



UMASS DONAHUE INSTITUTE



Knowledge Corridor Talent and Workforce Strategy

Prepared for the Knowledge Corridor Sustainability Plan

Prepared by

UMass Donahue Institute
Economic and Public Policy Research

June 2014



Acknowledgements

The UMass Donahue Institute would like to acknowledge the Pioneer Valley Planning Commission for their leadership in funding and guiding this project. Tim Brennan's thoughtful leadership has guided the strategy work since its inception. We also thank Lori Tanner, Lynn Shell, Jamie Duran and Indrani Gallagher, members of the Pioneer Valley Planning Commission staff who provided invaluable support at key moments during this process.

We would also like to acknowledge the members of the Knowledge Corridor Talent Strategy Task Force for their important contributions to this strategy:

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- Bill Ward, Former President & CEO, Hampden County Regional Employment Board
- Lyle Wray, Executive Director, Capital Region Council of Governments

For their critical assistance in making the focus groups happen and ensuring their success, we thank David Cruise and Kelly Aiken of the Hampden REB, Joan Kagan of Square One, Bob LePage of Springfield Technical Community College, Janet Gemmiti of Capital Workforce Partners, and Patricia Crosby and Michael Baines of the Franklin/ Hampshire REB.

We would also like to thank the numerous participants in stakeholder interviews and focus groups, listed within the report.

This strategic plan was researched and developed by the Economic and Public Policy Research (EPPR) group at the UMass Donahue Institute. Key project members included:

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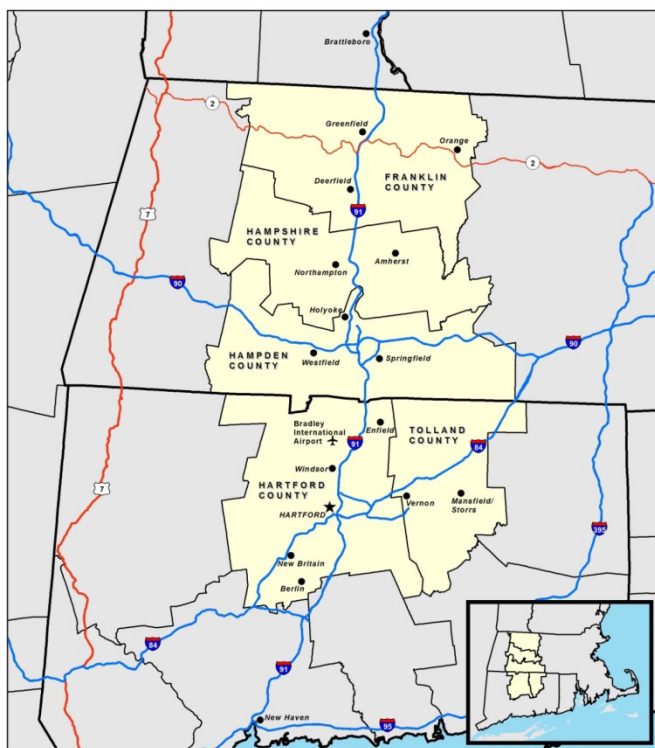
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I. Introduction

Background

New England's "Knowledge Corridor" along Interstate 91 and the Connecticut River through Connecticut and Massachusetts is named for its concentration of innovative companies in sectors such as aerospace, finance and insurance, and advanced manufacturing; and for an unusually high concentration of institutions of higher learning anchored by two state university flagship campuses: the University of Connecticut in Storrs, and the University of Massachusetts in Amherst. Within two to three hours' drive of both Boston and New York, the region is nevertheless culturally and economically distinct. With no single dominant metropolitan center, the region is instead punctuated by small to mid-size post-industrial cities like Hartford and Springfield and by quaint New England towns with a total population of almost 1.7 million people. The region is notable for its quality of life along the scenic Connecticut River Valley, and for its relative affordability. Knowledge industries, health care, finance, and advanced manufacturing are strong here, and so is agriculture.

Figure 1: Map of the Knowledge Corridor



The region is also defined by common challenges. Despite the concentration of colleges and universities, the region's population is older than that of nearby, larger metropolitan areas, and population growth has been largely stagnant in recent years. Meanwhile, adult educational attainment is more in line with the United States average than with the much higher attainment seen in Connecticut and Massachusetts.

overall. The region's urban cores, which are home to a quarter of the region's people, are characterized by high poverty and unemployment among their residents, even while they remain regional hubs of industry, especially for health care, finance and manufacturing.

To face these challenges and others, and funded by the U.S. Department of Housing and Urban Development, the Capital Region Council of Governments (CRCOG) in Connecticut and the Pioneer Valley Planning Commission (PVPC) in Massachusetts have partnered to develop a regional sustainability plan. Early on, CRCOG and PVPC came to the same conclusion as other forward-thinking regions and recognized that when it comes to economic development, talent matters most. Meanwhile, PVPC developed its own update to the Pioneer Valley's Comprehensive Economic Development Strategy (CEDS), the Plan for Progress (including Franklin County), which identified talent development and retention as the first of four goals for the Pioneer Valley over the next ten years. With this priority firmly established, PVPC contracted with the University of Massachusetts Donahue Institute to develop the first-ever workforce and talent action strategy for the bi-state Knowledge Corridor region. For the purposes of this work, the Knowledge Corridor has been defined to include Hartford and Tolland counties in Connecticut, and Franklin, Hampden and Hampshire counties in Massachusetts: roughly the I-91 corridor from Hartford, Connecticut to Greenfield, Massachusetts and surrounding areas.

Objectives and Stakeholder Outreach

At the outset, PVPC recommended that the UMass Donahue Institute (UMDI) focus on regional talent and workforce strategies with three critical aspects:

1. Build momentum for strategically connecting the three western Massachusetts counties (Hampden, Hampshire, and Franklin) with areas of Connecticut (Hartford and Tolland counties) to form an integrated strategy for the bi-state Knowledge Corridor region;
2. Focus solely on analysis, issues, and actionable strategies related to Talent and the Workforce; and
3. Given the vast number of relevant and recent studies on the region's workforce and economic development, to the extent possible, limit new data analysis, and build from already identified issues and potential talent/workforce strategies.

Accordingly, UMDI focused its efforts over the better part of a year, from summer 2013 to summer 2014, on stakeholder outreach to identify regional issues, promising practices, and to build understanding and consensus around a series of actionable strategies for the region's talent development, with data analysis serving a supporting role.

First among those efforts, PVPC assembled a guidance and accountability body that it termed the Knowledge Corridor Workforce and Talent Action Strategy Task Force, made up of nearly two dozen regional stakeholders from both sides of the border, including regional planning agencies, business leaders, workforce investment boards, educators, and others. UMDI presented its process and findings to the task force at key points throughout the project. In turn, the task force provided vision, initial guidance and direction, and feedback and outreach. Ultimately, it will be members of the task force, their colleagues and other regional stakeholders to own the strategies, champion them, and guide them from theory to implementation in a sustained effort in the coming years.

In addition, UMDI conducted stakeholder interviews with 27 key informants and led five focus group meetings to identify regional priorities and promising programs and strategies. The process and results of these led to the final formation of the recommended strategies, and are outlined below.

Summary of Findings and Recommended Strategies

The Knowledge Corridor is home to enviable assets and many strong areas of talent and workforce development. At a high level, the region is generally competitive with the U.S. overall in educational attainment, wage levels, unemployment rates, and other key measures. But, the region does not fare as well as the statewide averages for either Massachusetts or Connecticut across virtually all key education and workforce indicators. And the performance of the overall region masks staggering economic and demographic conditions in the region's urban core cities. This results in lost economic opportunities and a significant segment of the population that is simply not attached to the workforce or on a path to a productive career. These findings are critical for today and the future – too many adults did not achieve a high school degree (or higher) and are not even measured in the labor force; and too many children are not enrolled in early education / pre-school and are scoring at below basic levels of reading and math.

Specific findings from the first bi-state data analysis of the Knowledge Corridor (see Section 5) include:

- The unemployment rate for the region was 7.9 percent in 2013, but it was higher in Hartford and Hampden counties where the two largest cities are located. In the core urban cities¹, unemployment rates are high, and labor force participation is low – as low as 58 percent in Springfield and Holyoke – suggesting a strongly disconnected labor force.
- Population growth in the region is slow, with just 4.3 percent growth from 2000 to 2013, much slower than the nation which grew by 11 percent. National aging trends are evident here, too, with the population over age 65 projected to grow by 50 percent between 2010 and 2030.
- The region's economy is led by a few key industry sectors with a high share of employment compared to the nation in health care (16 versus 14 percent), educational services (11 versus 9 percent), manufacturing (10 versus 9 percent), and finance and insurance (8 versus 4 percent).
- High school graduation rates in the cities pose major obstacles to reaching the region's workforce potential: from 53 percent in Holyoke to 65 percent in Hartford, all are significantly lower than the state averages of 85 percent for both Connecticut and Massachusetts.
- Thirty-four percent of adults over age 25 in the region have bachelor's degrees or higher, while 27 percent have some college or an associate's degree. The respective states have higher shares with a bachelor's degree and lower shares with some college or an associate's, while the United States by comparison has 29 percent of each.
- In the urban cores, school test scores lag far behind state averages in reading, writing, math and science – by as much as 35 percentage points. In Holyoke, over 40 percent of students rated failing on standardized science tests.

These findings should serve as a call to action for the region's employers, public officials, educators, and other leaders and the general public. Based on our review of best practices nationally, other regions of the country (from large metro areas like Philadelphia and Seattle to struggling post-industrial regions of Ohio and Indiana) have been working at this for a while. They have galvanized support, collaboration and funding across the public and private sectors, foundations, non-profits, universities and colleges, etc. Their leaders at economic development organizations and chambers of commerce have recognized that talent and workforce development are the most important issues they face for business expansion and attraction and are making a commitment to collaboratively engage the business community.

The Knowledge Corridor is aptly named for multiple reasons but this report and strategic plan are intended to help the region expand what that means to become a region known for having a world-class education

¹ Throughout the report, we present data analysis of Hartford, New Britain, Springfield, and Holyoke as urban core cities in the Knowledge Corridor region.

and talent development system to match its world-class colleges, universities, companies, and hospitals. And that means scaling successful education and workforce training programs (and there are many individual success stories to build on) to serve a larger headcount of students and workers to meet the needs of the region's innovative employers.

Along these lines, underlying this strategy is a belief that if increased regional collaboration, scaled program implementation, and expanded resources can be pooled together, the Knowledge Corridor region has the building blocks to achieve an ambitious **vision** for talent and workforce development where:

- Talent is created, attracted and retained at levels competitive with other leading regional economies;
- Talent and resources sustain and grow local businesses, and launch a diverse array of new businesses; and
- Upward economic mobility is a reality and opportunities are available for all.

Achieving this vision will not be easy and requires a multi-pronged attack of multiple strategies implemented over time. Some of the identified strategies, such as promoting business community engagement and increasing regional investment in talent and workforce, will likely be cross-cutting, involving partnership across various stakeholder groups, implemented over time. Other strategies are more area-specific and have been organized into three time-blocks for implementation (near-term, mid-term and long-term), organized into the categories of:

- Early Childhood Education
- K-12 / Vocational Schools
- Community and Four-Year Colleges/Universities
- Career and Workforce Training

Much greater detail on the proposed strategies is presented later in this report.

Organization of the Report

The remainder of this report presents:

Section 2: Grounded in priorities articulated by the task force and strengths and challenges indicated by data analysis and prior research, this section presents findings from the key informant interviews, and a listing of interviewees.

Section 3: Building on the interview findings, this section suggests themes, findings and strategic directions from the cumulative work grounded in five targeted focus groups, along with supporting interviews and a review of best practices nationally. A list of focus group participants is included.

Section 4: This section presents the recommended strategies within a “cradle to career” framework that addresses the full span of workforce readiness, as well as a timeframe for each strategy.

Section 5: Presents data analysis and baseline conditions for the first ever comprehensive, regional Knowledge Corridor workforce and talent analysis.

II. Key Informant Interviews and Findings

We conducted 23 individual and group interviews with key informants from workforce, private sector, nonprofit, and K-12 and higher education organizations, for a total of 27 key informants from 22 organizations, K-12 and higher education, private industry, and nonprofit organizations within the region and around the country. Interviews focused on the strengths and weaknesses of existing workforce and talent programs and initiatives, what has worked here and in other places, and areas of greatest need and opportunity.

Key Informant Interview List

A listing of the 23 interviews, representing 27 individuals and 22 organizations is as follows:

1. Patricia Crosby, Executive Director, and Michael Baines, Project Manager/ STEM Sector Specialist, Franklin Hampshire Regional Employment Board
2. Delcie David Bean IV, Chief Executive Officer, Paragus IT
3. Tom Phillips, President & CEO, Capital Workforce Partners
4. Wilfredo Nieves, President, Capital Community College
5. Charles M. Smith, Director, Cohn Reznick LLC and Board member of Capital Workforce Partners
6. Todd Andrews, Vice President, Economic and Strategic Development, Goodwin College
7. Gerald Paist, Superintendent, Pathfinder Regional Vocational Technical High School
8. William Ward, [Former] President & CEO, Hampden Regional Employment Board
9. Mary Wallachy, Executive Director, and Sally Fuller, Project Director, Davis Foundation
10. William Messner, President, and Jeff Hayden, Vice President for Business and Community Services, Holyoke Community College; and Robert LePage, Vice President of Foundation and Workforce Training, Springfield Technical Community College
11. Lynn Pasquerella, President, Mount Holyoke College
12. Lyle Wray, Executive Director, Capital Region Council of Governments
13. Orlando Rodriguez, Senior Policy Fellow, Connecticut Voices for Children
14. David Cruise, President & CEO (former Director of Business and Employment Services), Hampden Regional Employment Board
15. Mike Malone, Vice Chancellor for Research & Engagement, Carol Barr, Vice Provost for Undergraduate and Continuing Education, Loren Walker, Director of Research Engagement, University of Massachusetts Amherst
16. Marybeth Campbell, Director of Education and Workforce Development, Massachusetts Executive Office of Education
17. Sergio Paez, Superintendent, Holyoke School District
18. Jonathan Swan, Deputy Chief Portfolio Officer, Hartford School District
19. Carole Collins Ayanlaja, Chief of Research and Assessment, Hartford School District
20. Jeff Brancato, Vice President of Strategic Initiatives, NorTech (Northeast Ohio)
21. Joshua Sevin, Managing Director for Regional Engagement, Economy League of Greater Philadelphia

22. Deborah D. Hoover, President & CEO, Burton D. Morgan Foundation (Northeast Ohio)

23. Bethia Burke, Director of Grants & Emerging Initiatives; and Chris Thompson, Director of Regional Engagement, Fund for Our Economic Future (Northeast Ohio)

Findings from the Key Informant Interviews

Findings from the key informant interviews helped to crystallize the region's priorities and challenges, the most promising best practices for the region, and suggested the direction for additional stakeholder outreach through focus groups and additional interviews. The foremost issues, opportunities and initiatives stemming from the key informant interviews can be divided into the following major categories of feedback:

Sector Strategies

- Regional workforce organizations tended to highlight their industry sector-based work with employers, especially in health care, manufacturing and education, among other sectors. These initiatives tended to have some devoted staff resources, although it was noteworthy that many organizations were not able to devote even a single full-time staff member to a specific sector. Data suggest that job openings in these sectors (representing both growth and turnover) are among the most prevalent and fastest-growing, and they hold some promise of livable wages and career paths for “middle-skills” occupations.
- The need for education professionals coincides with the view that a lack of qualified teachers and principals poses a serious challenge to improving the region's high-needs public schools (for instance in Hartford, New Britain, Springfield and Holyoke), with implications for the workforce pipeline.
- Encouraging communication and collaboration within a sector can strengthen the sector and its employment opportunities as well as help business thrive through improved marketing, and improved awareness of tech innovation.
- Regional collaboration on sector-based strategies is an emerging theme, from the “sales force” training and workforce options (TWO) initiative at Springfield Technical Community College (STCC) and Holyoke Community College (HCC) to bi-state federal grant efforts between Capital Workforce Partners and the Hampden REB.

Business Growth

- Stakeholders emphasized that working with business is a necessary part of any successful strategy.
- “Businesses see too many doors,” and would do better with a single point of contact for their workforce and other needs (e.g., site selection for expansion). Regional workforce stakeholders should ideally seek to assist businesses in other ways, like awareness and access to technical advances, business expansion, marketing, and access to capital.
- Stakeholders both in and outside of for-profit organizations agreed that business could play a larger role in training workers, and that businesses in some regions are better at this than in the Knowledge Corridor.

Middle-skill Training

- Direct business input is necessary to help develop specific courses and skills needed, and agreements with employers to hire trainees was widely agreed to be the best model for any successful program; i.e. the collaborative “sales force” approach by HCC and STCC, and the Precision Manufacturing Regional Alliance Project (PMRAP) program in Hampden County. Community colleges can make headway with businesses by consistently displaying that they can be proactive, efficient and responsive to business needs, including through successful communications to business leaders, such as demonstrating benefits of involvement with education in terms of return on investment.
- Many interviewees noted the desirability of post-secondary options in addition to traditional two or four-year degrees, such as “stackable credentials,” training courses and certificate programs.
- Several interviewees cited a need for more real-time employment demand information, specifically in manufacturing.
- Training and education programs need to be more nimble and responsive in changing curricula or creating new programs, based on demonstrated employer need.
- Attrition from community colleges before receiving a degree is common, with one urban school noting that after 3 semesters, only about half of students remained in school – a proportion not uncommon nationally at community colleges that serve disadvantaged areas but an issue nonetheless.
- Finding qualified instructors to teach the most advanced, sector-specific skills is often difficult. This is based on a combination of factors including relatively modest pay and educational requirements for instructors that may not be well matched to educational backgrounds of qualified professionals in some fields.

Career counseling, soft skills, language skills, remedial education, and other barriers

- Across the board, workforce and community college interviewees in particular noted that students exit high school unprepared for the workforce. A lack of soft skills (those that make students “job ready”) was a dominant theme.
- Language is a barrier in many locations, and not limited to the urban cores: interviewees in Franklin County noted that even among workers with health care experience, English language skills could be a barrier to employment.
- Community colleges have scarce resources for career counseling, soft skills training, or to assist students with problems such as financial, family or work conflicts. Community colleges also perform a significant amount of remediation for students.
- Adult basic education programs are seen as delivering a valuable and effective service, but have lengthy waiting lists, no tracking systems, and very limited funding.

Early Childhood

- Education and soft skill deficits often begin before children are school-age, and can be successfully addressed through quality early childhood education and early elementary school programs (i.e. emphasizing reading by age three).
- In addition to well-educated and trained K-12 educators, there is a need for well-educated early childhood educators to provide quality early childhood education. Currently, the majority of early childhood educators have only a high school degree. This is also a field of growing employment and varied pay levels.

K-12 Education (Urban core areas)

- “Dual enrollment” or “early college” is widely considered a highly promising initiative to link high school students to higher education.
- Math and literacy preparedness are weak in urban cores.
- Many cited a need for more internships and other opportunities for exposure to real work environments, as early as high school or even middle school, both during summer and the school year.
- Stakeholders cited a need for training and retaining K-12 educators, including teachers and principals, especially in urban core schools: a workforce opportunity in itself, and a crucial input to a well-prepared future workforce in the region.
- There is a need for parent outreach programs even prior to preschool.
- Interviewees cited a need for greater collaboration, with dozens of initiatives to improve education without meaningful coordination. Disjointed funding from multiple sources, each with their own emphasis and requirements, is a major reason for the preponderance of initiatives.
- Students in urban cores face high levels of trauma and obstacles: many move every 2-4 years, and in some areas more than ten percent of the student population is homeless.
- Secondary schools need to provide real world context for learning and connections to work.

Structural Issues

- Deeply ingrained structural poverty and limited access to opportunity presents a fundamental challenge in the urban cores.
- Recovery from the Great Recession and the demographics of an aging region and workforce form the environment under which all initiatives must operate.
- Collaborations are the major driving force behind the majority of successful programs: between business, workforce systems, community colleges, community development corporations, Chambers of Commerce, private colleges (such as Goodwin College), and high schools. Several interviewees noted that their organization’s most important role was as “convener.”
- “Everybody pilots – nobody scales.” Despite many innovative pilot programs in the region, there are much less frequent opportunities – based on availability of funding – for talent and workforce organizations to scale and sustain those initiatives to reach the larger target audiences.
- Grant funding is unstable, and programs are forced to follow the funding. Initiatives are “episodic, fragmented, and disaggregated.”
- Availability of manufacturing equipment at vocational schools, community colleges, and on the job is sometimes an issue, though the extent of this problem is unclear, and there are indications of improvement at vocational/technical schools in the region, especially for manufacturing equipment.
- Employers have few incentives to invest in training for workers with high turnover rates.
- States may operate better with true one-stop systems for all services: training and career services, TANF (welfare), food stamps, child care.
- Career services for students are better located at their school than at career centers or other locations.
- Financial aid can be less available for certificate programs than for degree programs.
- Both Connecticut and Massachusetts stakeholders cited community leadership “in silos,” town by town, when regional leadership would be more effective.
- Elected, rather than appointed, school committees may not best serve the needs of struggling urban districts.
- Stakeholders cited an inadequate commitment from state government, as well as regional and local officials for the range of funding needed across virtually all areas of education and training.

- Stakeholders need to demonstrate sustained interest in collaboration and resource investment to make regional efforts successful and achieve “collective impact.”
- In manufacturing and other industries with aging workforces, will businesses replace retiring workers or simply become more efficient and lessen the need for replacement workers (e.g. automate)?
- There is a clear need to reach outside the region for funding, from foundations and state government. Regional stakeholders need to be more engaged in Boston and Hartford and apply for more funding, such as funding for technical assistance (MA).

III. Themes and Findings from Stakeholder Outreach

Through an extensive process of data analysis, stakeholder input and a review of best practices locally and nationwide, UMDI developed a set of identified problems and goal statements around four cross-cutting themes and five specific theme areas, to serve as fodder for a bi-state workforce and talent strategy. The five initial themes centered on education and training providers, as well as the two most active sector strategies:

- 1) Community Colleges
- 2) K-12 Education
- 3) Early Education
- 4) Manufacturing Employment
- 5) Health Care Employment

Each of these themes is discussed further below. The recommended strategies themselves, which were incubated and developed during this process, appear in the next section.

Focus Groups and Listing of Participants

We conducted five focus groups pertaining to focus areas identified by our data analysis and key informant interviews. These groups align to the five major themes identified above, with the exception of K-12 education, where additional interviews proved more logistically feasible.

Young Presidents Organization Focus Group

1. Lou Auletta, President & CEO, Bauer, Inc.
2. Mark Borsari, President, Sanderson Macleod, Inc.
3. Drew DiGiorgio, President, Consolidated Health Plans
4. Scott Grodsky, Executive Vice President, Harry Grodsky & Co.
5. Jay Queenin, President, Specialty Bolt and Screw

Manufacturing Sector Focus Group

1. William Bishop, CFO, Peter Paul Electronics
2. David Cruise, President & CEO, Regional Employment Board of Hampden County
3. Steve Grande, President/Owner, Meridian Industrial Group
4. Eric Hagopian, President & CEO, Massachusetts Center for Advanced Design and Manufacturing
5. Jeff Jordan, Production Planner, Arcor Laser
6. Ed Leydyn, Owner, Ben Franklin Design and Manufacturing
7. Dan Walker, Vice President of Business Development, Hoppe Technologies

Health Care Sector Focus Group

1. Kelly Aiken, Director, Health Care Initiatives, Regional Employment Board of Hampden County
2. Rick Cabral, Administrator, Wingate at Wilbraham
3. Soloe Dennis, Regional Director, Massachusetts Department of Public Health
4. Allison Ebner, Director of Recruiting, FIT Solutions, LLC
5. Jennifer Higgins, Program Manager, Center for Human Development
6. Karen Jackson, Director of Operations, Loomis Communities

7. Cindy Landry, Sr. Human Resources Generalist, Health New England
8. Geoff Little, Sr. Business Account Representative, Holyoke Community College
9. Claudia Muradian-Brubach, Human Resources Manager, Behavioral Health Network
10. Kelly Richards, Vice President of Human Resources, Noble Hospital
11. Melissa Scibelli, Manager, On-the Job Training Programs, Regional Employment Board of Hampden County

Early Childhood Education Focus Group

1. Sally Fuller, Project Director, Davis Foundation
2. Clare Higgins, Executive Director, Community Action
3. Joan Kagan, President & CEO, Square One
4. Mav Pardee, Program Manager, Children's Investment Fund
5. Nancy Reiche, Vice President for Programs, Community Foundation of Western

Community College Focus Group

1. Jeffrey Hayden, Vice President for Business and Community Services, Holyoke Community College
2. Robert LePage, Vice President of Foundation and Workforce Training, Springfield Technical Community College
3. William Messner, President, Holyoke Community College
4. Dr. Robert Pura, President, Greenfield Community College
5. Dr. Ira Rubenzahl, President, Springfield Technical Community College
6. Michael Suzor, Assistant to the President, Springfield Technical Community College

Cross Cutting Themes: Stakeholder Outreach Findings

The stakeholder outreach suggested a number of cross-cutting themes that infused much of the discussion and research, and which suggested themes for the final recommended strategies presented in the next section:

- Increased collaboration and communication is a dominant theme of suggested approaches to workforce strategy in this region and elsewhere, and a characteristic of successful strategies everywhere. Both across borders and across silos, stakeholders in the Knowledge Corridor noted that working collaboratively to solve problems and cement career pathways is improving, but there is still a long way to go. Cross border collaboration is difficult for a number of reasons. Differing state regulations and workforce funding programs can complicate development of cross-border strategy. Workforce investment boards, community colleges, and other education and career training groups typically have a specific jurisdiction (and these generally focus on specific MA or CT counties). In sum, distance and time have contributed to limited cross-border partnerships and joint program implementation even when rewards could be great.
- Business engagement is an undercurrent in many of the strategies, and a necessary emphasis of any successful strategy. Business leadership is a vital ingredient for healthy workforce and economic development alike, but business leaders are often focused on survival at the expense of long-term strategic thinking, and may not consider seriously addressing workforce issues unless they threaten the short-term survival of the business.
- As could be expected, funding is an issue that affects the ability to implement groundbreaking strategies across each of the themes. In particular, the region should consider ways to source funds

regionally, including pool funds, which could be from foundations, business, government, nonprofits, or a combination.

- There is a clear focus on transitions: from early education through high school to college or career, from career back to school, and through career ladders. Breaking down silos (for instance, between high schools and community colleges) should provide opportunities to improve these transitions.

Five Themes: Stakeholder Outreach Findings

Each of the five theme areas: Community colleges, K-12 Education, Early Education, Manufacturing Business Initiatives, and Health Care Business Initiatives, are discussed in greater detail below.

Community Colleges

Problem Statement

Community colleges provide a sought-after and valuable commodity, and the community colleges in the region are a critical asset. Most of today's well-paying jobs require a credential beyond a high school degree. Associates' degrees and/ or certificates are the most accessible and promising route to a job with a living wage and a genuine career path for many. In the five counties of the Knowledge Corridor, there is as much as a 23 percent difference in median annual wages between those with an associate's degree or some college, and those with only a high school degree.

However, community college students often face many obstacles to degree completion, and even for those who graduate, entry to specific jobs is far from guaranteed. Many first-year community college students, even with a high school degree, require remedial education courses to be prepared for higher education coursework, which is not eligible for financial aid. A large percentage of students who enroll complete coursework, but do not complete a degree. Community colleges strive to provide a quality credential with an annual per-student budget that is lower than that for K-12 schools or the region's four-year public higher education institutions. Finally, education in sought-after and lucrative fields like STEM is more resource intensive than general studies programs or less lucrative fields, but reimbursement is the same. Resources are a critical issue.

Meanwhile, for those without even a high school diploma, access to adult basic education (ABE) is in high demand, and available resources can't keep up. Area ABE programs are oversubscribed, with long waiting lists. The large number of adults needing ABE represents an underutilized resource with otherwise limited attachment to the workforce.

Goal

Increase attainment of degrees and stackable credentials. Increase graduates' work readiness, job placement and earnings.

Findings

- Successful initiatives employ cross-border collaboration between community colleges and workforce boards around specific initiatives, such as health care sector employment. Labor markets do not stop at state or county borders, and neither should sector initiatives.

- Successful initiatives expand relationships and job placement initiatives between colleges and employers in specific industries, led by dedicated staff with knowledge of specific industries, such as the Training and Workforce Options (TWO) model from STCC/ HCC.
- The promise of real reform would secure additional resources and legal/ regulatory allowances to allow for additional tuition assistance, coaching and support services, and financial aid for summer schooling to improve retention and completion. Model on CUNY's Accelerated Study in Associates Program, which offers financial support and support services and has doubled their graduation rate with an additional expenditure (over previous funding) of \$3,900 per student per year.²
- Opportunities exist to employ innovative models to bolster the transition from high school to college and career for disadvantaged youth, such as P-TECH (a STEM 9-14 school in Brooklyn with private financing); expansion of STCC College NOW and Gateway to College programs; Virginia Community Colleges Career Coaches.
- While challenges are real, the rewards of scaling up availability of certificates and stackable credentials are just as real.

K-12 Education

Problem Statement

Every homegrown member of the labor force in the Knowledge Corridor passes through the K-12 education system or its private schools. A quarter of these future workers are young people who live in the region's urban cores, where high school graduation rates hover as low as fifty percent. In some cities, a majority of third graders are unable to read at grade level.

Urban schools in the region, as elsewhere, face daunting challenges: students who live in poverty and may experience traumatic life events such as violence or homelessness. A large segment of residents do not speak English well, if at all. These issues are exacerbated by a greater degree of poverty and unemployment in the region's cities as compared to major metropolitan areas. The region's urban school districts truly have their work cut out for them.

Goal

Increase attainment of high school degrees or alternate credentials in urban school districts. Improve student performance at every level, from kindergarten through high school, until it is on par with surrounding districts and state norms.

Findings

- Transitions can prove a dangerous time when students either sink or swim, and the transition from school to work can be challenging for youth without previous experience or exposure. Additional guidance and services during the transition from high school to career or college can make all the difference.
- Business leaders, educators and outreach workers all noted that many youth do not have the opportunity of exposure to career pathways while they are young enough to chart their course

² http://www.cuny.edu/academics/programs/notable/asap/Levin_ASAP_Benefit_Cost_Report_FINAL_05222013.pdf

forward. Widening middle and high school career awareness for the region's target industries is a broadly favored approach.

- One of the most promising approaches is to expand innovative middle skills transition initiatives, including dual enrollment programs, 9-14 programs that award an associates degree and high school degree, and innovative programs such as Springfield's new Tech Foundry program that seek to train and connect young people to specific skills and opportunities before high school graduation.
- Many teacher education programs do not prepare teachers for the special challenges of teaching in urban school districts, including teaching children who speak little English, or for those who must cope with traumatic life events. Specialized programs like Clark University's Adam Institute for Urban Teaching give new teachers the opportunity to learn on the job from experienced mentors. A regional training academy and/ or coaching for administrators and teacher leaders in K-12 schools serving disadvantaged populations could begin to meet this need.
- Multiculturalism is a strength, and should be branded as such. As one example, school districts across the country are considering and adopting measures such as a certification for dual language speakers at high school graduation. Teachers, administrators and business can work together to ensure that the potential, not just the limitations, of diversity are fully recognized.

Early Childhood Education

Problem Statement

Employers and college educators often note that students and job seekers arrive at school or work without the right mix of job-ready and technical skills. Evidence shows achievement gaps in children from different backgrounds as early as kindergarten, and these only get worse over time. Evidence, based on rigorous research, also shows that early education is cost-effective with a strong return on investment. Quality programs provide long-term effects on both academic and behavioral development and achievement that affect career prospects, as well as long-term health and other measures of well-being.

But access to quality early education is far from universal. Forty percent of three and four year olds in Massachusetts, and nearly forty percent in Connecticut, are not enrolled in pre-kindergarten.³ This is better than the national average, but it obscures the fact that only 15 percent of Massachusetts 4-year-olds and 13 percent of Connecticut 4-year-olds are enrolled in state-financed programs, far lower than the top states of Florida (76%), Oklahoma (73%), and Vermont (74%), as well as the U.S. average (28%).⁴ While limited data suggest that participation in pre-K appears to be higher than state averages in urban areas where the benefits might be the greatest, there is still room for significant improvement. Meanwhile, according to a 2011 report by Child Care Aware America, Massachusetts was ranked 6th and Connecticut was ranked 23rd least affordable states in the nation for center-based childcare for a 4-year-old, with average annual costs of over \$10,000 in both states.⁵

Providers note that the market rate for services that determines subsidies for programs is far below the true cost of providing those services. Consequently, many care providers forego state subsidies, which are inadequate to cover the costs of the attached regulations. Care for infants and younger toddlers is more costly than that for older children due to higher teacher to student ratios etc., and the cost of care for 3 and

³ <http://datacenter.kidscount.org/>

⁴ <http://www.nytimes.com/interactive/2013/02/13/education/State-Financed-Pre-kindergarten-Access-In-the-US.html>

⁵ http://www.naccrra.org/sites/default/files/default_site_pages/2012/cost_report_2012_final_081012_0.pdf

4-year olds often subsidizes the care for infants and younger toddlers in centers. Funding structures should account for the fact that moving 3 and/ or 4-year-olds from these centers would therefore leave care for infants and younger toddlers even more severely underfunded.

Current funding sources frequently tie early childcare to a working parent, which results in instability for a child if the parent's work situation changes. Full-day universal early education would end this destructive pattern and prove a boon to working parents as well.

Goal

Increase resources, affordability and availability of high quality early childhood programs and teachers, including pre-kindergarten and programs for infants and children ages 0-3 in the Knowledge Corridor. Ensure that early childhood education is seen as a vital part of a sustainable, long-term workforce and economic strategy for the region. Ultimately, ensure universal pre-kindergarten and widespread access to programs for infants and children ages 0-3.

Findings

- Innovative funding solutions could provide for truly universal care that is attached to the child, not the parent, and secure new broad-based funding for regional and/ or state early education programs. Look to San Antonio's sales-tax funded pre-k; Oklahoma's universal pre-k; Georgia's universal pre-k; Programs in Washington, D.C. and New Jersey; New York state/ city's initiatives, and others.
- There is a need for updated documentation of the true cost (not market cost) of early childcare by age to establish a baseline cost for universal quality early childcare in the region and state. Local elected officials, hospitals (who are accountable for new community engagement and outcomes under the Affordable Care Act), Chambers of Commerce, rotary clubs, foundations, colleges, school districts, and others may engage as funders, thought leaders or collaborators.
- Public awareness, particularly in underserved communities, of the long-term benefits of early childhood education must be made a priority to move the issue forward.
- Pay scales and career advancement opportunities for early childhood teachers are inadequate to attract and retain sufficient numbers of quality teachers. Look to Davis Foundation's Developing Early Childhood Educators and QUEST initiatives, Massachusetts Department of Early Education and Care Career Pathways, Los Angeles County Early Care and Education Career Lattices, and others. Above all, raising funding levels would permit the development, hiring and retention of a greater number of excellent teachers.
- A universal intake program for early childcare in one community, school district or neighborhood could solve problems of access while ensuring full enrollment for area schools in a small area. Square One previously explored a similar approach in Springfield's Mason Square. The system would include a coalition of area providers, local promotion of the benefits of early childcare, and a centralized database and intake system. Providers may require guarantees of fair placement and equitable sharing of funds to engage in a universal system.
- There is a tremendous need for state-level bureaucratic and regulatory reforms to improve both quality and access to funding. State restrictions on Child Care and Development Block Grants (CCDBG) funds that are more onerous than federal requirements, such as Massachusetts' twice-yearly income checks for parents instead of yearly checks, are one example. Situating early

childhood education within K-12 education departments could better align educational goals and approaches. Bureaucratic reforms such as the use of a single identifier that will follow children through early education and K-12 education would allow for more advanced tracking and service delivery, though this must address families' concerns about this system as a potential invasion of privacy.

Manufacturing Sector

Problem Statement

Knowledge Corridor regional workforce agencies are strongly focused on sector based strategies in manufacturing, health care, education and IT. While some jobs in manufacturing require four year or more advanced degrees, manufacturing remains a highly valued and unusual source of living wage jobs that require only an associate's degree, vocational training, or other custom training. The Knowledge Corridor maintains a strong set of small to large manufacturing firms, accounting for about 10 percent of the region's employment.

A primary problem that manufacturers have articulated time and again is the difficulty in finding workers with the skills manufacturing demands, either basic education (e.g. math skills), specific technical skills (e.g. C&C machinists), especially "hands-on" experience, or "soft" (job readiness) skills. A 2014 study in Connecticut estimates that there will be approximately 9,300 manufacturing job openings in manufacturing by the end of 2015.⁶ Meanwhile, the aging of the workforce means that many skilled workers are nearing retirement age, and there is no ready pipeline of younger workers or apprentices to take their place. Skills in some occupations are so specialized that it takes serious investment and many years of training to achieve the necessary skill levels.

Moreover, manufacturing in the region is vulnerable to competition from other places, and despite the remaining strength of firms and jobs in the region, employment has continued to decline slightly in recent years. Experts on the sector note that sustaining existing businesses, in addition to laying the groundwork for expansion, is a high priority.

Goal

Increase alignment of educational and workforce training programs with manufacturing's specific needs, while ensuring that workers have flexible skills and training that allow them to adapt with a changing industry. Increase graduates' work readiness through both soft skill improvement and industry-specific training. Improve coordination of manufacturing-specific workforce and business support initiatives across the region to expand effective initiatives, minimize redundancy and make the most of available resources.

Findings

- Collaboration between business and schools, so that schools receive feedback from business about what is working well and not working well in their education programs and can tailor programs appropriately, and so that businesses understand what training may be most appropriately provided under their watch, is key. Communication goes both ways: manufacturers tell schools when their needs are not being met, and schools/ instructors help manufacturers find the most dedicated, hardworking students to hire. Businesses should contribute to career coaching and exposure to manufacturing for younger students, through steps like visiting and speaking to classes, holding open houses, and other promotional efforts to raise the profile and desirability of

⁶ "2014 Survey of Connecticut Manufacturing Workforce Needs" Connecticut Business and Industry Association, et al.

manufacturing careers. For approach to be a success, businesses must feel that they are benefitting from offering their time and resources.

- Additional funding and the relaxation of certain educational and other requirements could ensure an adequate supply of well-qualified technical instructors at area schools, issues which currently limits schools' abilities to hire the most qualified instructors.
- Ongoing on-the-job training, internship or co-op programs for interested applicants from area high schools, community colleges, four-year colleges and/ or workforce investment boards are one of the most promising ways to introduce new workers to manufacturing, if hurdles of appropriate training and funding can be adequately addressed.
- Workforce services and other business support services, such as exports or supply chain assistance, access to capital, and other needed assistance within a single, easy-to-access framework give businesses a reason to connect to services. There are efforts already underway within the region to do this.

Health Care Sector

Problem Statement

Health care, ranging from hospitals, physicians' offices and outpatient care centers, home health care, nursing and residential care centers as well as medical laboratories, has been a consistent focus of these workforce strategies around the region. While some jobs in health require considerable higher education, the industry remains a highly valued and unusual source of living wage jobs that require less than a bachelor's degree. Many occupations with the strongest projected growth in the region are health care occupations that may require an associate's degree or less, including registered nurses, nursing orderlies and attendants, licensed practical and vocational nurses, and home health aides. Meanwhile, employers note the growing need for billers, medical coders, health IT, and other support occupations.

The extensive opportunity for economic and workforce growth presented by the robustness of the region's health care industry and employers is well appreciated, and various successful programs and models exist to capitalize on these opportunities. Despite high rates of unemployment and many more job seekers than there are available jobs, employers still have difficulty finding qualified applicants in some cases, noting a gap in workforce readiness/ soft skills for entry level applicants in particular. More specifically in lower level jobs, retention also poses problems.

Successful initiatives to address health care workforce needs exist, but there are real opportunities to broaden and extend these programs to meet needs for a wider array of occupations and skills, and to address needs more broadly across the entire Knowledge Corridor region. A more comprehensive, coordinated regional strategy could contribute to a stronger workforce with well-defined career pathways, and ultimately to higher quality patient care.

Goal

Increase alignment of educational and workforce training programs with health care employers' specific needs, while ensuring that workers have flexible skills and training that allow them to adapt with a changing industry.

Findings

- Collaboration among businesses across the region to better address the full scale of need and the skills needed, and to disseminate best practices in staff recruitment and development, should be targeted at specific occupations and/ or career ladders. By partnering with educators (community colleges, vocational schools), workforce organizations and others across the region, businesses can identify real-time workforce needs, including numbers of employees, skills and training needed, and barriers to recruitment and retention to more accurately steer talent toward promising careers.
- More collaboration across stakeholders could help to ensure that career pathways are well defined with appropriate transitions and support. Loomis Communities' work with REB and STCC is one model. Businesses can share best practices, as well as support services for employees' mobility such as tuition reimbursement or social supports for working families.
- On-the-job training, internship or co-op programs for interested applicants from area community colleges, four-year colleges and/ or workforce investment boards is a successful approach to matching workers and businesses. Challenges such as the initial expense and investment of training new workers, and low retention rates of entry level employees can be addressed by practices such as wage subsidies.
- Regional and state partners need to be aware of a lack of current, targeted data on health care industry workforce demand and supply. Workforce agencies working together can identify specific agencies and seek access to data sets that would contribute to better targeted training and workforce efforts. Primary data collection (via surveys) is another promising tool to identify and measure the scale of real workforce needs.

IV. Knowledge Corridor Talent and Workforce Strategies

This section presents strategies to address pressing workforce and talent needs in the bi-state Knowledge Corridor region that stretches from roughly Hartford, CT north along I-91 and the Connecticut River to Greenfield, MA. Underscoring this strategic plan is the idea that when it comes to economic development, talent matters most. Whether it's for site location decisions, entrepreneurial eco-systems, or innovation company expansion, talent and the presence of a deep pool of skilled workers is the most important factor in regional economies. Accordingly, the focus is on identifying actionable strategies that the region should implement over time across the full pipeline of talent and workforce development – sometimes referred to as “cradle to career.”

Top Three Challenges for Workforce and Talent

While this is a complex topic with almost unlimited factors, stakeholders and challenges, we have identified three core problems that need to be addressed to help the Knowledge Corridor achieve its full potential for economic growth and sustainability:

1. The educational and career outcomes for residents of core urban areas (in particular) limit the economic trajectory of the cities (e.g., New Britain, Hartford, Springfield, Holyoke) and the region as a whole;
2. An aging workforce and demographic trends that indicate a shrinking pool of working age residents creates even more need to raise the skills of incumbent workers and ensure a reliable pipeline of new workers for key sectors, such as manufacturing and health care; and
3. There is an overarching difficulty in bringing successful programs to scale based on a universal lack of funding which limits the number of people (headcount) served compared to need, and limits the outcomes from early education through business-based training initiatives.

In many ways, the strategy envisioned for the Knowledge Corridor is consistent with recent efforts by the Connecticut Business Industry Association (CBIA) Education Fund⁷ and the Massachusetts Business Alliance for Education (MBAE)⁸ to strengthen the educational systems and training preparation of its residents for jobs. In summary, the MBAE's latest report “The New Opportunity to Lead” highlights three overarching tactics: 1) reforming various aspects of the delivery of education and training; 2) unleashing innovation through collaborative efforts and scaling up successful programs; and 3) focused and sustained implementation through a wide range of stakeholders.

⁷ <http://www.cbiam.com/edf/>

⁸ <http://www.mbae.org/>

Vision and Goals

In the face of these challenges, the Knowledge Corridor has very strong assets to build on – world-class colleges and universities, innovative companies and recognized industry clusters, and multiple “best practice” educational and workforce initiatives. If increased regional collaboration, scaled program implementation, and expanded resources can be pooled together, the region has the building blocks to achieve an ambitious **vision** for talent and workforce development in the Knowledge Corridor region where:

- Talent is created, attracted and retained at levels competitive with other leading regional economies;
- Talent and resources sustain and grow local businesses, and launch a diverse array of new businesses; and
- Upward economic mobility is a reality and opportunities are available for all.

Based on the experiences of other regions already working towards collaborative talent and workforce strategies, achieving this vision will require a regional acknowledgement that sustained collective action is needed to support collective impact and realize more specific **goals** of:

- Increasing the attainment of middle skills and higher educational and training credentials to be comparable to the best performers nationally.
- Eliminating the gap in educational performance between urban core areas and the rest of the region.
- Attaining national recognition as an economic corridor known for providing ample talent, resources and supports for key business sectors to thrive.
- Sustaining and scaling successful programs and collaborations to solidify gains and ultimately transform the region.

Based on significant local and regional stakeholder input, third-party research, and best practices in talent and workforce initiatives, this strategic plan has identified 18 specific strategies for action and implementation. As depicted in Figure 1, this strategy has been organized based on three cross-cutting strategies and strategies in four area-specific categories. The strategies cover the full pipeline of talent development, and help indicate the large number of strategies that are best achieved with collaboration across multiple stakeholders. Along those lines, after descriptions of each individual strategy, we present some initial ideas about how these strategies can be implemented over time by way of “teams” of stakeholders focusing on different elements of the talent pipeline.

Figure 2. Knowledge Corridor Talent and Workforce Strategy

Cross-Cutting Strategies			
1. Promote Business Community Engagement in Workforce and Talent Initiatives			
2. Increase the Regional Investment in Talent, Workforce and Education			
3. Create Wide-Reaching Essential ("Soft") Skills Programming			
Area-Specific Strategies			
Early Childhood Education	K-12 / Vocational Schools	Community and 4-year Colleges	Career / Workforce Training
Implement Universal Early Education Intake Pilot Programs in Distressed Cities	Strengthen Vocational and High School Links/Pathways to Employers and Education		
	Widen Middle and High School Career Awareness for the Region's Target Industries	Support and Expand Adult Basic Education	Increase Access and Opportunities to State-funded Workforce Training Grants
		Reform Funding for Community Colleges	
Advocate and Fundraise for Universal Birth through Five Programs	Create Targeted Urban Teacher Education Curriculum at Area Colleges		Expand Industry Engagement in Target Sectors
	Expand Innovative Middle Skills Transition Initiatives		
	Improve Vocational School and Community College Recruiting for Instructors		
	Develop Training Academy and Coaching for Administrators and Teacher Leaders in K-12 Schools Serving Disadvantaged Populations	Promote Entrepreneurship Opportunities and Education	
		Attract and Retain Younger Talented Workers	
		Implement Pilot Employer-Driven Customized Training Programs with Employer Funding Matches	

Cross-Cutting Strategies

Promote Business Community Engagement in Workforce and Talent Initiatives

An over-arching, cross-cutting issue for talent and workforce development is the engagement of the business community and employers. Based on our research and focus group findings, significant efforts are already being made to incorporate input, feedback and direct guidance from employers to the curriculum and training at vocational schools, community colleges, etc. This includes the industry sector focused initiatives being led by regional workforce investment boards, industry advisory boards for vocational schools, community colleges and career-focused colleges like Goodwin College and Bay Path College to groups like the Springfield Business Leaders for Education. Stakeholder feedback revealed that successful efforts often require occupation-specific analysis of headcount needs, and a customized mix of incumbent training and new employee training to needs for businesses across each industry. Ensuring that training is current with the latest technologies and software (IT) and modern equipment (manufacturing) requires frequent engagement by the business community. In addition, employers can also play a key role in broader talent development initiatives such as: 1) hosting open houses to build awareness of career opportunities in a variety of fields; and 2) helping to fund and sustain best practice programs and educational initiatives with demonstrable positive outcomes. Coordinated outreach, partnership and sustained effort with the business community is essential, and we recommend increasing the resources to engage in this work (e.g., regional workforce investment boards, Metro Hartford Alliance, Western Mass Economic Development Council, etc.).

Increase the Regional Investment in Talent, Workforce and Education

When it comes to economic development, talent matters most. In virtually every survey of site selectors and businesses, the most important factor for business expansion and re-location decisions is the workforce and talent pipeline. At the same time, funding and resources from the federal and state levels continues to shrink or at best hold steady despite the tremendous needs and demand for adult basic education, industry-specific workforce training and other educational programs. To counteract this, an emerging number of regions across the country have decided to take matters into their own hands by finding ways to supplement and enhance investment in education and workforce – the most critical determinant of a region’s economic development success. Therefore, a long-term strategy must be to create partnerships and creative mechanisms to enhance the region’s own investment in its human capital. The most successful strategy to achieve collective impact is to combine resources from business, non-profits (universities, hospitals), and foundations with available resources locally and nationally.

Create Wide-Reaching Essential (“Soft”) Skills Programming

According to one recent survey of manufacturing employers in Massachusetts, the vast majority of employers would be willing and able to train job applicants with the right basic and soft skills – areas which are perceived as seriously lacking for many workers. In another survey conducted for the Massachusetts Business Alliance for Education, 38 percent of employer respondents gave public schools a grade of D or F in terms of “awareness of work appropriate behavior” and just 19 percent gave an A or B. An effective model for soft skill (or applied skill) development would be a boon to the region’s workers and businesses – an issue and opportunity that cuts across education and training providers at all levels. In order to maintain credibility for job placements purposes, such a program must enforce strict expectations and standards for completion, and/ or consider ongoing coaching and support for participants post-employment. Such models could span programs targeting early ages (middle or even elementary school), which may provide a greater return on investment if gains at these early ages can be solidified, with programs for high school students and/ or adults. Acting on this kind of initiative as a bi-state regional collaboration with joint use of resources and funding among stakeholders could help attract funding and partners.

Early Childhood Education

Implement Universal Early Education Intake Pilot Programs in Distressed Cities

Evidence shows that early education is cost-effective with a strong return on investment, and that quality programs provide long-term effects on both academic and behavioral development and achievement that affect career prospects, as well as long-term health and other measures of well-being. Early education is increasingly understood as a core part of a solution to the challenge of inadequate soft skills in job seekers. While universal early childhood education is an eventual goal for this strategy, a series of pilots of universal care for well-defined urban neighborhoods in each of the core cities in the region provides a step along that path. Early childhood education providers in each city should spearhead efforts to identify a pilot neighborhood, recruit providers to participate, and create a universal intake system to ensure broad access to early care for children in the pilot neighborhoods. To be effective, this streamlined enrollment effort would be combined with targeted outreach to promote the benefits of early childhood education to area families.

Advocate and Fundraise for Universal Birth through Five Programs

Quality early education is increasingly heralded as one of the most cost-effective means to address both poor educational outcomes and more subtle outcomes of persistence and motivation, especially for disadvantaged children. Fundamentally, access to quality early childhood education is a funding issue. Many current funding sources tie early childcare to a working parent or a family's income, which results in instability for a child if the parent's work situation changes or if income increases incrementally over the cut-off. Concerted efforts should be made to explore new and innovative funding solutions, while also restructuring funding sources to follow student need rather than parental work status or strict family income limits. The region should focus on increasingly playing an advocacy role to increase state funding for early childhood education on both sides of the border, while also seeking out new and innovative partnerships to expand programs, using models that call on regional funding sources as outlined in the structural funding solutions below.

K-12 / Vocational Schools

Strengthen Vocational and High School Links/Pathways to Employers and Education

In educational circles and private business, there is growing recognition that, in the words of Harvard Graduate School of Education's "Pathways to Prosperity" report, "preparing for college and preparing for a career should not be mutually exclusive options". Meanwhile, the stigma of vocational schools as byways for the non-college bound is ending and new vocational approaches and programs in vital areas such as advanced manufacturing and STEM education are marking vocational school as a viable path to career success, with or without college. Outstanding models such as Westfield Vocational Technical School and Pathfinder Vocational School are uprooting the notion of the successful high school as a one-size-fits-all educational experience. Despite these examples, the transition from high school to college or career is not a universally well-guided process. Through partnership with business and higher education using strategies like curriculum alignment, career coaching (similar to Virginia Community College System Career Coaches, who operate in high schools) and others, vocational and high schools can ensure that students graduate high school ready to work and/ or continue their educations.

Widen Middle and High School Career Awareness for the Region's Target Industries

Young people often have little sense of what they want or should reasonably expect from a job, let alone a career. Both youth and parents may have misconceptions and a general lack of knowledge surrounding opportunities and conditions in some of the region's strongest industries, particularly manufacturing, but also in health care, and information technology. In an effort to bridge this gap, the Knowledge Corridor region should expand employer engagement initiatives for students, their families, and the community as a whole. New approaches to industry exposure include open houses, wherein students and their families can visit modern manufacturing facilities as is currently showing promise in Connecticut, or visit demonstrations of modern medical equipment. Likewise, employers note that job fairs and classroom visits can be worthwhile and rewarding, but coordination between large numbers of schools is time consuming and limits employer participation. As a region, consider securing funds to create a new coordinator position to better coordinate events such as open houses, job fairs and classroom visits.

Expand Innovative Middle Skills Transition Initiatives

As it grows clearer that training beyond a high school diploma is a growing necessity to succeed in today's knowledge-driven economy, innovative approaches to training and education beyond traditional high school have grown in popularity and are demonstrating success. Programs such as P-Tech, a grades 9-14

model technical school that prepares students for IT careers and has now been replicated in several states; Tech Foundry, an early stage initiative based in Springfield that will grant IT certificates to high school students and connect them to employment; and others promise new and innovative approaches to education and training. Promising initiatives like these deserve the full resources and backing of decision makers and the community in the Knowledge Corridor.

Develop Training Academy and Coaching for Administrators and Teacher Leaders in K-12 Schools Serving Disadvantaged Populations

Both Connecticut and Massachusetts have mechanisms for improving, restructuring or replacing failing urban schools, though these differ. One of the most common elements of these efforts is increased responsibility and accountability of school administrators/ principals for instructional quality and outcomes in their individual schools. This tends to happen one school at a time. A more concerted regional effort to provide training and/ or coaching to principals and “teacher leaders” in underperforming or struggling schools, specifically in the area of improving instructional quality through teacher coaching, recruitment and retention of quality instructors, provides an opportunity to scale up a promising approach.

Community and 4-year Colleges

Support and Expand Adult Basic Education

Demand for Adult Basic Education (ABE) in the region far outstrips the available services, and there is reason to believe that some traditional outcomes for ABE programs, such as award of a GED, are less connected to real employment outcomes than may have been wished.⁹ Addressing both the lack of funding and the demand for real world outcomes, Massachusetts has enacted a new pay for success (PFS) model that promises to provide significant additional funding to ABE using a return on investment model based on outcomes such as increased employment and degree attainment, as well as reduced incarceration and reliance on safety nets, rather than the intermediate outcome of ABE program completion. Currently, Holyoke Community College and Springfield Technical Community College are pursuing increased grant funding for adult basic education through the Massachusetts pay for success initiative in a partnership model that will combine traditional ABE and ESOL services with career coaching and placement services. Results of these efforts should be closely monitored and successful approaches replicated (whether PFS or other models) to increase the funding and implementation of ABE throughout the region. This is especially critical as the region’s major cities, such as Springfield, have particularly low labor force participation rates which highlights the importance of reconnecting this population to the workforce with all the corresponding benefits that provides (higher household incomes, lower poverty, etc.).

Reform Funding for Community Colleges

Current funding for community college is lower than that for both K-12 and state four-year institutions on a per-student basis. Meanwhile, funding regulations often limit the usefulness of funds, by making summer school ineligible for financial aid, and funding education in STEM and other high-promise fields at the same level as more traditional or general studies students in spite of the more resource-intensive nature of these fields. These difficulties contribute to typically low rates of completion for associates’ degree students, and limit effectiveness of programs. Increased financial aid and support services, as are available through the City University of New York (CUNY)’s Accelerated Study in Associates Programs (ASAP) program, have been shown to result in dramatically improved completion rates for community college students, doubling

⁹ http://www.nber.org/papers/w16064.pdf?new_window=1

graduations and boasting impressive cost-effectiveness ratings.¹⁰ Both increased funding and more flexible funding should be encouraged to improve student retention and graduation rates.

Improve Vocational School and Community College Recruiting for Instructors

Instructors for technical programs require up-to-date technical and industry knowledge to be effective, a fact that is sometimes at odds with traditional teacher education requirements. Likewise, instructors with up-to-date technical knowledge are often in demand for current jobs in industry that may have significantly higher pay scales. Since quality instruction is critical and resources are scarce, requirements for hiring should be revisited (at the state level when necessary) and funding should be secured to ensure the highest quality of instruction. These changes must be enacted at the state level, meaning that regional stakeholders' role is one of advocacy and partnership with state agencies.

Create Targeted Urban Teacher Education Curriculum at Area Colleges

Educational requirements for teachers, while extensive, do not specifically address the challenges and needs associated with teaching disadvantaged students specifically in urban settings. Among other factors, this contributes to difficult recruitment and retention of quality instructors in urban schools. Urban districts have unique needs for social and emotional learning that comprise the "soft skills" that employers seek, English language learning, addressing trauma and other issues that disproportionately affect outcomes for disadvantaged students. K-12 educators and others should work with area colleges to develop specialized curricular and training tools that prepare teachers for these and other challenges of teaching in urban schools. School districts will monitor teacher recruitment and retention, teacher performance evaluations and student performance, and provide feedback to area colleges and universities on areas for improvement in teacher education and preparation.

Attracting and Retaining Younger Talented Workers

A critical long-term determinant of the region's economic success is the ability of the Knowledge Corridor to attract and retain younger, talented workers. While the region's colleges produce a large number of college graduates each year, the perceived lack of career opportunities and the lure of larger nearby cities such as Boston and New York results in a challenging environment to grow our pool of talented, entrepreneurial younger workers. And current research on demographic trends and the growing demand for skilled workers with at least an associate's degree predicts a looming shortage of college-educated workers in the region. For example, the Connecticut Planning Commission for Higher Education¹¹ is completing a strategic master plan for the state that includes a thorough assessment of the future demand for jobs with higher education credentials and will be recommending policies to address these needs. A similar effort could be initiated in Massachusetts to recognize the growing percentage of jobs that require higher education degrees. This long-term strategy should also focus on leveraging and better promoting the current and emerging assets in the region related to tangible opportunities for high-quality, walkable urban environments that are increasingly in demand. Consistent with the overarching HUD Sustainable Communities initiative, the region should actively implement policies in support of transit-oriented development in anticipation of enhanced rail service. The region should also support efforts for improved rail service that provides frequent, time efficient connections to Boston and New York, in particular. In addition, the region should increase the role and voice of groups like HYPE in Hartford and the Young Professionals Society (YPS) of Greater Springfield in the future vision of the Knowledge Corridor. Finally, it is important to support the role of guidance counselors, parents, and colleges to help students choose higher education options and pathways that will lead to successful completion of degrees.

¹⁰ http://www.cuny.edu/academics/programs/notable/asap/Levin_ASAP_Benefit_Cost_Report_FINAL_05222013.pdf

¹¹ See <http://www.cga.ct.gov/hed/pched/pched.asp>

Career / Workforce Training

Increase Access and Opportunities to State-funded Workforce Training Grants

While both Massachusetts and Connecticut offer a mix of workforce training and on-the-job-training grants directly to businesses (and non-profits), the application process can be overly cumbersome and dissuade employers who already have limited resources from applying. Easing the application process, or opening and/ or advertising underused avenues to access these funds, could greatly benefit the region's employers looking to expand and train new workers. Businesses could benefit from increased education and awareness of expedited applications processes, such as have recently been implemented in Massachusetts with the Express Program for businesses with under 100 employees; and increased awareness of alternative ways to tap these resources, such as formation of a consortium of companies with similar training needs that can reduce the administrative burden on individual companies. One specific idea mentioned by stakeholders is to pursue state grant funding to help businesses train the next generation of leaders (executives, managers). This could be accomplished in partnership with local colleges (helping to identify and implement training) to help companies achieve the "knowledge transfer" to younger workers necessary as senior staff transition towards retirement.

Expand Industry Engagement in Target Sectors

Without vibrant regional businesses, a strong workforce is impossible. Stakeholders recognize that workforce outreach is best conducted as part of a broader industry cluster framework that addresses the most pressing needs and problems in each industry, whether or not those directly relate to workforce issues. Building on and expanding the success of initiatives such as PMRAP, the Healthcare Workforce Partnership of Western Massachusetts, Training and Workforce Options (TWO), and other employer engagement initiatives, stakeholders must work with employers in targeted industries to address their needs across a variety of areas, including workforce. This strategy calls on a comprehensive labor market approach that does not stop at state or county lines. It calls on educators and workforce organizations to hold business outreach as a core component of realizing their goals, and equally on businesses to come to the table and freely share best practices and information about their needs and concerns, and to encourage business partners and competitors to join the conversation. The resulting solutions will place an emphasis on continuing feedback between education and training programs and employers to ensure that employers' real needs and difficulties are addressed. In keeping with current regional efforts, efforts in manufacturing and health care will be at the forefront, and successful approaches may be replicated for other industries.

Implement Pilot Employer-Driven Customized Training Programs with Employer Funding Matches

Public and private sector leaders alike recognize that successful training and education efforts require business to partner with educators and trainers. But too often, employers see too little gain or have too little at stake to become involved in a sustained way. Providing matching funds to employers for specifically customized training requires businesses to extend both their own money and time to work together with colleges and training providers to develop customized training for new or incumbent workers to suit their needs. A pilot could reroute existing funding to small and medium sized regional employers to engage local educators in the development of customized training for their businesses. Employers would guarantee new or continued employment for successful graduates of these programs. A similar model is now being developed between Springfield Technical Community College (STCC), Holyoke Community College (HCC) and the Massachusetts Competitiveness Project, in which major employers have

contributed funds and knowledge to develop customized training and will arrange employment for successful graduates.

Promote Entrepreneurship Opportunities and Education

Increasingly, successful economic development strategies are recognizing that a common element for cities that are growing is a supportive environment that encourages entrepreneurship and business start-ups for all its residents (college graduates, immigrants, minority groups, etc.). Building on the region's emerging eco-system for entrepreneurship, the Knowledge Corridor should look to build on promising new ventures to create more opportunities for new companies and ultimately jobs for the full-range of its residents. Examples to leverage include the new SPARK initiative in Holyoke (entrepreneurship for Latinos), the Strong Cities, Strong Communities Challenge (SC2) in Hartford to make it *The City* for entrepreneurs¹², other privately-led initiatives like the Valley Venture Mentors, and higher education entrepreneurship programs like the recently funded Center for Entrepreneurship at UMass Amherst. The Knowledge Corridor, especially in its core urban cities, is also blessed with a highly diverse population, and one of the major sources of population growth in the region has been via its foreign born population. This strategy would explicitly focus on how education and training opportunities can be linked with entrepreneurship initiatives. For example, entrepreneurship can be implemented as part of educational curriculum at area high schools, community colleges and four-year colleges, building on a growing body of successful initiatives in the Boston area (e.g., Babson College) and throughout the country.

Action Plan – Next Steps

Implementing this set of ambitious but achievable set of strategies will require a focused and sustained implementation effort across a wide range of stakeholders. The experience of regions around the country that are implementing meaningful talent and workforce strategies is that it takes time – time to implement complex programs, time to build collaborative teams, time to raise awareness and educate decision-makers, and time to raise the level of resources in the community. Keeping in mind that the Knowledge Corridor region does have much to be proud about, with very real “best practices” being implemented in our own backyard, the sooner the region gets to work collaboratively to tackle these challenges, the closer we'll be to achieving our goals and helping to make the Knowledge Corridor synonymous with creation, retention and attraction of talent to support a dynamic economy and diverse set of employers. To help this process along, our proposed action plan attacks implementation from two dimensions:

- 1) Timeframes for full implementation and achievement of goals (short, mid-term, and long-term), along with key performances to track over time; and
- 2) Stakeholder teams to lead the implementation of strategies and to be accountable for progress over time.

Timeframes for Implementation of Strategies

From the beginning of this strategic plan development, the research team and task force kept in mind the idea that it would be important to identify strategies that could be acted on immediately and could produce tangible near-term results and positive impacts. As with any strategic planning effort, a key goal is to

¹² For more information on this planning competition funded by the U.S. Economic Development Administration, see: <https://hartford.sc2prize.com/>

produce enough buy-in and momentum that critical stakeholders can quickly mobilize to ensure that the planning process directly leads to “doing” (implementation). And nothing reinforces a strategic planning effort and implementation like achieving measurable near-term positive benefits that can be communicated to a variety of audiences and stakeholders.

Along those lines, the strategies described above have been organized into short-term (1-2 years), mid-term (3-5 years), and long-term (6-10) initiatives (see Figure below). For example, Hampden County organizations (Holyoke Community College, Springfield Technical Community College, Hampden County REB, Hampden County Jail and Corrections, etc.) are currently partnering on a funding application with Massachusetts for a “pay for success” adult basic education program. This could represent a near-term “win” for the region and an example that could be built on in other parts of the Knowledge Corridor region. Similarly, both Connecticut and Massachusetts have company-specific workforce training grant programs and there are opportunities via expedited forms and collaborative (multi-company consortium) to quickly help more companies in the region access these funds.

It is important to note that mid-term and long-term strategies are not intended to indicate that action on those strategies should wait or that those strategies are somehow not as important as the near-term strategies. Rather, the mid-term and long-term strategies recognize that these strategies will likely require sustained work, collaboration, and advocacy to be achieved over time. In other words, these represent critical long-term needs and objectives for the region that will require more time to fully implement and a slightly longer timeframe to expect tangible impacts and results.

Performances Measures – How are we doing?

Closely related to any strategic plan should be a set of key performance measures (or “measures of effectiveness” – MOEs) that help to quantify progress towards the vision of talent and workforce in the Knowledge Corridor. Consistent with region’s most pressing challenges and the goals identified earlier, we recommend that the region annually update data on:

- **High school graduation rates** for the region and the urban core cities (Hartford, New Britain, Springfield, and Holyoke) – these rates currently vary from 53 percent in Holyoke to 65 percent in Hartford compared to statewide averages of 85 percent in both Connecticut and Massachusetts.
- **Subject proficiency scoring** for the region and the urban core cities starting in grade 3 or earlier – with the eventual goal of eliminating differences between the core cities and state averages in students scoring at the basic and below basic levels in English, math and science.
- **Early education participation and outcomes** – the region should strive to increase participation in early education from birth through age 5 among its poorest residents in particular, and to implement meaningful outcomes measurements in the form of kindergarten readiness measures.
- **Adult educational attainment rates** – the region should strive to increase the percentage of adults with a post-secondary degree, and in Hampden and Hartford counties in particular.
- **Adult basic education served and outcomes** – the region should track: a) the demand for ABE; b) the number of currently served students; and c) the outcomes of ABE students in terms of degrees, certificates and job outcomes.
- **Number of workers trained (certificates/degrees) and placed in target industries** – starting with the key target sectors of manufacturing and health care (followed closely by business/financial services and IT), track the number of students finishing training and hired by local employers.
- **Unemployment and labor force participation rates** for the region and the urban core cities as both measures are relevant in terms of the connection of all residents to job opportunities.

Figure 3. Talent and Workforce Strategies by Timeframe for Implementation

Short-term (1-2 Years)	Mid-term (3-5 years)	Long-term (6-10 years)
Promote Business Community Engagement in Workforce and Talent Initiatives		
Increase the Regional Investment in Talent, Workforce and Education		
Create Wide-Reaching Essential ("Soft") Skills Programming		
Develop Training Academy and Coaching for Administrators and Teacher Leaders in K-12 Schools Serving Disadvantaged Populations	Implement Universal Early Education Intake Pilot Programs in Distressed Cities	Advocate and Fundraise for Universal Birth through Five Programs
Strengthen Vocational and High School Links/Pathways to Employers and Education	Create Targeted Urban Teacher Education Curriculum at Area Colleges	
	Widen Middle and High School Career Awareness for the Region's Target Industries	
Support and Expand Adult Basic Education	Improve Vocational School and Community College Recruiting for Instructors	Reform Funding for Community Colleges
Expand Industry Engagement in Target Sectors	Expand Innovative Middle Skills Transition Initiatives	
Increase Access and Opportunities to State-funded Workforce Training Grants	Promote Entrepreneurship Opportunities and Education	Attract and Retain Younger Talented Workers
	Implement Pilot Employer-Driven Customized Training Programs with Employer Funding Matches	

Stakeholder Teams for Strategy Implementation

Because so many of the strategies that we've identified require collaboration among key stakeholders (e.g., vocational schools, community colleges, workforce investment boards, career centers, etc.), across jurisdictions (e.g., workforce investment boards in Connecticut and Massachusetts) or both, we are recommending that the region embrace and mobilize stakeholder teams to help implement this strategic plan. In some cases, teams may focus on coordination and information sharing of best practices within the region, federal grant opportunities, and advocacy efforts. In other cases, implementation teams may require time to gel or they could benefit from specific events/conferences to pull together more of the actual "doers" in each area (as they may not otherwise be able pause their daily activities).

More specifically, we recommend that the following teams be set up over time and charged with helping implement sets of strategies. We fully recognize that identifying and establishing meaningful cross-border implementation teams is not easy and will likely be an ongoing process. These ideas are thus meant to be fodder for the leadership team implementing the overall strategy to consider as this strategic plan is "operationalized" into action.

- **Cross-cutting and overall implementation** – the Knowledge Corridor Partnership Steering Committee (formerly the Hartford-Springfield Economic Partnership) should be responsible for overall implementation and monitoring progress of this strategic plan as well as the cross-cutting initiatives. This group includes a mix of lead economic development organizations, workforce investments boards, community and four-year colleges and private sector employers that forms an ideal consortium to lead overall implementation. This group would establish the area-specific stakeholder teams consistent with the overall strategy framework that make the most sense.
- **Business community engagement** – we recommend that the Metro Hartford Alliance and Western Mass Economic Development Council take a lead convening role for business community engagement on talent and workforce, working closely with the workforce investment boards, community colleges, vocational schools, chambers of commerce, and other groups to lead a sustained, collaborative effort to engage the business community in all areas of talent development.
- **Early childhood education** – while there are some clear leaders in this area (e.g., the Davis Foundation in Springfield), it is important to recognize that there is not a pre-existing stakeholder team to address the critical issue of early education. Likely stakeholders would also include Square One (Joan Kagan), Community Action (Clare Higgins), and the Connecticut Early Childhood Alliance but other leaders in this area likely need to be identified and organized into a team.
- **K-12 / Vocational Schools** – similarly, initiatives at K-12 school districts and vocational schools tend to be school specific and organized teams across state and municipal boundaries tend not to exist. That said, there are many innovative and promising programs and initiatives at the region's schools that should be scaled and implemented more widely in the region. Creating a team of cross-border K-12/vocational school leaders is critical to make progress in these areas.
- **Community and 4-year colleges** – based on focus groups with regional community college leaders and existing organizations of higher education institutions (e.g., 5 Colleges Inc., higher education consortium in the Hartford area), we suggest that a more formalized partnership of Knowledge Corridor community and 4-year colleges work together on the reforms and strategies identified in this strategic plan.
- **Career and workforce training** – these strategies and this team of implementers would be led by the region's three workforce investment boards (Capital Workforce Partners, Hampden County REB, Franklin-Hampshire REB), in close partnership with the region's career centers and other stakeholders.

V. Knowledge Corridor Talent and Workforce Data Profile

Introduction

Underlying the Knowledge Corridor Talent and Workforce Action Strategy is a substantial body of research, data and evidence that highlight the region's strengths, assets and challenges. A large number of prior reports and analyses have focused on labor market trends and workforce programs and strategies for parts of the Knowledge Corridor region. The vast majority of these cover smaller geographic regions either in Connecticut or Massachusetts, often particular counties. This section of the report presents a first-ever talent and workforce data profile of the entire bi-state Knowledge Corridor across a wide array of labor market, education and related data. While the presented data cover subjects ranging from population growth and poverty to employment by industry, to educational outcomes, collectively the analysis supports the three core problems or challenges identified in this report that:

1. The educational and career outcomes for residents of core urban areas (in particular) limit the economic trajectory of the cities (e.g., New Britain, Hartford, Springfield, Holyoke) and the region as a whole;
2. An aging workforce and demographic trends that indicate a shrinking pool of working age residents means that skilled workers in key sectors, such as manufacturing, are retiring with no ready pipeline to replace those workers and their years of experience; and
3. There is an overarching inability to bring successful programs to scale based on a universal lack of funding which limits outcomes from early education through business-based training initiatives.

Unrealized Potential in the Urban Cores

While post-secondary educational attainment has risen for the region as a whole, high school graduation rates and basic skill proficiency in such subjects as math and reading pose significant challenges for Knowledge Corridor urban areas, which contain roughly 25 percent of the region's population.¹³ With significantly higher unemployment rates and lower labor force participation rates (with the exception of New Britain) compared to the region, the challenges in the region's cities limit the greater region's overall competitive economic capacity.

There is an increasing awareness among stakeholders at various scales that promoting middle skill training and career pathways is both a key factor in regional development success, and provides a pathway for many traditionally excluded groups to achieve higher earnings and career stability: but middle skill workers are also underrepresented in today's workforce. Among other works, a recent report by the Federal Reserve Bank of Boston demonstrated that demand for middle skills workers by industry has largely gone unmet, and is expected to present significant challenges over the next 20 years.¹⁴

¹³ For purposes of this data analysis, we have focused the urban core areas of the cities of Hartford, New Britain, Springfield and Holyoke.

¹⁴ For more discussion see "The Middle-Skills Gap: Ensuring an Adequate Supply of Skilled Labor in Northern and Southern New England" and "Mismatch in the Labor Market: Measuring the Supply and Demand of Skilled Labor in New England" from the New England Public Policy Center and the Boston Federal Reserve Bank at www.bostonfed.org/economic/neppc/.

The region's share of adults with a bachelor's degree or higher hovers near the U.S. average – and significantly below Connecticut or Massachusetts state averages. This underscores the potential for middle skill workers – those with some college, an associate's degree or certifications – and suggests that regional workforce training and development initiatives can play a significant role in building regional prosperity by boosting attainment at these middle levels. The dense concentration of higher education institutions in the region anchored by major research universities and a diverse network of community colleges and specialized training facilities are key assets for the region to engage to achieve these goals.

Aging of the Workforce and Shifting Demographic Trends

Despite the high concentration of institutions of higher education drawing younger students, the region's workforce is aging, with lower levels of younger age cohorts in line to replace the large workforce segment made up of baby boomers. Population and employment growth rates are well below national levels over the long term. Population projections for the region suggest minimal growth over the next 10 years, as the workforce continues to age. Closely related, recent research and policy goals from the Connecticut Planning Commission for Higher Education have focused on how the region can increase the attainment of higher education credentials to help meet projected future demand for skilled workers (compounded by the retirement of baby boomers). For example, research by the Georgetown University Center on Education and the Workforce projects that by 2020, 70 percent of all jobs in Connecticut and 72 percent in Massachusetts will require post-secondary education, compared to an average of 65 percent nationwide.¹⁵ By comparison, 62 percent of adults over age 25 in Connecticut and 64 percent in Massachusetts, compared to 58 percent nationally, currently have some post-secondary education (the figure is 61 percent in the Knowledge Corridor).

Business Outreach and Sector Focus on Manufacturing, Health Care and Finance/Insurance

In recent decades, changes to the region's industrial composition have been largely affected by major declines in manufacturing employment, as well as some steep declines in insurance and finance services, which were significantly impacted by the financial crisis and ensuing economic downturn. At the same time, other strengths in health care and education services have experienced steady increases, and the aging population of the region is projected to increase demand for healthcare and personal service industries, as suggested by occupational projections through 2020. Despite the steep decline in manufacturing industries over the last several decades statewide and nationally, the industry remains a bastion of innovation and a major employer, with numerous small to large manufacturing firms. Along those lines, the region continues to enjoy a relatively large concentration of jobs in health care, manufacturing and finance/insurance. It will be increasingly important for regional stakeholders to maintain a competitive advantage in these key sectors in the hopes of weathering long term shifts in the industry and seeking opportunities to support expansion of locally-grown firms.

About the Data

This analysis draws on a number of publicly available secondary data sources and series, which are limited to geographies provided by the source data. In most cases, we are able to aggregate data to form a cohesive Knowledge Corridor region by county. However, there are some instances where data is

¹⁵ Recovery: Job Growth and Education Requirements Through 2020" from Georgetown University Center on Education and the Workforce, available from <https://cew.georgetown.edu/recovery2020/states>.

aggregated by the limited reported geographies to approximate the region.¹⁶ The data-driven profile is structured as follows:

- Summary facts for the region and discussion of population trends
- Industry and occupational employment trends
- Education levels across the region, with particular attention paid to middle skills education

Regional Summary Statistics

Slightly over half the region's 1.7 million residents live in Hartford County, and an additional quarter of the region's residents live in Hampden County (Table 1). The region's largest city is Springfield, with a population of over 153,000, with Hartford second with a population of over 125,000. Regional employment was more than 819,000, with an unemployment rate of 7.9 percent in 2013. Average wages are significantly higher on the Connecticut side of the border than on the Massachusetts side. Poverty rates are highest in the largest population centers of Hampden and Hartford counties, driven by the extreme poverty in the urban core areas as shown in Table 2.

Table 1: Knowledge Corridor and County Social and Economic Indicators

Place	Population	Employment	Unemployment Rate	Average Annual Wages	Poverty Rate	Education: Bachelor's or Higher*
Knowledge Corridor	1,747,785	814,089	7.9%	\$52,256	13.3%	34%
Franklin County	71,221	25,946	6.6%	\$36,447	11.2%	36%
Hampden County	467,319	196,332	8.9%	\$44,387	17.9%	26%
Hampshire County	159,596	60,607	6.1%	\$40,871	13.3%	44%
Hartford County	898,272	490,838	8.1%	\$61,214	12.2%	35%
Tolland County	151,377	40,366	6.7%	\$42,828	6.5%	39%

Sources: U.S. Census, Annual Estimates of the Resident Population; CT Department of Labor, QCEW; MA Executive Office of Labor and Workforce Development, ES-202; BLS, LAUS; U.S. Census, ACS, 3 year 2010-2012; ACS 2012; UMDI Calculations

*Education level is for persons 25 years or older.

Note on vintage of data: Population and Unemployment rate – 2013; Employment, Wages, Education – 2012; Poverty rate 2010-2012

Together, the four core cities in the region – Hartford, Holyoke, New Britain and Springfield – are home to roughly 25 percent of the working age population, and are home to a disproportionately larger share of people in poverty, with lower income levels and a combination of higher unemployment and lower workforce participation. Unemployment and poverty rates are significantly higher than for the region as a whole, and the staggeringly high rates of poverty – about 1 in 3 people – in these cities provides both a major structural challenge and an opportunity for improvement. Although the unemployment rate is lower in Springfield and Holyoke than in other cities in the region, this is counteracted by labor force participation rates that are much lower in these cities, suggesting the presence of a large number of discouraged and disconnected potential workers.

¹⁶ For instance, the BLS and state OES data series on occupations is not reported by county, but rather by metropolitan statistical area or by workforce investment area. In all cases, these geographies are not county aggregates, and may exclude or include additional subdivisions that do not technically comprise the 5 county aggregates of the Knowledge Corridor region. However, the geographies used under certain data series well represent the core of the region and the broader labor market from which the region draws.

Table 2: Social and Economic Characteristics of Selected Cities of the Knowledge Corridor, 2012

Place	Population	Employment	Labor Force Participation Rate	Unemployment Rate	Average Annual Wages	Poverty Rate
Knowledge Corridor	1,747,785	814,089	66.2%	7.9%	\$52,256	13.3%
Hartford	125,017	110,964	61.6%	15.4%	\$79,474	35.1%
Springfield	153,703	75,045	58.3%	10.9%	\$50,135	29.5%
New Britain	72,939	25,321	67.8%	11.5%	\$52,004	24.2%
Holyoke	40,249	22,039	58.1%	10.2%	\$40,343	33.9%

Sources: U.S. Census, Annual Estimates of the Resident Population; CT Department of Labor, QCEW; MA Executive Office of Labor and Workforce Development, ES-202; BLS, LAUS; BLS, QCEW; U.S. Census, ACS, 3 year 2010-2012; UMDI calculations

Note on vintage of data: Population, Labor force participation rate, Unemployment rate – 2013; Employment, Wages – 2012; Poverty rate 2010-2012

Population and Labor Force Trends

As of 2012, the population of the Knowledge Corridor was estimated to be about 1.7 million people, roughly half the size of Connecticut and about a quarter the size of Massachusetts (see Table 3). The majority of the region's population is located in Hartford and Hampden counties, accounting for about 80 percent of the total. Hartford County alone accounts for just over half of the region's total. The major cities of the region include Holyoke, Springfield, Hartford, and New Britain and are home to about 23.5 percent of the region's population, as of the 2010 Census. This share has remained relatively constant since 2000, where about 24 percent of the region's population lived in the main cities.

The region's population growth has been slow over the past decade, increasing by a modest 4.3 percent since 2000. This falls well below national growth of close to 11 percent, and lags slightly behind state population growth rates as well. While most of the region experienced similarly slow growth during this period, the large population center of Hampden County grew even more slowly at only 2.4 percent, the more rural Franklin County actually lost population, and only Tolland County grew at a rate approaching the national rate, or 10.6 percent. Annual growth rates in the region appear to follow Connecticut's trend, in keeping with the concentration of the region's population in Hartford County, with spurts of higher growth in the early 2000s and 2008, but slower growth since then.

Table 3: Population Growth in the Knowledge Corridor, 2000-2012

Region	2000 Population	2013 Population	Percent change
Knowledge Corridor	1,675,647	1,747,785	4.3%
Franklin County	71,471	71,221	-0.3%
Hampden County	456,533	467,319	2.4%
Hampshire County	152,364	159,596	4.7%
Hartford County	858,416	898,272	4.6%
Tolland County	136,863	151,377	10.6%
Connecticut	3,411,777	3,596,080	5.4%
Massachusetts	6,361,104	6,692,824	5.2%
United States	282,162,411	316,128,839	12.0%

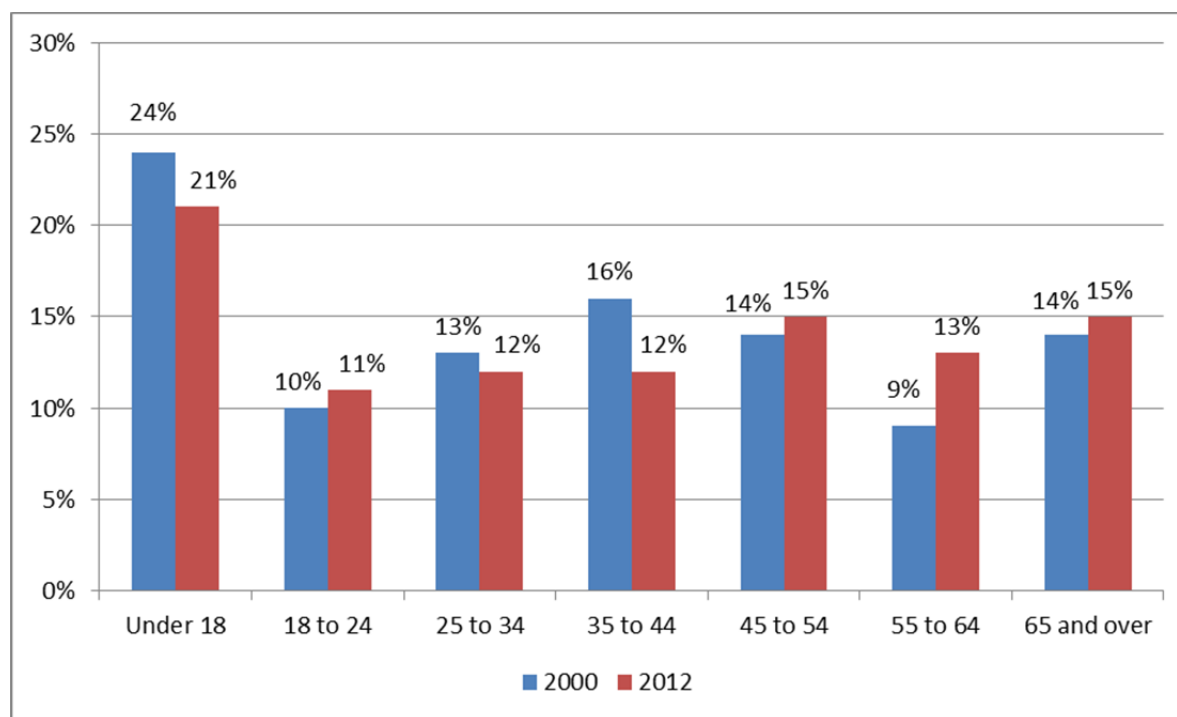
Sources: U.S. Census, Populations Division, Population estimates July 1, 2000; U.S. Census, Annual Estimates of the Resident Population; UMDI calculations

Population projections using data from the University of Massachusetts Donahue Institute and Connecticut Department of Labor Population Projections suggest the Knowledge Corridor will experience relatively little growth over 2010 levels through 2025. The region's population is projected to increase to about 1,771,000 by 2020 and remain at that level through 2025; representing an increase of only about 1.7 percent over 2010 estimates. This is far below the growth rate projected for the nation where the population is projected to increase by 12 percent over 2010 estimates (U.S. Census Population Projections).

While Hartford County is projected to have modest population increases, Hampden and Hampshire Counties are expected to show slight declines in population by 2020. Coupled with stagnant population growth, the age composition of the population is shifting towards older cohorts, and there are smaller levels of younger age cohorts to replace the aging population. As will be discussed in later sections, this has significant implications for the labor force and implies that the Knowledge Corridor will need to address the internal demographic changes that directly impact the workforce and industry.

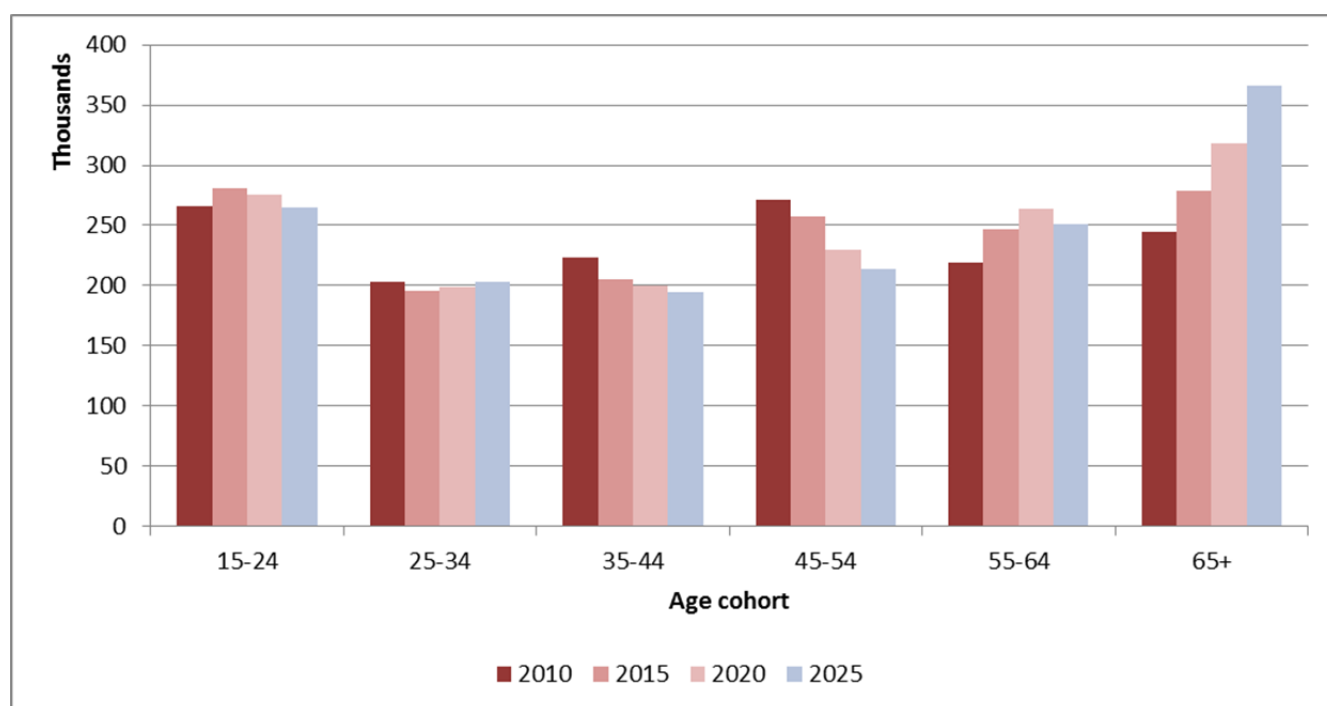
Aging of the Labor Force

One often cited challenge for the Knowledge Corridor is its aging population and workforce. From 2000 to 2012, the population aged 55 to 64 increased from 9 percent to 13 percent of the region's population, and the population over age 65 increased from 14 to 15 percent. The working age population aged 35 to 44 decreased from 16 percent to 12 percent of the region at the same time. In fact, the only age cohort under age 45 to increase as a share of population during this time was the population aged 18 to 24 – from 10 to 11 percent of the region's population. Tellingly, the population under age 18 decreased not just as a share of the region – from 24 to 21 percent – but in absolute terms as well. In other words, the bulk of the existing labor force are the baby boomers who are approaching retirement, and there is a significant relative shortage of younger workers coming through the pipeline to replace them.

Figure 4. Age Distribution of the Knowledge Corridor Population, 2000 and 2012

Sources: U.S. Census, Decennial Census 2000; U.S. Census, ACS 1yr 2012

Perhaps even more striking are projections of the region's population over the next 10-15 years, which suggest a continually aging population with minimal growth. Figure 5 shows population projections for the working age cohorts (age 15 and over) of the Knowledge Corridor. Relative shares of the youngest age cohorts are projected to be smaller than older populations. The population ages 25-43 and 35-44 for instance, are expected to remain level around 200,000 people through 2025. Likewise, the population of people age 45-54 is expected to decrease significantly over these years, while the population age 65 and over are projected to increase significantly as the baby boomers age. Not only is population growth expected to stagnate in the region, data suggests that mass retirement will contribute to labor challenges and that the working population will be comprised of larger shares of older individuals in the years ahead. The implication is that to maintain the workforce needed by regional employers into the future will require a greater portion of Knowledge Corridor residents to attain higher levels of education and training.

Figure 5: Projected Population by Age in the Knowledge Corridor Through 2025

Sources: U.S. Census, 2010 SF 1; MA Population Estimates Program; Connecticut State Data Center, Population Projections; UMDI Calculations

Inter-regional commuting trends

Part of what defines the Knowledge Corridor as an integrated region are the commuting patterns that connect workers to employment, creating a shared regional labor market. Nearly one in four workers in the Knowledge Corridor crosses county lines to go to work, and about one in 25 cross the state border. Across the five counties in the Knowledge Corridor, these connections vary and are centered primarily within the adjacent counties of Hampden County in Massachusetts and Hartford County in Connecticut. The vast majority of worker commutes *within* the region flow into these two employment centers. Overall, commuting patterns suggest cross border commutes are weighted towards flows from Massachusetts to Connecticut counties, with the bulk of these originating in Hampden County and flowing into Hartford County (18,500), while the smaller counties of Franklin and Tolland have relatively little commuter flow across state borders.

A larger share of the region's Connecticut based residents commute to employment destinations elsewhere in the state, relative to Massachusetts, although about 6,700 commutes were estimated to originate in Hartford into Hampden and Hampshire Counties. The two largest inter-county commute pairs are from Tolland to Hartford (over 35,000 each day) and from Hampshire to Hampden (over 20,000).

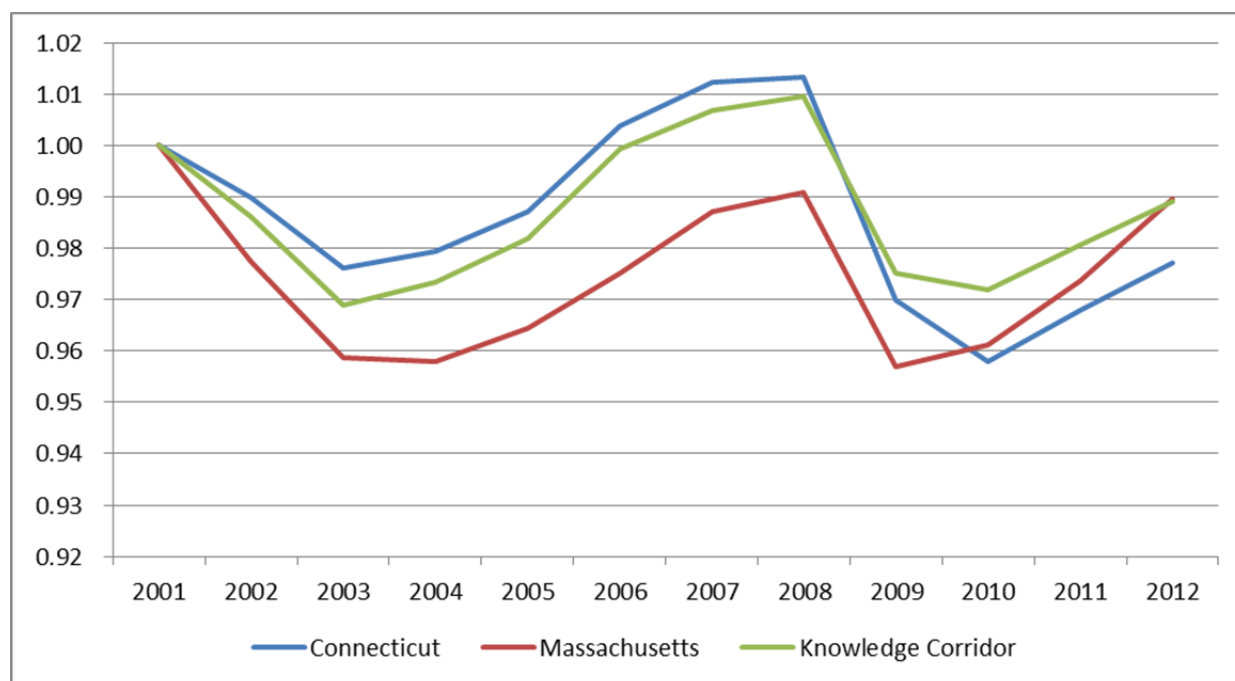
Table 4: 2005-2010 Knowledge Corridor Commuting Patterns, 2006-2010

Place of Residence	Place of Work	Number
Hartford County	Tolland County	8,715
	Hampden County	6,164
	Hampshire County	497
Tolland County	Hartford County	35,583
	Hampden County	2,145
Franklin County	Hampshire County	7,264
	Hampden County	1,806
Hampden County	Hartford County	18,595
	Hampshire County	10,680
	Tolland County	1,234
	Franklin County	1,104
Hampshire County	Hampden County	20,293
	Franklin County	2,391
	Hartford County	1,769
Total Cross-County Commuters		118,240
Total Interstate Commuters		30,404
Total Employment		814,089

Sources: U.S. Census Journey to Work, County to County Commuting Flow; ACS 2006-2010; CT Department of Labor, QCEW; MA Executive Office of Labor and Workforce Development, ES-202

Employment

The Knowledge Corridor provided about 814,000 jobs in 2013. In the years following the recession of the early 2000s, employment grew in the Knowledge Corridor, tracking trends of the states and nation (see Figure 6). Employment grew slightly faster in the region than for Connecticut and Massachusetts over this period, but much slower than the nation. Major declines in employment during the Great Recession in 2008-2010 period caused employment numbers to retreat to 2003 levels in the region. Although employment in the region declined less than for Connecticut or Massachusetts as a whole, the recovery beginning in 2010 occurred at a somewhat slower rate than for the nation and state of Massachusetts.

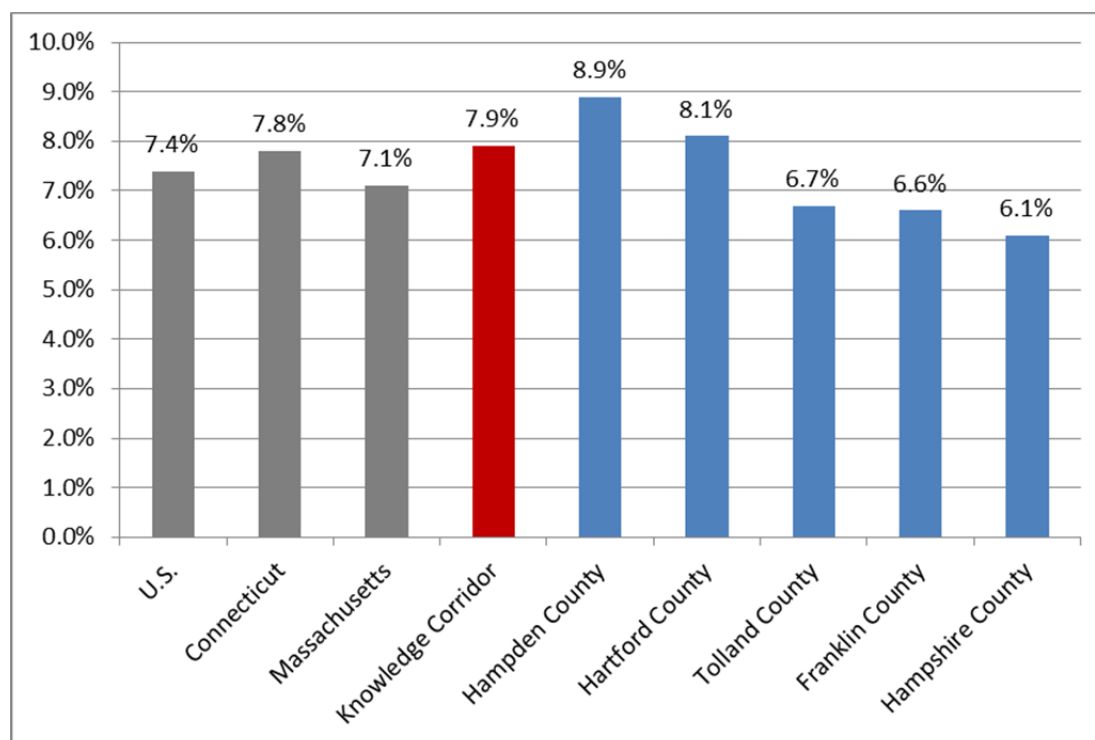
Figure 6: Total Employment Indexed to 2001 for the Knowledge Corridor, 2001-2013

Source: BLS, QCEW; UMDI Calculations

Over the longer term, employment in the Knowledge Corridor has suffered. Like the rest of the nation, the region has suffered significant losses in manufacturing industries over the last two decades; an industry that still plays a dominant role in the regional economy, providing a relatively larger share of total jobs compared to the national economy, as will be discussed further below.

Unemployment and Labor Force Participation

The unemployment rate in the Knowledge Corridor in 2013 was 7.9 percent, level with the national rate, but significantly higher than pre-recession rates of 4.9 percent in 2007. Still, the rate is steadily declining from a peak of 9.3 percent at the height of the recession in 2010, which is consistent with state and national trends. The largest counties of the region, home to Hartford and Springfield, have the highest rates of unemployment. Hartford and Hampden County have current rates of 8.1 percent and 8.9 percent, respectively. Lower levels of unemployment in Hampshire (6.1 percent), Franklin (6.6 percent) and Tolland (6.7 percent) counties helped to offset the high rates in the larger counties of the region. The high concentration of employment in higher education within these counties may help to insulate the region against economic fluctuations, such as that experienced during the Great Recession. Still, as noted above, there are stark differences in the distribution of the unemployed across the Knowledge Corridor region with persistently high rates of unemployment in the urban core areas frequently near or above 10 percent.

Figure 7: Unemployment Rates for Knowledge Corridor, Counties and Comparisons, 2013

Sources: BLS, LAUS (CT, MA, Knowledge Corridor); BLS, Current Population Survey (U.S.)

Complicating the picture of unemployment rates, labor force participation rates of the working age population in the Knowledge Corridor (66 percent) are slightly higher than the national average (64 percent), but still fall below state averages (see Table 5).

Consistent with population patterns, the bulk of the labor force in the Knowledge Corridor is located in the large population center of Hartford County, which represents over half of total workers in the region, while Hampden County houses another quarter of the regional labor force. For comparison, about 77,000 workers live in the city of Hartford itself, while a majority of the county's estimated 487,000 workers are dispersed throughout the county, although many commute to Hartford city for employment. Participation rates are relatively high across Hartford County, approaching 68 percent, but only 62 percent in the city itself.

Where the Knowledge Corridor struggles most with labor force participation is in Hampden County, where participation in Springfield and Holyoke is just 58 percent. This remarkably low rate of labor force participation is consistent with other reports on Springfield that highlight the challenge of connecting large numbers of its population to the workforce, and is indicative of the scale of training and adult basic education needed.

Income and Poverty Rates

Per capita income and poverty rates for the Knowledge Corridor fall between state averages and national averages (Table 5) – better than the U.S. overall but lagging well behind Massachusetts and Connecticut statewide averages. Of note, per capita income in the Knowledge Corridor appears to be pulled higher by the Connecticut counties (both over \$33,000), while the per capita income measures of the Massachusetts counties are relatively lower (approximately \$25,400 to \$28,850).

In addition, Hampden County has a very high rate of poverty reaching 18 percent in 2012. These economic indicators suggest that while across the board the Knowledge Corridor labor force is faring better than the nation, Hampden County is faring significantly worse than both the region and the nation, due to very high rates of poverty, low labor force participation, and correspondingly low per capita income levels.

Table 5: Labor Force and Population Economic Characteristics, 2010-2012

Region	Participation rate	Per Capita Income	Poverty rate
Knowledge Corridor	66.2%	\$30,902	13.3%
Franklin County	68.4%	\$28,294	11.2%
Hampshire County	65.5%	\$28,852	13.3%
Hampden County	62.7%	\$25,416	17.9%
Hartford County	67.7%	\$33,830	12.2%
Tolland County	67.9%	\$33,782	6.5%
Connecticut	68.0%	\$36,956	10.5%
Massachusetts	67.6%	\$34,860	11.6%
United States	64.1%	\$27,385	15.7%

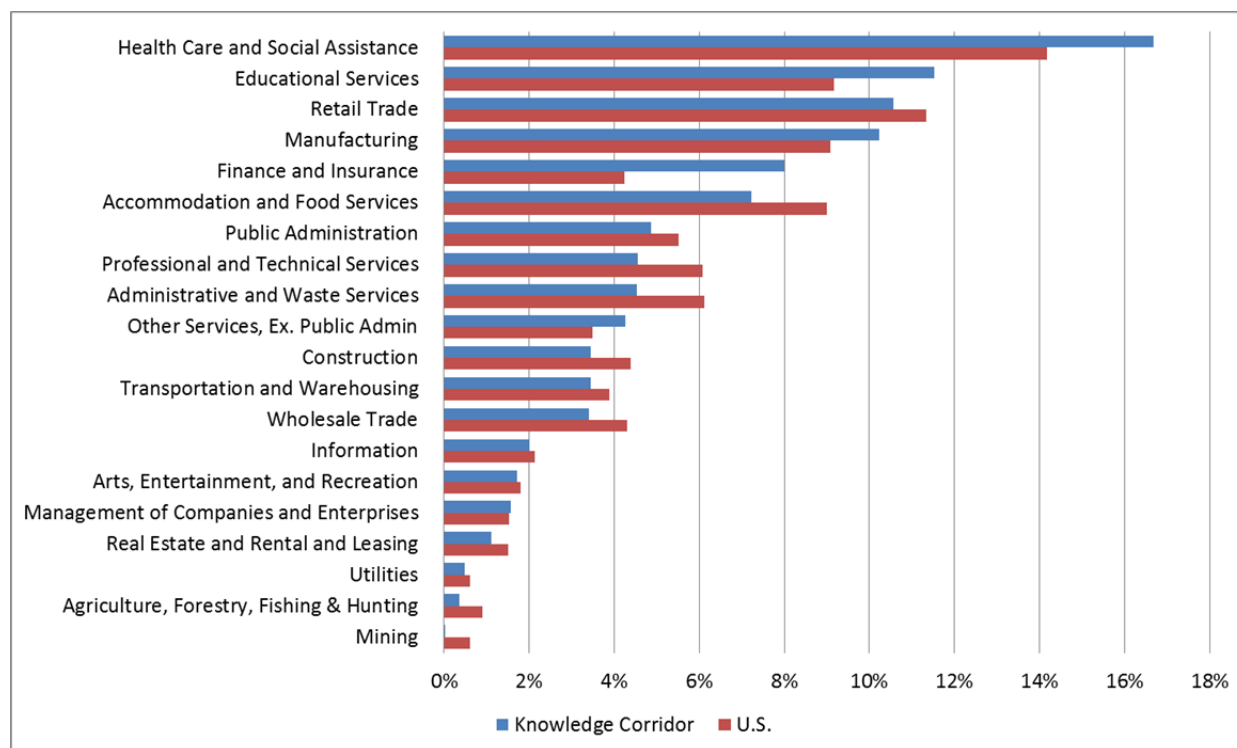
Source: U.S. Census, ACS 2010-2012 3 year estimates; UMDI Calculations

Industry and Occupational Employment Trends

Industry Employment

Well-crafted workforce and talent strategies require a detailed understanding of the region's employers and major industries. Throughout the Knowledge Corridor region, health care and education ("meds and eds") are the two dominant industries, providing the largest number of total job opportunities and a relatively steady path of employment growth. Together, these two key industries represent 28 percent of the region's employment base, with 135,677 jobs in health care and social assistance, and another 93,850 jobs in educational services (Figure 8). The regional share of employment in these industries is significantly higher than national shares, suggesting relative specialization in both health care and educational services consistent with the large numbers of hospitals, specialized care, and academic institutions in the region.

Other core industries of the region include manufacturing (83,301 jobs) and finance and insurance (65,017 jobs), the latter of which is highly concentrated in the region relative to the nation; a statistic largely reflective of Hartford's reputation as a global insurance hub. Similarly, the region has long been known for a robust manufacturing cluster supplying components and parts to defense and aerospace industries. These industries have lost a significant number of jobs since 2003, decreasing by eight percent in insurance and finance and over 14 percent in manufacturing, much of which occurred during the Great Recession. However, the decline in manufacturing employment is part of a much broader trend across the states and region, which has seen manufacturing industries shrink dramatically over the course of the last few decades. Importantly, manufacturing still has a stronger share of employment in the Knowledge Corridor than for the nation.

Figure 8: Share of Industry Employment in the Knowledge Corridor, 2012

Source: CT Department of Labor, QCEW; MA Executive Office of Labor and Workforce Development, ES-202; BLS, QCEW

Since 2009, approximately the trough of the most recent recession, some of these industries are still shedding jobs. In 2012, employment was down 6.1 percent in construction, 4.7 percent in information, 2.7 percent in public administration, 1.4 percent in real estate and rental and leasing, 2.4 percent in manufacturing, 0.9 percent in finance and insurance, and 0.7 percent in educational services compared to 2009 levels (see Table 6). In addition to comprising the largest share of total industry employment, health care and social assistance grew by 5.1 percent during the same timeframe.

Table 6: Change in Industry Employment in the Knowledge Corridor, 2009-2012

NAICS Code	Industry Description	Knowledge Corridor Employment 2012	Corridor Employment Growth 2009-2012	United States Employment Growth 2009-2012
62	Health Care and Social Assistance	135,677	1.9%	5.1%
61	Educational Services	93,850	2.3%	-0.7%
44-45	Retail Trade	86,027	1.8%	2.2%
31-33	Manufacturing	83,301	-2.4%	0.8%
52	Finance and Insurance	65,017	-3.2%	-0.9%
72	Accommodation and Food Services	58,868	6.4%	6.2%
92	Public Administration	39,576	-1.1%	-2.7%
54	Professional and Technical Services	37,013	6.6%	5.5%
56	Administrative and Waste Services	36,833	12.3%	11.5%
81	Other Services, Ex. Public Admin	34,645	4.5%	3.7%
23	Construction	28,055	-0.2%	-6.1%
48-49	Transportation and Warehousing	28,027	-0.6%	1.5%
42	Wholesale Trade	27,744	-1.7%	1.7%
51	Information	16,335	-5.3%	-4.7%
71	Arts, Entertainment, and Recreation	13,891	6.0%	1.9%
55	Management of Companies and Enterprises	12,726	-0.1%	8.0%
53	Real Estate and Rental and Leasing	8,996	-4.2%	-1.4%
00	Total, All Occupations	814,089	1.5%	2.4%

Source: U.S. BLS, QCEW; CT Department of Labor, QCEW; MA Executive Office of Labor and Workforce Development, ES-202; UMDI Calculations

Note: Industry sectors with shares smaller than 1 percent in the Knowledge Corridor were omitted from the results, including Utilities, Agriculture, forestry, fishing and hunting, and Mining.

Occupational Employment and Wages

Industry employment measures the level of workers employed in a particular industry that are inclusive of all types of workers, regardless of their specific occupation. In contrast, occupational data measures employment levels of workers doing similar jobs across different industries, and can provide insight as to the types of knowledge and skill that are required of the regional labor pool.¹⁷

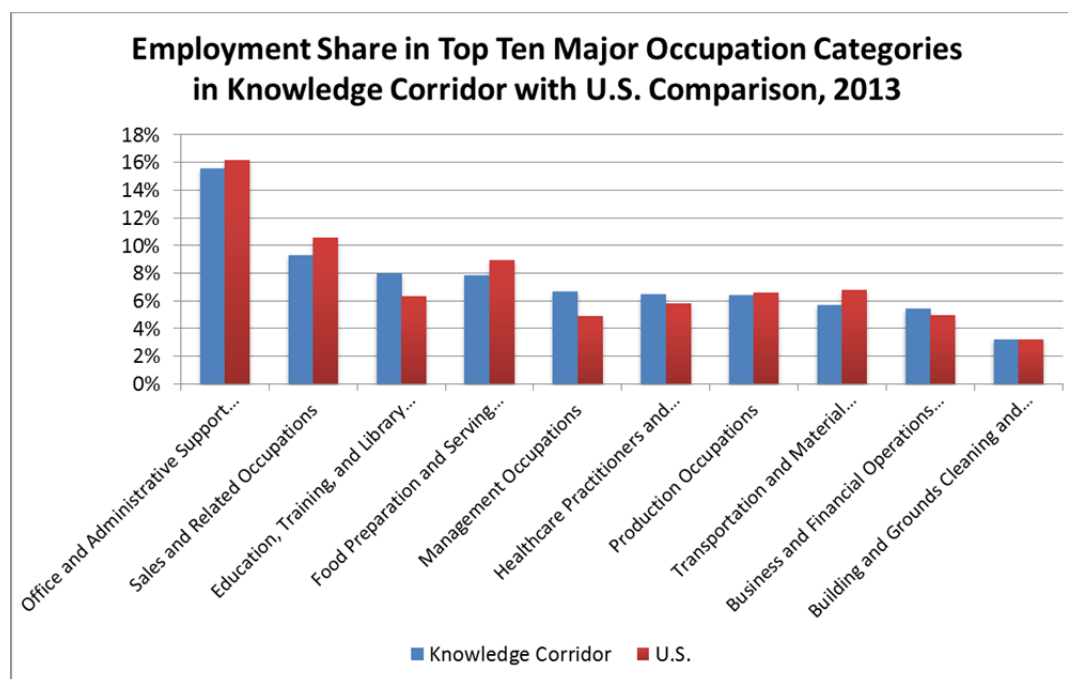
As is the case nationwide, the largest share of occupations are classified as office and administrative support; occupations that tend to be ubiquitous across any number of industries, and include those employed as office, financial, and mail clerks, office secretaries, data entry, and other similar types of workers (see Figure 9). Education related occupations, as well as a concentration in workers in healthcare, personal care, and community and social services are reflective of the broader regional industry concentrations in education and healthcare.

¹⁷ Estimates for the Knowledge Corridor were completed using an aggregate of OES data reported by Metropolitan Statistical Area (MSA) that cover the region for the year 2012. OES data for Metropolitan Statistical Areas are subject to data suppression for some occupational groupings to protect employer confidentiality. However, the MSA aggregate data, while not exact to the Knowledge Corridor boundaries, provides a strong picture of the regional labor pool and relative concentrations of occupational groupings.

There have been significant increases in workers in major categories related to education, healthcare, and community and social services.¹⁸ In particular, the change and concentration of workers in community and social services relative to the United States is significant. Management occupations also have witnessed a significant increase over this time period and comprise a significant share of total workers relative to other occupational categories. Production occupations, which are generally found in manufacturing and related industries, declined over the period, following the manufacturing decline over the past decade. Also of note, occupations in the categories reflective of STEM workers have declined since 2006, though these appear to make up a small share of total employment in the region (but not underrepresented relative to the nation).

In general, wages of Knowledge Corridor occupations are higher than national hourly wages¹⁹ across major categories, yet appear to be lower than Massachusetts' and Connecticut state averages. This can be explained by the urban wage premium reflective of metropolitan Boston and southern Connecticut which is part of the broader metropolitan New York City area. On average, wages in the region are highest within Management related occupations, which includes executive management positions that may skew the average wage, but also lower level management positions that vary across industries. Other high paying occupational groupings include Healthcare practitioners, Computer and math occupations, and Business and financial operations positions, which relative to the national average (\$22/hour) wage are significantly higher. The lowest paying occupations (\$11.52 in 2012) can be found in Food preparation and serving, which represent a significant share (8 percent) of workers in the region. Other low wage categories that comprise significant shares of the workforce are workers in Personal care and services (\$13.17), Building and grounds cleaning and maintenance (\$14.12), and Healthcare support (\$15.66).

Figure 9: Knowledge Corridor Employment for Top Ten Major Occupational Groups, 2012



Source: BLS, Occupational Employment Statistics

¹⁸ Due to the nature of the OES data series, analysts must be careful in using the data in a time series manner. However, change over time can be used to get a general idea about which types of occupations are growing more or less relevant in the regional economy.

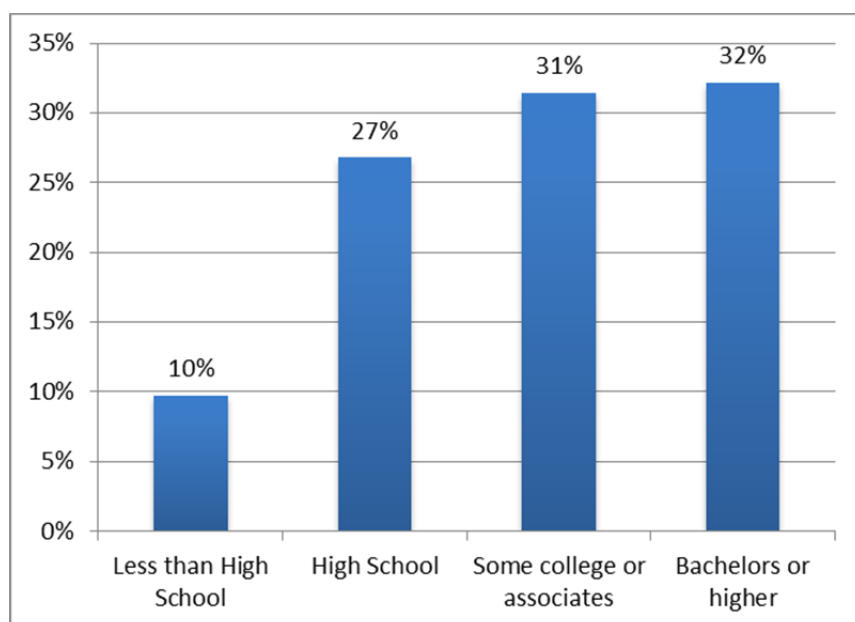
¹⁹ Hourly wages reported here are based on an average length work week; annual wages can be found by multiplying the hourly wages by 1,080.

Overall, the high-level occupational structure is reflective of the region's industrial composition, namely strengths found in education, healthcare, manufacturing and finance and insurance. There are also particularly high concentrations of workers in community and social services and management occupations that are not explicitly evident from the industry data. Workers in the Knowledge Corridor, on average, are paid higher wages than at the U.S. level, though less than the large New York City and Boston metropolitan areas.

Occupational Job Projections

Where the region has been in terms of occupational change is only one indicator of where it is headed. Occupational projections from Connecticut and Massachusetts, by region, provide another important indicator of what talent may be needed to bolster economic growth in the decade ahead. Notably, and in keeping with other reports of increasing levels of educational attainment that will be required in the changing economy, a large majority – 63 percent – of job openings expected in the region will be filled by workers with at least some post-secondary education (Figure 10).

Figure 10. Projected Annual Job Openings in the Knowledge Corridor by Education Level, 2010 through 2020



Sources: CT Department of Labor Occupational Projections 2010-2020; MA EOWLD Long-Term Projections, 2010-2020

Table 7 displays the projected number of job openings (including growth and replacement positions) for the major occupational groupings. Office and administrative support; sales and related occupations; food preparation and serving; education, training and library occupations; and health care practitioners and technical occupations top the list. It is important to note that because these are openings due to both growth and replacement, larger numbers of openings may indicate growth, replacement due to retirement of aging workers, or replacement in occupations with typically high turnover rates, such as in food service. Due to the industrial strengths in the region and the typically better than average compensation of the jobs, we note that production occupations and healthcare support are also expected to experience significant growth and openings due to replacement. For instance, among specific occupations, the region is projected to have 132 annual openings for machinists.

Table 7: Occupational Projections by Major Group for the Knowledge Corridor, 2010-2020

SOC Code	Description	Employment Change, 2010-2020	Average Annual Openings	Average Annual Growth	Average Annual Replacement Openings
00-0000	Total, All Occupations	73,487	27,488	8,078	19,410
43-0000	Office and Administrative Support Occupations	5,424	3,697	859	2,838
41-0000	Sales and Related Occupations	3,425	3,015	412	2,603
35-0000	Food Preparation and Serving Related Occupations	4,169	2,625	437	2,188
25-0000	Education, Training, and Library Occupations	7,242	2,018	727	1,291
29-0000	Healthcare Practitioners and Technical Occupations	8,800	1,878	883	995
11-0000	Management Occupations	2,917	1,592	339	1,253
39-0000	Personal Care and Service Occupations	7,886	1,587	790	797
53-0000	Transportation and Material Moving Occupations	3,395	1,410	356	1,054
13-0000	Business and Financial Operations Occupations	3,908	1,365	435	930
51-0000	Production Occupations	1,969	1,237	300	937
37-0000	Building and Grounds Cleaning and Maintenance Occupations	3,038	979	331	648
31-0000	Healthcare Support Occupations	4,859	880	485	395
15-0000	Computer and Mathematical Occupations	3,475	813	351	462
21-0000	Community and Social Services Occupations	3,523	792	355	437
47-0000	Construction and Extraction Occupations	2,650	785	271	514
49-0000	Installation, Maintenance, and Repair Occupations	2,204	781	209	572
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	2,424	696	258	438
33-0000	Protective Service Occupations	549	488	79	409
17-0000	Architecture and Engineering Occupations	394	392	66	326
19-0000	Life, Physical, and Social Science Occupations	745	219	78	141
23-0000	Legal Occupations	362	184	41	143
45-0000	Farming, Fishing, and Forestry Occupations	129	55	16	39

Sources: CT Department of Labor Occupational Projections 2010-2020; MA EOWLD Long-Term Projections, 2010-2020

Educational Attainment and Achievement

Fundamental understandings of regional development processes in recent years have shifted policy emphasis to the role of worker skills and creativity as driving forces behind innovative activities and regional competitiveness. A premium has been placed on knowledge, learning, and training as essential preconditions that influence long term sustainable prosperity empowering regional resilience. Middle skills play an increasingly significant role in these processes, a fact recognized by economic development leaders in Connecticut and Massachusetts²⁰, and draws strengths from industries that require diverse, specialized skill sets such as those found in health care, educational services, and manufacturing: sectors core to the Knowledge Corridor.

The Knowledge Corridor, as its brand suggests, contains an unusually high concentration of higher educational institutions, which provides one mechanism for building a strong workforce of the future. Still, educational attainment and performance challenges exist from pre-school through higher education. Skills that build learning and creativity are developed in primary and secondary education, but a lack of access to

²⁰ For example, the Massachusetts “Choosing to Compete in the 21st Century” economic development policy plan highlights the importance of middle skills workforce training and jobs in its strategic recommendations.

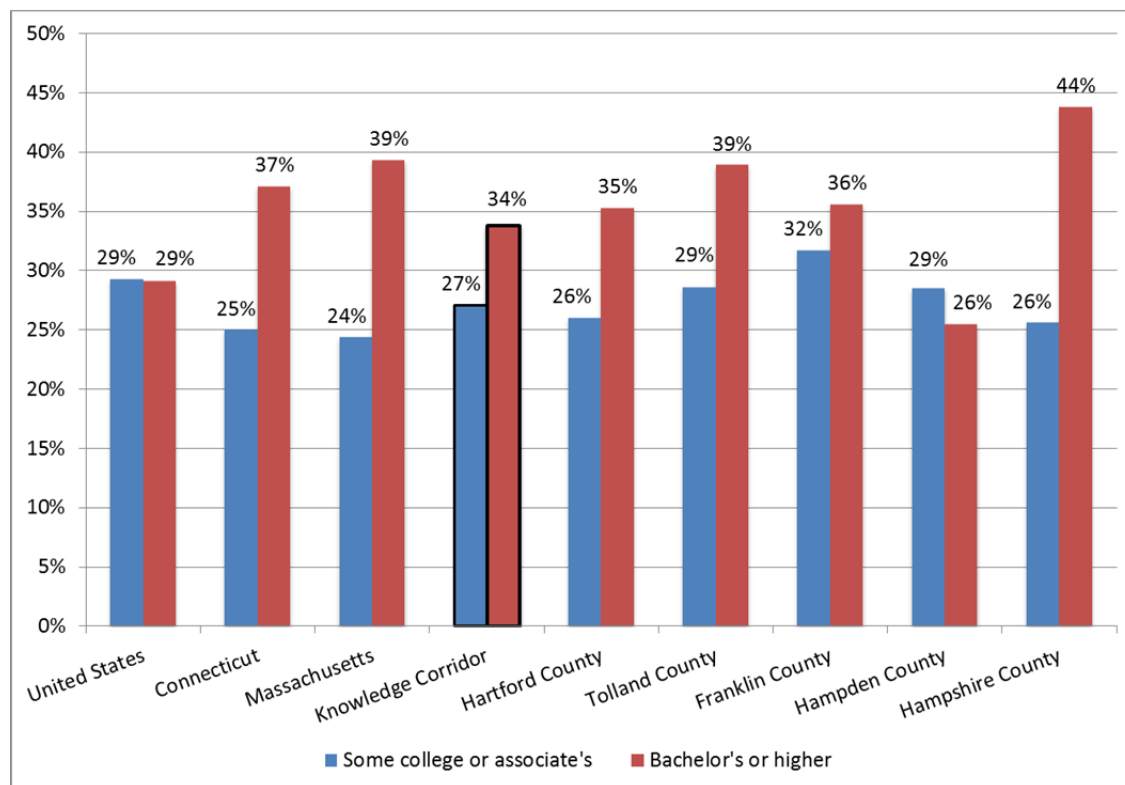
pre-school and stunningly low reading levels by third grade in the urban core areas (in particular) are cause for concern, and also provide windows of opportunities. This section discusses several dimensions of educational attainment and achievement levels of the regional population, as well as a broad overview of the types of knowledge bases students of the region are obtaining.

Workforce Educational Attainment

The educational attainment profile of the Knowledge Corridor's adult population (age 25 and older) is in some ways as similar to the U.S. as to Connecticut or Massachusetts. Massachusetts has the highest attainment of bachelor's degrees of any state in the country at almost 40 percent (Figure 11). Completion of a bachelor's degree or higher is five percentage points higher in Massachusetts than for the Knowledge Corridor (34 percent), and three percentage points higher in Connecticut (37 percent).

However, when it comes to attainment of some college or an associate's degree, the Knowledge Corridor outperforms either state, and falls short of the U.S. average, suggesting a shift away from completion of a bachelor's and toward more limited post-secondary education that characterizes both the Knowledge Corridor and the U.S., compared to Connecticut or Massachusetts. The gap in educational attainment between the region and states can be at least partially attributed to the differences in industrial composition and the worker requirements that regions such as Boston and the New York City labor shed in southern Connecticut, demand of the workers in high-tech, finance, bio-tech, and other advanced industries that are not as prominent in the Knowledge Corridor region as elsewhere in the two states.

Figure 11: Educational Attainment for the Knowledge Corridor, Ages 25 and Over, 2012



Sources: U.S. Census, ACS 1yr 2012; UMDI Calculations

Within the Knowledge Corridor, high education levels are highest in Hampshire County (home to UMass and other prestigious colleges) and to some extent Tolland County in Connecticut (home to UConn). The large university presence in these counties helps explain the prevalence of attainment at the bachelor's degree or higher level, at 44 percent in Hampshire and 39 percent in Tolland. Hampden County in Massachusetts has the lowest share of its population age 25 older with a four year or higher degree at only 26 percent.

At the other end of the educational attainment spectrum, 15 percent of Hampden County's adult population did not complete high school. This compares with 11 percent in Hartford County and about six percent for the remaining counties in the Knowledge Corridor region. Considering the bulk of the region's population is concentrated in Hampden and Hartford counties, the lack of education levels presents a serious challenge for connecting people to jobs and employers. A closer look at the urban core areas of the region provides more insight on some of the challenges.

Urban Core Education Performance

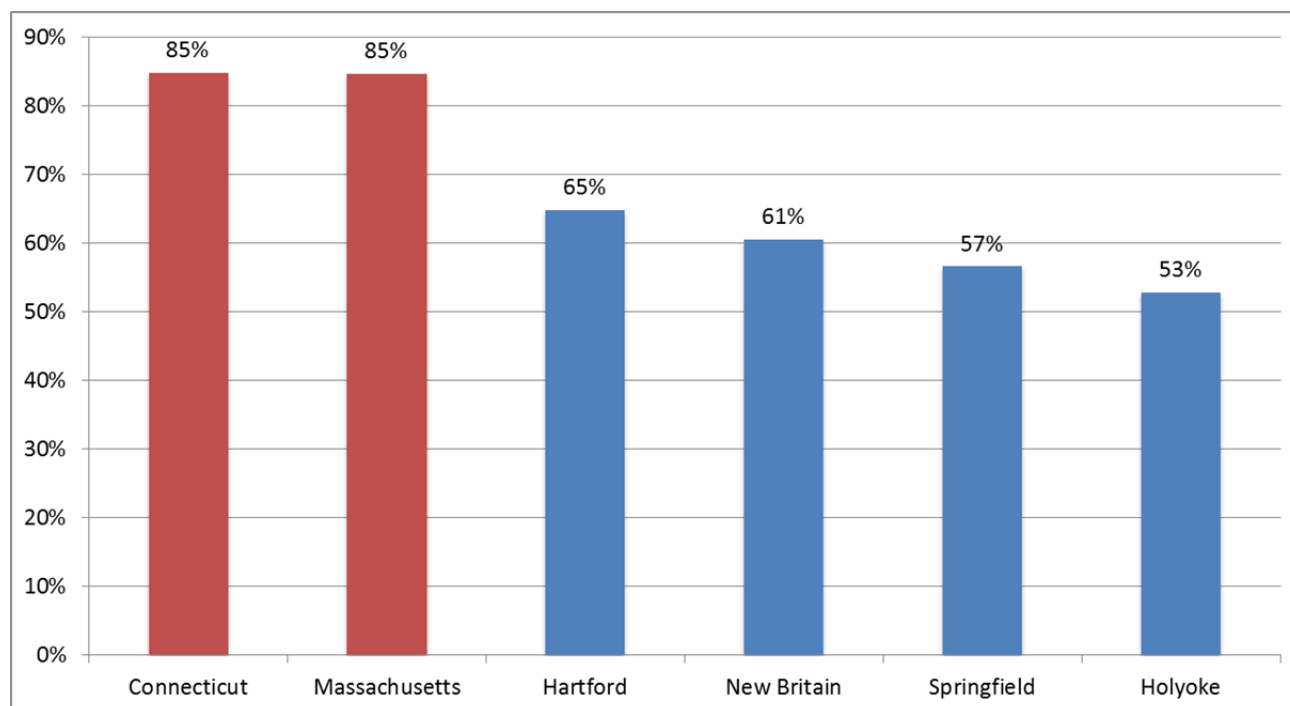
The core cities in the region, which we identify as Hartford, New Britain, Springfield, and Holyoke, are of particular interest as it pertains to education. These areas are hampered by concentrated poverty, high unemployment, and low labor force participation rates and income levels. These economic challenges are difficult to disentangle from the education performance and attainment in these cities.

The four urban cores have significantly lower high school graduation rates than both Massachusetts and Connecticut state averages (see Figure 12).²¹ In the most recently reported cohort for the 2012 graduating class, only 53 percent of students graduated high school in the district of Holyoke, while only 57 percent completed high school in Springfield. This amounts to an approximately 30 percentage point difference from state averages for Massachusetts. Similarly, drop-out rates for Holyoke and Springfield are 3.5 and almost 4 times as high as the state average of seven percent.

While it is difficult to compare across state boundaries due to methodological differences in data collection and reporting at the state level, a similar story appears in Hartford and New Britain. Hartford's graduation rate was 20 percentage points below Connecticut's average of 85 percent, while New Britain was roughly 25 percentage points below the state's average. Students in these areas, particularly those with low educational achievement, tend to be less likely to migrate to other regions with better job opportunities and more likely to enter the labor force of the Knowledge Corridor region, albeit with often tenuous labor attachment, as discussed earlier. Although trends and recent reports suggest some of these numbers are gradually improving, the gaps are so immense that with roughly a quarter of the student population (and future workforce) concentrated in these urban centers, and an imminent shortage of younger workers as the baby boomers near retirement, this poses a serious challenge for the region's workforce in the near future.²²

²¹ Data for this section is gathered from Massachusetts Department of Elementary and Secondary Education and the Connecticut Department of Education. As such, respective departments report data, specifically graduation and drop-out rates differently. Data is compared to the respective state totals, but caution is used to compare across states due to reporting differences. Similarly, assessment methodologies differ across borders, therefore achievement scores are only compared to their respective state testing jurisdictions the districts fall within. Even still, analysis of the four urban centers in the Knowledge Corridor suggest large negative deviations from state averages, highlighting the challenges of early secondary education of the future workforce.

²² For example, 2012 estimates indicate that Massachusetts adults without a high school degree had an unemployment rate of 20.1 percent compared to 8.7 percent overall in an article by Alan Clayton-Matthews "Benchmarking the Massachusetts Unemployment Rate", *MassBenchmarks*, 2014, Vol. 16, issue one.

Figure 12: High School Graduation Rates in Selected Knowledge Corridor Cities, 2012

Sources: MA Department of Elementary and Secondary Education. CT State Department of Education, Public School Information System.

Urban Core Subject Testing and Achievement

Student skill achievement as measured by state testing standards is another indicator of relative skill of the region's future labor pool. Based on the most recent available data reported by respective state agencies (2012 for Massachusetts and 2011 for Connecticut)²³, proficiency levels in the region's urban centers are significantly lower than state averages across subject areas (see Tables 8 and 9).

Massachusetts test scores are reported for the Grade 10 Massachusetts Comprehensive Assessment System (MCAS), the primary standardized test for measuring performance in Massachusetts as of 2012.²⁴ In Holyoke and Springfield, just 34 percent and 41 percent of students, respectively, achieved a score of "proficient" in English in 2012, compared to 69 percent statewide. Science and math results are even more problematic, both in terms of achievement levels, and in light of the growing importance of STEM careers. In math, 43 percent in Holyoke and 39 percent in Springfield scored in the "failing" or "in danger of failing" range, compared to just 15 percent statewide. Just 26 percent and 28 percent of test takers in Holyoke and Springfield, respectively, achieved 'proficiency or higher' in math. In science, just 15 and 21 percent of students tested "proficient" in science in Holyoke and Springfield, respectively. Another 43 percent and 42 percent are 'in need of improvement', while 42 percent and 37 percent students have scores that are failing or near failing.

²³ Testing and performance standards differ between Connecticut and Massachusetts, so data cannot be combined for the Knowledge Corridor as a whole. Achievements in English, Math, and Science for the four urban cores in this analysis are compared to respective state averages.

²⁴ Massachusetts is in the process of testing a new measurement system based on the Common Core standards, the Partnership for Assessment of Readiness for College and Careers (PARCC) as a possible replacement for the Massachusetts Comprehensive Assessment System, which has been in use for about two decades.

Table 8: Subject Proficiency Scores for Selected Massachusetts Cities, 2012

Subject	District	Proficient or above	Needs improvement	Warning or Failing
English	Holyoke	34.0%	35.0%	31.0%
	Springfield	41.0%	38.0%	22.0%
	Massachusetts	69.0%	22.0%	9.0%
Math	Holyoke	26.0%	31.0%	43.0%
	Springfield	28.0%	33.0%	39.0%
	Massachusetts	59.0%	26.0%	15.0%
Science	Holyoke	15.0%	43.0%	42.0%
	Springfield	21.0%	42.0%	37.0%
	Massachusetts	54.0%	32.0%	13.0%

Source: Massachusetts Department of Elementary and Secondary Education, 2012

On the Connecticut side of the border, a similar story presents in Hartford and New Britain, whose students (for the school year 2010-2011) scored significantly lower than state averages across core subject areas (Table 9). Test results are presented for the Connecticut Academic Performance Test, administered in Grade 10. Reading scores were particularly problematic, with Hartford and New Britain scoring 25 percentage points and 33 percentage points, respectively, below the state average for reading proficiency. In writing, Hartford and New Britain were 18 percentage points and 27 percentage points below the state average for proficiency. The percent of students that scored 'proficient or higher' in math were 27 percent in Hartford and 36 percent in New Britain, compared to 80 percent for the state. Less than half of students in New Britain demonstrated 'at least proficiency' in math and a considerable 31 percent of students tested 'below basic knowledge' in math, almost four times worse than the state average. Likewise, a significantly high percentage of students demonstrated 'below basic knowledge' in science; 26 percent of Hartford and 35 percent of New Britain students, compared to a state average of 7.9 percent. In both cities, less than half of all tested students demonstrated 'proficiency or higher' in science relative to 82 percent of all Connecticut students. In light of the importance of STEM skills to modern regional development, high school student proficiency rates in these core cities present significant challenges for both students and policymakers in the region.

Table 9: Subject Proficiency Scores for Selected Connecticut Cities, 2011

Subject	District	Proficient or above	Basic	Below Basic
Math	Hartford	53.2%	25.8%	21.0%
	New Britain	44.1%	25.4%	30.5%
	Connecticut	80.3%	12.0%	7.7%
Science	Hartford	49.0%	24.5%	26.6%
	New Britain	42.5%	22.4%	35.1%
	Connecticut	81.7%	10.4%	7.9%
Writing	Hartford	70.5%	17.5%	12.1%
	New Britain	59.7%	20.1%	20.2%
	Connecticut	88.6%	7.6%	3.9%
Reading	Hartford	57.5%	29.0%	13.4%
	New Britain	49.1%	26.6%	24.3%
	Connecticut	81.9%	12.6%	5.5%

Source: Connecticut Department of Education, 2010-2011

Post-Secondary Education in the Knowledge Corridor

One of the Knowledge Corridor's most marketable assets is the large concentration of colleges and universities, which provides a large number of college students as well as quality jobs for faculty and staff, and a basis for an innovative knowledge economy in the region. The region is home to two land-grant universities, the University of Connecticut at Storrs and the University of Massachusetts at Amherst, and a significant and diverse number of institutions of higher education. College student enrollments and degrees awarded at post-secondary education institutions are thus one indication of the potential labor pool for the region, and these institutions are a critical partner in developing a more educated workforce for regional employers. That said, it is equally important that regional stakeholders be realistic about the retention of college graduates as the region "imports" many students from other parts of the U.S. and globally, who may wish to return "home" upon graduation. While the most important factor in retaining graduates is the availability of appropriate job opportunities, it is likely not realistic – or even desirable – to retain all of these students. This section uses the most recent data (2012) from the US National Center for Education Statistics (NCES) Integrated Post-Secondary Education System (IPEDS) series, which reports data on enrollment, degrees granted, and area of study by institutions of higher education.²⁵

Of the 196,000 students enrolled at Knowledge Corridor institutions in 2012, over half (56 percent) were enrolled at undergraduate institutions (see Figure 13), and 38 percent of all enrollments were concentrated at three universities – University of Massachusetts, Amherst (32,000), University of Connecticut, Storrs (28,218), and Central Connecticut State University (15,153). (See Table 10 for specific school enrollment numbers).

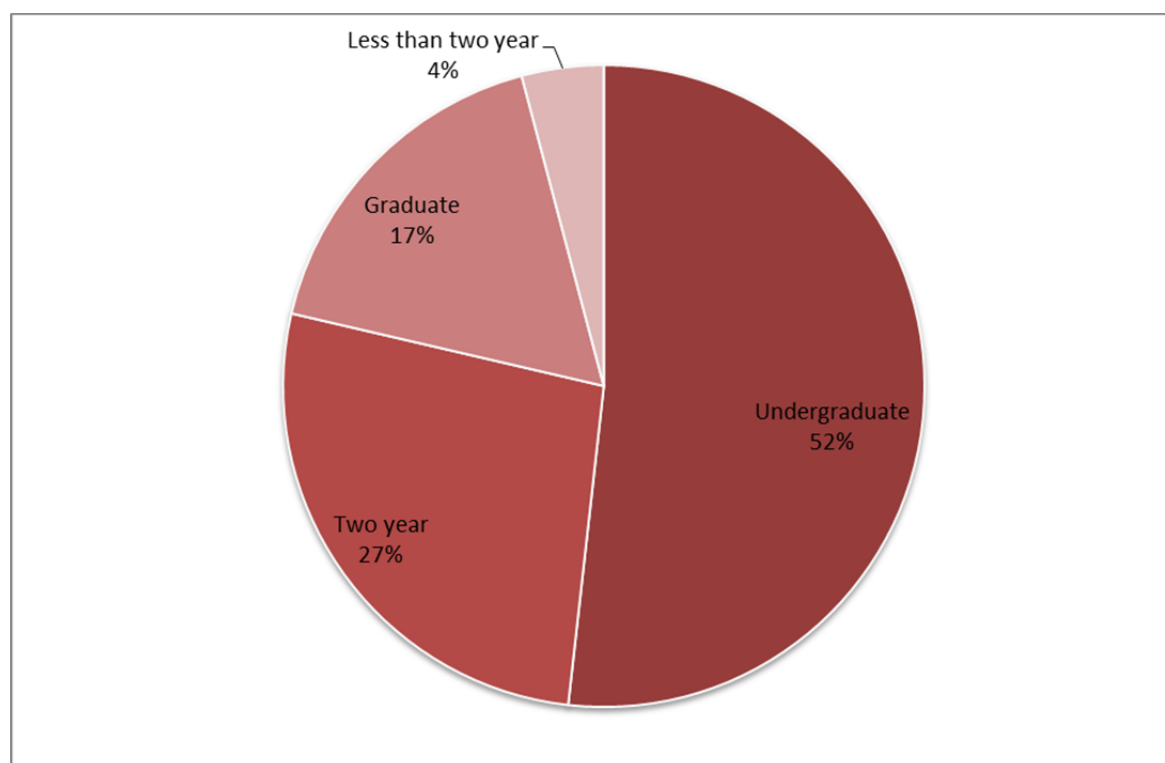
The main campus of both major research universities in the region (UMass and UConn) is relatively isolated from major population centers. However, each has made major strides and announcements in 2014 to establish a strong presence in the proximate centers of Springfield and Hartford, respectively,

²⁵ Data is aggregated by institutions within the Knowledge Corridor region and are compared to Connecticut, Massachusetts, and US totals to describe the potential labor pool being educated in the region.

providing greater opportunities for urban residents to take advantage of university resources. These universities are also core centers of regional knowledge formation and innovation spawning out of the commercialization of cutting edge research programs that contribute to regional development opportunities.

Of particular significance to workforce development and middle skills training is the large network of community college institutions in the region, which enroll over a quarter of students in the region. Unlike many of the major research institutions that draw students from around the globe, community colleges serve as a center for the regional population to learn specific and applied skills needed on the job. As shown in Table 10, Manchester Community College (10,445), Holyoke Community College (9,425), Springfield Technical Community College (9,286), Tunxis Community College (6,856), and Capitol Community College (6,594) are the largest of the community colleges in the region and along with a number of other community colleges are well positioned in the region to provide accessible skills training to the regional workforce.

Figure 13: Post-secondary Educational Enrollment in the Knowledge Corridor by Institution Type, 2012



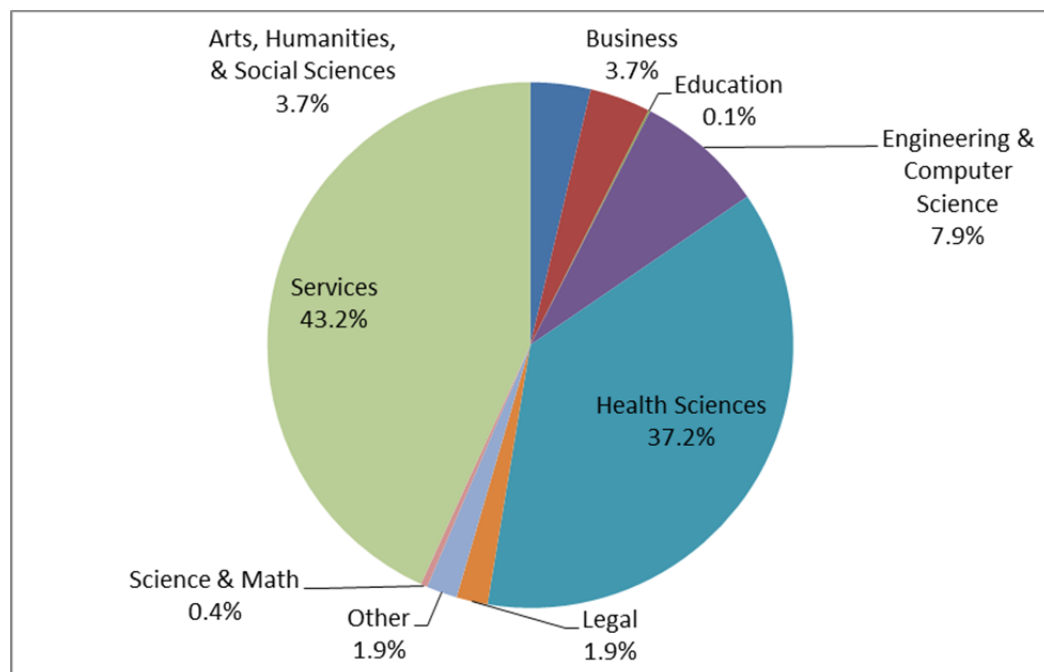
Source: National Center for Education Statistics, Integrated Post Secondary Education System (IPEDS)

Table 10: Top 20 Post-secondary Institutions by Enrollment in the Knowledge Corridor, 2012

Institution	City	State	2012 Enrollment
University of Massachusetts Amherst	Amherst	MA	32,000
University of Connecticut	Storrs	CT	28,218
Central Connecticut State University	New Britain	CT	15,153
Manchester Community College	Manchester	CT	10,445
Holyoke Community College	Holyoke	MA	9,425
Springfield Technical Community College	Springfield	MA	9,286
University of Hartford	West Hartford	CT	8,176
Westfield State University	Westfield	MA	7,413
Tunxis Community College	Farmington	CT	6,856
Capital Community College	Hartford	CT	6,594
Goodwin College	East Hartford	CT	4,473
American International College	Springfield	MA	4,275
Western New England University	Springfield	MA	4,137
Springfield College	Springfield	MA	3,618
Smith College	Northampton	MA	3,324
Greenfield Community College	Greenfield	MA	3,244
University of Saint Joseph	West Hartford	CT	3,228
Bay Path College	Longmeadow	MA	2,780
Springfield College-School of Human Services	Springfield	MA	2,666
Charter Oak State College	New Britain	CT	2,637

Source: National Center for Education Statistics, Integrated Post-Secondary Education System (IPEDS)

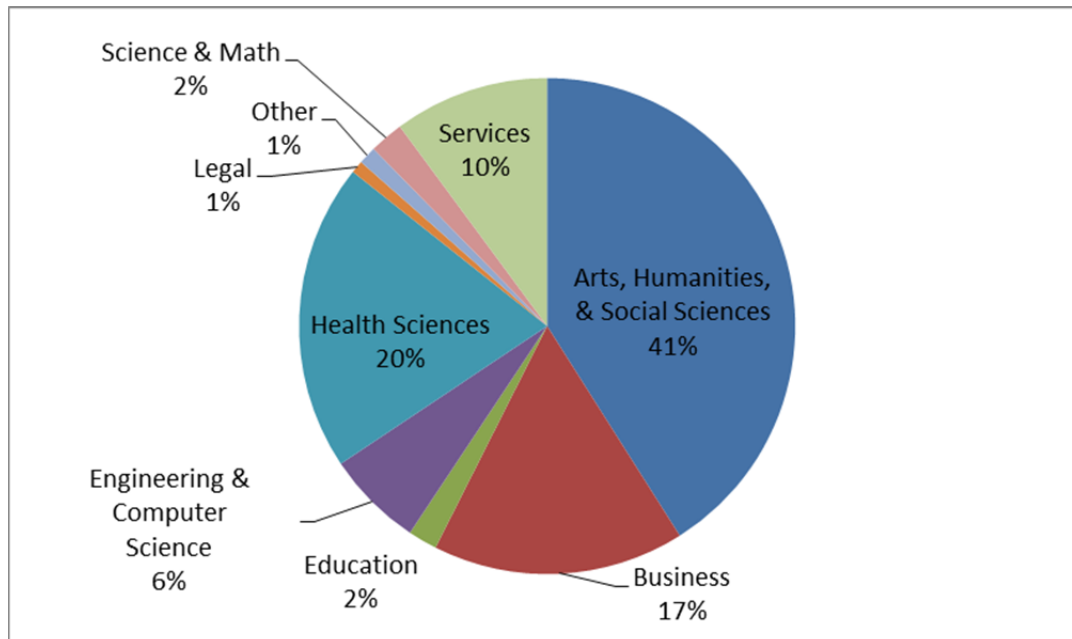
As shown in Figures 14 through 16, the most common areas of study differ between less than two year awards (certificates, licensing and similar), associates degrees and bachelor's degrees. Among the 6,800 less than two year awards in 2012, health sciences and "services" – which includes precision production (manufacturing), personal and culinary services, transportation, and mechanic repair, among others – dominate, at almost 80 percent of total awards. Engineering and computer science make up an additional eight percent of less than two year awards.

Figure 14. Awards of Less than Two Year Degrees, by Major Subject Area, 2012

Source: National Center for Education Statistics, Integrated Post Secondary Education System (IPEDS)

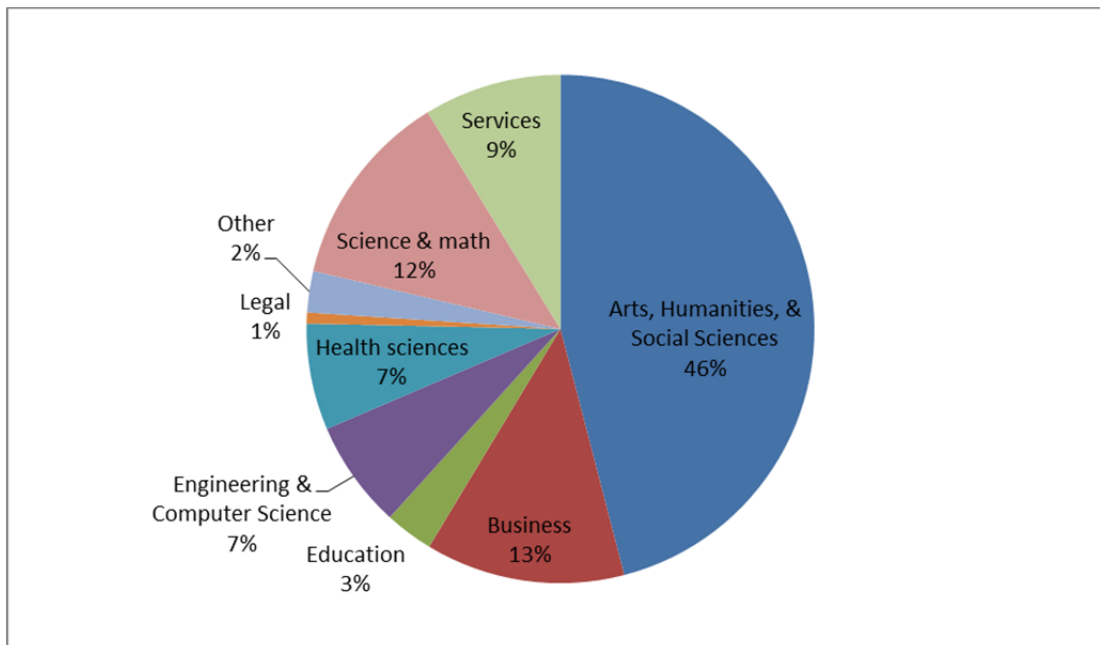
In both two and four year colleges, humanities, arts and social science majors dominate, with 41 and 46 percent of degrees awarded, respectively (Figures 15 and 16). In two-year institutions, an additional 20 percent of degree awards are in health sciences, 17 percent are for business, and ten percent of degree awards were for “services”. The largest number of associate’s awards was granted in subjects such as psychology, communications, art, and other fields in the arts, humanities, and social sciences. Among bachelor’s degrees, after arts, humanities and social sciences, business degrees were the next most common, at 13 percent, followed by science and math degrees at 12 percent, and services degrees at 9 percent.

Figure 15. Associates Degree Awards, by Major Subject Area, 2012



Source: National Center for Education Statistics, Integrated Post Secondary Education System (IPEDS)

Figure 16. Bachelor's Degree Awards, by Major Subject Area, 2012



Source: National Center for Education Statistics, Integrated Post Secondary Education System (IPEDS)

VI. Call to Action

Whether it's for entrepreneurial eco-systems, innovation company expansion, or company site location, talent and the presence of a deep pool of skilled workers is the most important factor in regional economies. The Knowledge Corridor is already home to enviable assets and many strong areas of talent and workforce development. At a high level, the region is generally competitive with the U.S. overall in educational attainment, wage levels, unemployment rates, and other key measures. But, the region does not fare as well as the statewide averages for either Massachusetts or Connecticut across virtually all key education and workforce indicators – and the performance of the overall region masks staggering economic and demographic conditions in the region's urban core cities.

The region's businesses, educators and workforce professionals already hold many of the resources and the know-how that will be required to transform the region's talent pool. What emerges from our stakeholder outreach, best practices research, and data analysis is an encouraging truth: real opportunities and successful initiatives paint a clear way forward for the region.

The “cradle to career” strategies we present serve as a call to action for the region's employers, public officials, educators, and other leaders and the general public. With the groundwork laid, concerted action and collaboration can and will lead to a stronger region.

ATTENTION: The Knowledge Corridor Partnership Steering Committee is seeking participants to help implement this strategy. Any individuals or organizations interested in contributing to this critical regional initiative should contact:

Tim Brennan
Executive Director of the Pioneer Valley Planning Commission
Chair, Knowledge Corridor Partnership Steering Committee

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