workers. The Commonwealth Corporation and regional sector partnerships have achieved a number of accomplishments, noted in the following section.

The Commonwealth Corporation has funded multiple industry collaborations since the late 1990s. At least five healthcare industry partnerships currently exist. Challenges to sustaining these initiatives range from a lack of density of healthcare employers in a workforce development area to a lack of strategic leadership necessary to implement the initiative. The largest barrier, of course, is a lack of sustainable funding to staff these partnerships.

Finally, it is worth noting that the existing regional healthcare collaborations are focused on specific geographic areas with membership comprised of employers in those areas, which is a standard, national model for implementing successful partnerships. These partnerships represent a significant share of the state's healthcare employers, yet expanding the number of regional sector partnerships throughout the state will increase the number of employers that are involved in these collaborations.

## ACCOMPLISHMENTS TO BUILD ON

The Commonwealth Corporation has achieved a number of significant successes and accomplishments with its sector partnerships. For example:

- The WCTF has supported 46 sector partnerships (including but not limited to healthcare);
- Over 6,000 people have completed training; and
- More than 94 percent earned a new job, promotion, or raise.

The Healthcare Workforce Transformation Fund, which is still underway, has funded 59 projects in Massachusetts aimed at helping healthcare organizations respond to the workforce demands of healthcare reform.

As a result of this work forming sector partnerships, the Commonwealth Corporation has developed considerable expertise in crafting and supporting these projects. In addition to providing technical support, the Corporation has published multiple resources<sup>78</sup> including those focused on forming partnerships, building relationships with employers, and measuring business impact.

**Regional Healthcare Partnerships.** Massachusetts is fortunate enough to have at least five longstanding healthcare partnerships: the Metro North Regional Employment Board's Healthcare Partnership, the Partnership for a Skilled Workforce's HealthcareWorks, the Northshore Workforce Investment Board's Healthcare Skills Gap Partnership, Boston Healthcare Consortium, and the Healthcare Workforce Partnership of Western Massachusetts. These partnerships have identified local priorities and initiated projects that meet local needs. For example in Western Massachusetts, the partnership created an on-the-job training initiative to help with skill shortages, particularly among new and entry-level employees. In Boston, the partnership is focusing on creating systems for colleges to collect and report employment data regarding their healthcare professions graduates.

## RECOMMENDED STRATEGIES

**Regional Sector Partnerships.** Stakeholders interviewed for this paper agreed that regional consortiums of healthcare employers and colleges would help improve adoption of innovative healthcare workforce development programs beyond pilot projects. These partnerships could also help local secondary and postsecondary education providers better understand local labor needs, and new and evolving career pathways. Regional, sector-based partnerships have successfully helped local areas organize their workforce system, prioritize workforce needs, and attract funding to help address those needs.

These regional partnerships would also help local workforce boards meet federal Workforce Innovation and Opportunity Act (WIOA) regulations requiring that they form industry and sector partnerships to meet the needs of multiple employers within an industry.

Funding should continue to be set aside, from state revenue or other funding sources, to create and sustain industry partnerships across Massachusetts. These funds should continue to flow through the Commonwealth Corporation to take advantage of its considerable expertise on this topic. The Commonwealth can also pursue additional federal discretionary funds to support sector partnerships, like the America's Promise Grants recently released by U.S. Department of Labor, as well as use the state's WIOA set-aside funds to help support these strategies.

Regional partnerships are dependent upon the strategic leadership needed to craft a collaborative vision and manage the partnership, as well as a sufficient number of participating healthcare employers. These could be based on the seven regional planning areas called for in the Massachusetts' WIOA Combined State Plan.

Consistent with the Commonwealth Corporation's previous experience with regional sector partnerships, local areas should be allowed to choose the industry they focus on, including areas other than healthcare. The Commonwealth already has a few very strong healthcare sector partnerships, as described earlier, and these existing examples can provide other regions with good models for developing their own partnerships.

Expanding sector partnerships can have multiple benefits for both workers and employers. Employers and the workforce community formed the Health Careers Collaborative of Greater Cincinnati in 2003 to meet regional workforce needs focusing on unemployed, underemployed, and incumbent workers. The collaborative has developed career pathway programs that provide training and wraparound supports to prepare individuals for careers in nursing, allied health, rehabilitation, clinical lab, and health information technology. Since 2008, the Collaborative has trained more than 3,700 jobseekers and incumbent workers.<sup>79</sup>

- 88 percent completed training;
- 88 percent obtained employment;
- 81 percent retained employment after 12 months; and
- Of the more than 400 participating incumbents workers achieving their associate degree, 80 percent were retained in employment.

A Washington State evaluation of four sector-based partnerships found that \$620,000 in state investments leveraged an additional \$18.2 million (30 times the amount of the state investment).<sup>80</sup>

These partnerships are particularly effective at solving industry-specific problems at the regional level. One of the partnerships studied in this evaluation, the Tacoma-Pierce County Health Council, was able to help reduce vacancy rates for cardiovascular technicians at the region's two hospitals from 50 percent to 0 in two years. They also helped reduce attrition of nursing students at a local college from 53 percent to 5 percent.



## IV. FEDERAL RESOURCES

This section highlights federal resources that Massachusetts could access to address healthcare workforce challenges.

### **WORKFORCE INNOVATION AND OPPORTUNITY ACT**

Under the Workforce Innovation and Opportunity Act (WIOA), governors are allowed to reserve up to 15 percent of their state WIOA funding for statewide employment and training activities, which may include the development and implementation of sectoral initiatives that meet the skill demands for in-demand industries. Funding can also be used for the development of career pathways in in-demand industries and occupations—and healthcare is certainly an industry sector that is in high demand in most states and regions, including Massachusetts. The section of WIOA that governs this flexible use of funds is Section 134(a)(3). A state's 15 percent reserve funding can be used for statewide activities or to assist local areas in carrying out allowable activities within their regions. Local workforce areas may also use a portion of their local funding to support sector-focused education and training activities and the facilitation of industry partnerships in high-demand industries.<sup>81</sup>

## PERKINS CAREER AND TECHNICAL EDUCATION ACT

Similar to WIOA, states may reserve up to 10 percent of federal Perkins funding for career and technical education for state leadership activities. These funds can be used to support a number of activities for identifying in-demand industry clusters in the state. The funds can also be used to develop high-quality programs of study that offer structured pathways from secondary to postsecondary education and result in the attainment of industry-recognized, postsecondary credentials in these high-demand industries and occupations. The provision of the Perkins Act that governs this flexible use of State Leadership funding is Section 124. Local school districts and postsecondary institutions that receive Perkins funding may also use local funding for the development of programs of study and other forms of education and training that lead to postsecondary credentials in high-demand fields, including healthcare.<sup>82</sup>

## ABILITY TO BENEFIT

In the Consolidated and Further Continuing Appropriations Act, 2015, Congress reinstated a previously suspended program called Ability to Benefit. ATB allows students to receive Pell grants if they do not have a high school diploma or its equivalent but could benefit from postsecondary training. Through ATB, lower-skilled students have access to Pell grants to pay for postsecondary courses if they are enrolled in an eligible career pathways program (as defined in WIOA) and either pass an approved test or successfully complete six hours of college credit.

ATB allows students without a high school diploma or a GED to begin to earn postsecondary occupational credit at the same time as they develop basic educational and English language skills—often concurrently working toward completing a high school equivalency degree. These co-enrollment strategies accelerate the time required to earn credentials that meet employers' skill needs. Recent studies show that students in these programs outperform similar students in earning college credits and certificates, and in persisting to program completion and good jobs.

## TANF

The U.S. Department of Health and Human Services, Administration for Children and Families (ACF) provides funding through Temporary Assistance for Needy Families to states to help poor families with dependent children achieve self-sufficiency. In 2013, Massachusetts received \$500 million. In exchange for these resources, states must agree to meet work participation rates for families receiving benefits: 50 percent for single-parent families, 90 percent for two-parent families. Unfortunately, the work requirements make it difficult for families to pursue the training and education necessary to pursue most healthcare jobs.

The Obama Administration claims to have the authority to waive the work requirement policy. Congressional Republicans disagree. Once this dispute is settled, a work requirement waiver for the Commonwealth would allow it to design pilot projects aimed at providing TANF recipients with the training and supports necessary to enter healthcare jobs.

## HEALTH PROFESSIONS OPPORTUNITIES GRANTS

Federally, the Department of Health and Human Services (HHS) administers the Health Professions Opportunity Grants (HPOG). Authorized by the Affordable Care Act, HPOG funds organizations that provide education and job training to TANF recipients and other low-income individuals, preparing them for occupations in the healthcare field that pay well and are expected to either experience labor shortages, or to be in high demand in the foreseeable future.

A wide range of organizations are eligible for HPOG, including state entities, workforce investment boards, institutions of higher education, and other nonprofits and community-based organizations. Grantees are afforded significant flexibility in defining which "other low-income individuals" they serve, and existing projects have expanded to a wide range of populations, including "individuals without a high school diploma or GED, incumbent workers, Supplemental Nutrition Assistance Program (SNAP) recipients, and disadvantaged and at-risk youth." HPOG grants may be used to train participants



for a wide range of careers. To date, according to ACF, the “most common training programs include those for nurse aides, home health aides, licensed and vocational nurses, registered nurses, medical assistants, pharmacy technicians, and phlebotomists.”

Through two rounds of funding, 64 grants have been awarded totaling almost \$390 million. Program participants enroll in a variety of training and education programs that result in an employer or industry-recognized certificate or degree, and training programs take place in a variety of settings, including the classroom, workplace, and via distance and online learning. HHS also requires grantees to collaborate with state and local agencies in order to support HPOG-funded programs, including workforce development boards, the state agency responsible for administering TANF (in Massachusetts, the Department of Transitional Assistance), and state apprenticeship agencies.

The second round of HPOG awards were made at about this time last year for five-year project periods. Legislative authorization is in place through next fiscal year (the third budget period of the five year project period). The Administration hopes that Congress will support the last two years of the project, but that is still to be determined.



## V. CONCLUSION

As the healthcare industry shifts its business and service delivery models, it faces some persistent workforce challenges—the need for more, and more diverse, workers at all levels. These transitions are also introducing some new opportunities as new occupations begin growing more quickly and entirely new career paths are being developed. Workers are needed to fill these opportunities.

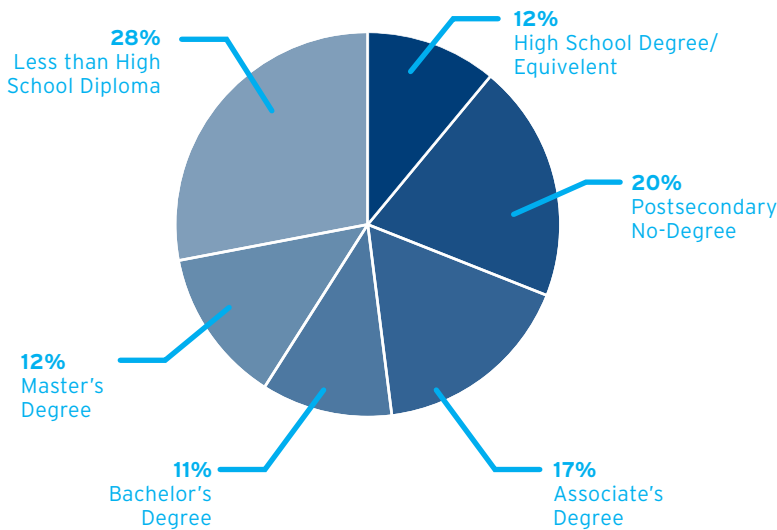
Massachusetts has invested considerable resources to help address these challenges. As a result, there have been important outcomes that benefit the healthcare industry and its workforce: excellent accountability structures for STEM careers; a strong high school career and technical education system; improving healthcare career pathway development aided by federal grants; community college performance-based funding that rewards schools for student success; and an engaged employer community in regions like Boston and Western Massachusetts.

These results provide a depth of experience and momentum that is a significant asset to the state and its healthcare industry. Continuing to grow the state's pipeline of new and adequately prepared workers will ensure the industry has the necessary workforce to care for patients as the baby boom cohort ages. Improving college success for working adults will help the industry to promote those who already understand the work, culture, and mission of their organization, contributing to lower turnover. Doing this work will require greater collaboration between the workforce community and industry. Regional partnerships will help workforce organizations and colleges to stay in touch with industry needs, improve local ability to attract outside workforce funding, and help scale change.

Continued bold leadership will benefit students, workers, employers, and patients as Massachusetts continues to support its world-class healthcare industry.

# APPENDIX

## OPPORTUNITIES AT A WIDE VARIETY OF EDUCATIONAL REQUIREMENTS



**Figure 1: Distribution of Educational Requirements for All Healthcare Practitioner and Support Occupations<sup>83</sup>**

The healthcare industry also provides job opportunities for people with a variety of educational preparation. At every level, demand for workers with these skills is growing faster than the average growth for all employment. Fifteen percent of healthcare jobs require a high school diploma or less. Almost half of the state's healthcare practitioner and support occupations are middle-skill jobs that require more than a high school diploma but less than a master's degree (see Table 2 on page 5). Roughly 37 percent of jobs within the workforce require a master's, doctoral, or other professional degree for employment within the state.

**Table A1. Top Five Jobs Requiring a HIGH SCHOOL DIPLOMA<sup>84</sup>**

- Pharmacy technicians are by far the largest occupation in this category
- Hourly wages range from \$15.07 for orderlies to \$19.68 for psychiatric aides.
- At 13 percent, medical equipment preparers are expected to grow fastest out of these five occupations.

OCCUPATION	2015 JOBS	% BY EDUCATION	2015-2020 % CHANGE	AVG. HOURLY EARNINGS
Pharmacy Technicians	8,722	33.3%	3%	\$15.29
Psychiatric Aids	2,813	10.8%	9%	\$19.68
Veterinary Assistants & Laboratory Animal Caretakers	2,389	9.4%	10%	\$15.58
Orderlies	2,275	8.7%	7%	\$15.07
Medical Equipment Preparers	1,350	6.6%	13%	\$19.64

**Table A2. Top Five Jobs Requiring SOME POSTSECONDARY EDUCATION OR NON-DEGREE AWARD**

- > Nursing assistants comprise the largest number of jobs at this level.
- > The majority of these occupations are expected to grow by roughly 10 percent through 2020.

OCCUPATION	2015 JOBS	% BY EDUCATION	2015-2020 % CHANGE	AVG. HOURLY EARNINGS
Nursing Assistants	42,806	34.8%	10%	\$14.48
Licenses Practical & Licensed Vocational Nurses	17,352	14.1%	11%	\$25.78
Medical Assistants	17,017	13.8%	10%	\$17.97
Dental Assistants	7,712	6.3%	10%	\$20.21
Psychiatric Technicians	7,263	5.9%	5%	\$18.29

**Table A3. Top Five Jobs Requiring an ASSOCIATE'S DEGREE**

- > Dental hygienists comprise the majority of jobs yet are the slowest growing occupation.
- > Three of the top five occupations in this category pay over \$30 as an average hourly wage.

OCCUPATION	2015 JOBS	% BY EDUCATION	2015-2020 % CHANGE	AVG. HOURLY EARNINGS
Dental Hygienists	6,361	18.8%	8%	\$38.93
Medical & Clinical Laboratory Technicians	6,101	18.0%	10%	\$21.41
Radiologic Technologists	4,849	14.3%	9%	\$33.99
Veterinary Technologists & Technicians	2,750	8.1%	14%	\$19.54
Respiratory Therapists	2,597	7.7%	15%	\$33.68

**Table A4. Top Five Jobs Requiring a BACHELOR'S DEGREE**

- > Registered nurses (84 percent) account for the overwhelming majority of jobs at this level.
- > Registered nurses are the largest healthcare occupation in the state comprising 24 percent of the overall sub-master's healthcare workforce. However, registered nurses are not the fastest growing occupation in the Bachelor's education cluster.
- > Substance abuse and behavioral disorder counselors are anticipated to grow by roughly 15 percent by 2020 (approximately 617 jobs). These jobs pay, on average, \$20.44/hour or about \$42,500 annually for a full-time worker. They are the second lowest paying job in the Bachelor's educational cluster overall just ahead of recreational therapists at \$19.28/hour.

OCCUPATION	2015 JOBS	% BY EDUCATION	2015-2020 % CHANGE	AVG. HOURLY EARNINGS
Registered Nurses	83,930	84.0%	13%	\$41.35
Medical & Clinical Laboratory Technicians	6,492	6.5%	9%	\$34.28
Substance Abuse & Behavioral Disorder Counselors	4,029	4.0%	15%	\$20.44
Dietitians & Nutritionists	2,104	2.1%	9%	\$28.27
Occupational Health & Safety Specialists	1,130	1.1%	7%	\$35.54

## DEMOGRAPHIC CHANGES IN MASSACHUSETTS

Table A5. 2015 to 2020 Estimated Demographic Changes for Massachusetts

RACE / ETHNICITY	2015 POPULATION	2015 % OF COHORT	2020 POPULATION	2020 % OF COHORT	CHANGE	% CHANGE
White, Non-Hispanic	5,004,451	73.72%	4,972,718	71.58%	-31,733	-1%
White, Hispanic	580,484	8.55%	645,866	9.30%	65,382	11%
Black, Non-Hispanic	465,423	6.86%	498,181	7.17%	32,758	7%
Asian, Non-Hispanic	432,725	6.37%	486,233	7.00%	53,508	12%
Two or More Races, Non-Hispanic	116,932	1.72%	130,998	1.89%	14,066	12%
Black, Hispanic	104,602	1.54%	116,513	1.68%	11,911	11%
Two or More Races, Hispanic	37,735	0.56%	45,575	0.66%	7,840	21%
American Indian or Alaskan Native, Hispanic	21,101	0.31%	23,997	0.35%	2,896	14%
American Indian or Alaskan Native, Non-Hispanic	12,148	0.18%	12,359	0.18%	211	2%
Asian, Hispanic	6,468	0.10%	7,346	0.11%	878	14%
Native Hawaiian or Pacific Islander, Hispanic	4,059	0.06%	4,518	0.07%	459	11%
Native Hawaiian or Pacific Islander, Non-Hispanic	2,778	0.04%	2,979	0.04%	201	7%

# ENDNOTES

1. Massachusetts Department of Public Health, "Massachusetts Health Professional Data Series: Registered Nurses 2010," April 2013.
2. Michelle Wong, et al., "Massachusetts Indicators: Aging and Work," The Center on Aging and Work at Boston College, December 2007.
3. Ibid.
4. From Economic Modeling Systems (EMS) industry and final staffing patterns data which are based on over 90 different federal and state data sources.
5. "Baby Boomers Retire," December, 29, 2010, available at: <http://www.pewresearch.org/daily-number/baby-boomers-retire/>.
6. V. Fuchs, *Provide, Provide: The Economics of Aging*, NBER working paper no. 6642 (Cambridge, MA: National Bureau of Economic Research, 1998).
7. See: <http://www.ihl.org/engage/initiatives/tripleaim/pages/default.aspx>.
8. See: <http://www.commonwealthfund.org/publications/newsletters/quality-matters/2012/april-may/in-focus>.
9. The individual and family services subsector is largely composed of behavioral health organizations, but also includes refugee, disaster, temporary relief, and government social services workers such as welfare case managers.
10. For this portion of the analysis, data were drawn from Economic Modeling Systems (EMS) industry and final staffing patterns data which are based on over 90 different federal and state data sources.
11. Represents healthcare practitioners and support occupations in industry only.
12. Includes all employment in industry, not solely healthcare practitioners and support occupations.
13. JFF analysis of EMSI data.
14. Massachusetts Senior Care Association "Quality Care for Quality Jobs Report," November 2015; Massachusetts Board of Higher Education, "Allied Health-Direct Care Workforce Plan: A Foundation for Our Future," The Vision Project, June 2014.
15. JFF analysis of EMSI data.
16. Massachusetts Senior Care Association, "Quality Care for Quality Jobs Report," November 2015.
17. As quoted in Massachusetts Board of Higher Education, "Allied Health-Direct Care Workforce Plan: A Foundation for Our Future," The Vision Project, June 2014, p. 17.
18. While registered nurses are still able to find employment in many regions with an associate's degree, employers are increasingly requiring a minimum of a baccalaureate degree to account for the increasingly complex care nurses provide. For this reason, and for the purposes of this report, the minimum required education for registered nurses has been designated as "bachelor's degree."
19. The examples shown here and throughout the paper are limited to those occupations requiring a baccalaureate degree or less, in keeping with Jobs for the Future's mission that focuses on education and workforce models assisting low-income, low-skill workers.
20. Massachusetts Department of Higher Education, "Nursing and Allied Health Workforce Development: A Strategic Workforce Plan for Massachusetts Healthcare Sector," October 2012.
21. Max Green and Ankanksha Jayarathi, "8 CIO Concerns for 2016," Becker's Health and IT Review, accessed June 20, 2016, <http://www.beckershospitalreview.com/healthcare-information-technology/8-cio-concerns-for-2016.html>.
22. Erin Fraher, Rachel Machta, and Jacqueline Halladay, *The Workforce Transformations Needed to Staff Value-based Models of Care* (Chapel Hill, NC: The Cecil G. Sheps Center for Health Services Research, University of North Carolina, 2015).
23. The Commonwealth Corporation, *Healthcare Workforce Transformation Fund: Report to the Administration and Legislature on Fund Activity through December 2015* (Boston, MA: The Commonwealth Corporation, 2016), accessed May 22, 2016, <http://commcorp.org/resources/documents/Healthcare%20Report%20to%20Legislature%202014-2015.pdf>.
24. Henry Renski and Susan Strate, *Long Term Population Projections for Massachusetts Regions and Municipalities* (Boston, MA: Office of the Secretary of the Commonwealth of Massachusetts, University of Massachusetts Donahue Institute, 2015), 11.
25. JFF analysis of EMSI data.
26. American Community Survey as reported in "Allied Health-Direct Care Workforce Plan: A Foundation for Our Future," Massachusetts Board of Higher Education, June 2014.
27. "The Rationale for Diversity in the Health Professions: A Review of the Evidence," U.S. Department of Health and Human Services, Health Services Research Administration, Bureau of Health Professions, October 2006.



28. As cited in Melissa K. Hansen, *Diversity in the Healthcare Workforce* (Washington, DC: National Conference of State Legislatures, 2014).
29. Ibid.
30. Ibid.
31. "Knocking at the College Door," Western Interstate Commission for Higher Education, <http://www.wiche.edu/info/knocking-8th/profiles/ma.pdf>.
32. "2015 Massachusetts Statewide STEM Data Dashboard," UMass Donahue Institute, Massachusetts Department of Higher Education, September 2015.
33. Ibid.
34. "Mass. 8th-Graders Score Near Top On International Exam," <http://legacy.wbur.org/2012/12/11/massachusetts-students-timss>.
35. "2015 Massachusetts Statewide STEM Data Dashboard," UMass Donahue Institute, Massachusetts Department of Higher Education, September 2015.
36. Ibid.
37. Mary Branham, *Massachusetts Program the Cadillac of CTE* (Lexington, KY: Council of State Governments, 2016), accessed July 30, 2016, [http://www.csg.org/pubs/capitolideas/sep\\_oct\\_2011/MassRegional.aspx](http://www.csg.org/pubs/capitolideas/sep_oct_2011/MassRegional.aspx).
38. "Massachusetts Mathematics and Science Partnership: Annual State Evaluation Report (Year 12)," UMass Donahue Institute, Massachusetts Department of Elementary and Secondary Education, April 2016.
39. See: <http://www.mass.gov/edu/government/departments-and-boards/ese/programs/accountability/accountability-and-assistance-system-overview.html>.
40. Community College Research Center, *What We Know About Dual Enrollment* (New York, NY: CCRC, 2012).
41. "Early College Designs," Jobs for the Future, accessed on June 27, 2016, <http://www.jff.org/initiatives/early-college-designs>.
42. "STEM Starter Academy Annual Evaluation Report – Year 2," UMass Donahue Institute, Massachusetts Department of Higher Education, January 2016.
43. See: <http://svi.seattlecolleges.edu/bright-future/>
44. Boston Healthcare Careers Consortium, *Critical Collaboration: Improving Education and Training Pathways to Careers in Healthcare* (Boston, MA: Boston Private Industry Council, 2011), 15.
45. Jennifer Ma and Sandy Baum, *Trends in Community Colleges: Enrollment, Prices, Student Debt, and Completion* (New York, NY: College Board Research, 2016).
46. Wendy Erisman and Patricia Steele, *Adult College Completion in the 21st Century: What We Know and What We Don't* (Washington, DC: Higher Ed Insight, 2015).
47. Ruffalo Noel Levitz, *2015-16 Adult Learners Report* (Cedar Rapids, OH: Ruffalo Noel Levitz, 2016).
48. CAEL, *Fueling the Race to Postsecondary Success: A 48-institution Study of Prior Learning Assessment and Adult Student Outcomes* (Chicago, IL: CAEL, 2010).
49. "The 'Big Three' Completion Plan," Massachusetts Department of Higher Education, accessed June 20, 2016, <http://www.mass.edu/visionproject/bigthree.asp>.
50. Massachusetts Department of Higher Education Transfer Advisory Group, *Final Report from the Commonwealth Transfer Advisory Group* (Boston, MA: Massachusetts Department of Higher Education, 2008), accessed June 1, 2016, <http://www.mass.edu/bhe/lib/ctag/ctagreport.asp>.
51. Peter Baher, "Student Flow Between Community Colleges: Investigating Lateral Transfer," *Research in Higher Education* 53, no. 1 (2012): 94-121.
52. Xueli Wang, "The Effect of Postsecondary Enrollment on College Success: Initial Evidence and Implications for Policy and Future Research," *Educational Researcher* 42, no 7 (2013): 392-402.
53. Victoria Pitt, et al., "Factors Affecting Nursing Students' Clinical Performance and Attrition: An Integrative Literature Review," *Nursing Education Today* 32, no. 8 (2012): 903-913.
54. John Wachen, Davis Jenkins, Clive Belfield, and Michelle Van Noy, *Contextualized College Transition Strategies for Adult Basic Skills Students: Learning from Washington State's I-BEST Program Model* (New York, NY: Community College Research Center, 2012). See also: Davis Jenkins, Matthew Zeidenberg, Gregory Kienzl, *Educational Outcomes of I-BEST Washington State Community and Technical College System's Integrated Basic Education and Skills Training Program: Findings from a Multivariate Analysis* (New York, NY: Community College Research Center, 2009), and David Prince and Davis Jenkins, *Building Pathways to Success for Low-Skill Adult Students: Lessons for Community College Policy and Practice from a Statewide Longitudinal Tracking Study* (New York, NY: Community College Research Center, 2005).
55. Massachusetts Board of Higher Education, *The Degree Gap: Honing in on College Access, Affordability, and Completion in Massachusetts* (Boston, MA: Massachusetts Board of Higher Education, 2016), accessed May 16, 2016, [http://www.mass.edu/visionproject/\\_documents/2016%20The%20Degree%20Gap%20-%20Vision%20Project%20Annual%20Report.pdf](http://www.mass.edu/visionproject/_documents/2016%20The%20Degree%20Gap%20-%20Vision%20Project%20Annual%20Report.pdf).
56. Information about health information technology careers and training is available at <http://occrilinois.edu/docs/librariesprovider4/tci/strategies-for-transformative-change/health-it.pdf?sfvrsn=4>.

57. M. McPherson, "Allied Health Core Curriculum: It's Time Has Come" *Community College Journal*, 2004.
58. See: <http://occrll.illinois.edu/our-products/current-topics-detail/current-topics/2015/10/06/galvanizing-a-national-movement-with-a-competency-based-health-occupations-core-curriculum>.
59. Massachusetts Board of Higher Education, "Allied Health-Direct Care Workforce Plan: A Foundation for Our Future," The Vision Project, June 2014.
60. See: <http://occrll.illinois.edu/our-products/current-topics-detail/current-topics/2015/10/06/galvanizing-a-national-movement-with-a-competency-based-health-occupations-core-curriculum>.
61. Massachusetts Board of Higher Education, *Final Report from the Task Force on Retention and Completion Rates at the Community Colleges* (Boston, MA: Massachusetts Board of Higher Education, 2007).
62. Data from <http://completecollege.org/state-data-loader/?state=Massachusetts&code=ma>.
63. Mario Delci, Private Communication, Massachusetts Department of Higher Education 2010 data. December 8, 2016.
64. "Postsecondary State Policy," Jobs for the Future, available at <http://www.jff.org/initiatives/postsecondary-state-policy>.
65. The Literacy Project Foundation, accessed May 25, 2016, <http://literacyprojectfoundation.org/community/statistics/>
66. "Basic Skills in the Workplace" in *Worker Training: Competing in the New International Economy*, accessed May 25, 2016, <https://www.princeton.edu/~ota/disk2/1990/9045/904508.pdf>
67. For a summary, see "Final Report from the Task Force on Transforming Developmental Math Education," October 2013, accessed June 15, 2016, <http://www.mass.edu/bhe/lib/documents/AAC/AAC14-12DevelopmentalMathEducationTaskForceRecommendations-supersededbyOct22ndAACmeetingedit.pdf>.
68. Colleges use the Accuplacer to test English ability too, but the corequisite strategy described here is focused on math.
69. See: <http://completecollege.org/strategies/#stratHolderPerformanceFunding>
70. This section adopted from <http://www.completecollege.org/> and [http://www.completecollege.org/docs/Remediation\\_Joint\\_Statement-Embargo.pdf](http://www.completecollege.org/docs/Remediation_Joint_Statement-Embargo.pdf).
71. Charles A. Dana Center, Complete College America, Inc., Education Commission of the States, and Jobs for the Future, *Core Principles for Transforming Remedial Education: A Joint Statement*, 2012, available at [http://completecollege.org/docs/CCA\\_joint\\_report-printer.pdf](http://completecollege.org/docs/CCA_joint_report-printer.pdf).
72. Additional information about multiple measures can be found at Columbia University's Community College Research Center.
73. Bruce Vandal, *Promoting Gateway Course Success: Scaling Corequisite Academic Support* (Indianapolis, IN: Complete College America, 2014), available at: <http://completecollege.org/wp-content/uploads/2014/06/Promoting-Gateway-Course-Success-Final.pdf>.
74. Charles A. Dana Center, Complete College America, Inc., Education Commission of the States, and Jobs for the Future, *Core Principles for Transforming Remedial Education: A Joint Statement*, 2012, available at [http://completecollege.org/docs/CCA\\_joint\\_report-printer.pdf](http://completecollege.org/docs/CCA_joint_report-printer.pdf).
75. See: [https://www.insidehighered.com/sites/default/server\\_files/files/core\\_principles\\_nov5.pdf](https://www.insidehighered.com/sites/default/server_files/files/core_principles_nov5.pdf) p. 6
76. Massachusetts Board of Higher Education, "Allied Health-Direct Care Workforce Plan: A Foundation for Our Future," The Vision Project, June 2014.
77. Erin Fraher, Rachel Machta, and Jacqueline Halladay, "The Workforce Transformations Needed to Staff Value-based Models of Care". The Cecil G. Sheps Center for Health Services Research, University of North Carolina. November 2015 p. 2
78. See: <http://commcorp.org/resources/?cat=all>
79. See: <http://www.competitiveworkforce.com/Health-Care.html>
80. Scott Cheney, Stacey Wagner, and Lindsey Woolsey, *Evaluating Industry Skills Panels: A Model Framework* (Olympia, WA: The Washington State Workforce Training and Education Coordinating Board, 2008)
81. See the link to the WIOA statute: <https://www.congress.gov/113/bills/hr803/BILLS-113hr803enr.pdf>
82. See the link to the Perkins CTE statute: <https://www.gpo.gov/fdsys/pkg/BILLS-109s250enr/pdf/BILLS-109s250enr.pdf>
83. Source for Figure 1 and Tables A1 - A5 is JFF Analysis of EMSI data.
84. In some markets the majority of employers may require postsecondary education for some of these occupations.



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