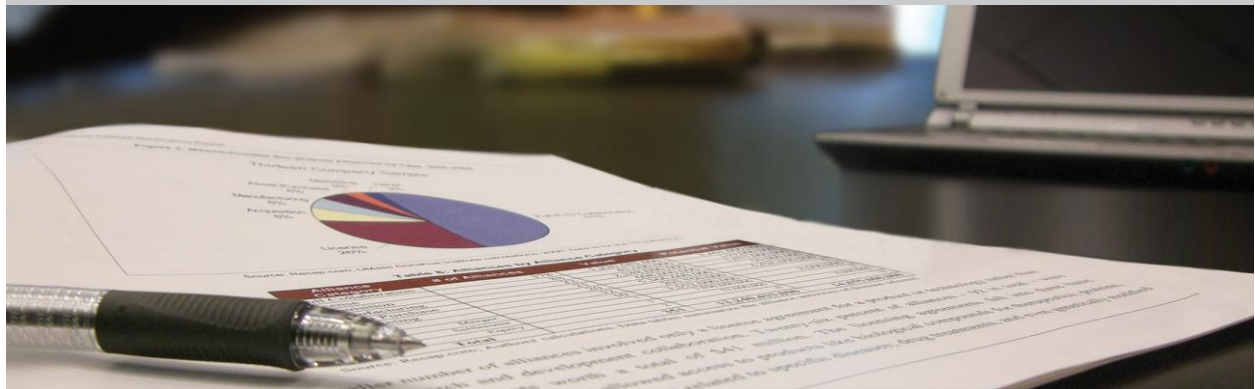# Northeast Massachusetts Regional Labor Force Blueprint 2023-2027

June 2024

UMassAmherst | Donahue Institute
Economic and
Public Policy Research

Northeast Massachusetts
Regional Labor Force Blueprint 2023-2027

Prepared by the UMass Donahue Institute's
Economic & Public Policy Research Group

Project Leader
Branner Stewart, Senior Research Manager

Project Staff
Annie Alexander, Research Analyst
Ember Skye Kane-Lee, Research Manager

Unit Director
Mark Melnik, Director of Economic
& Public Policy Research

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Introduction

The Northeast Massachusetts region includes 42 cities and towns that are served by the Greater Lowell Workforce Board, the Merrimack Valley Workforce Board, and the North Shore Workforce Board. The goal of the Northeast Massachusetts Regional Labor Force Blueprint is to ensure that regional employers, educators, and workforce training officials are coordinated in a way that creates strong talent pipelines for jobs that offer career pathways and living wages.

Figure 1: Map of Workforce Regions in Northeast Massachusetts
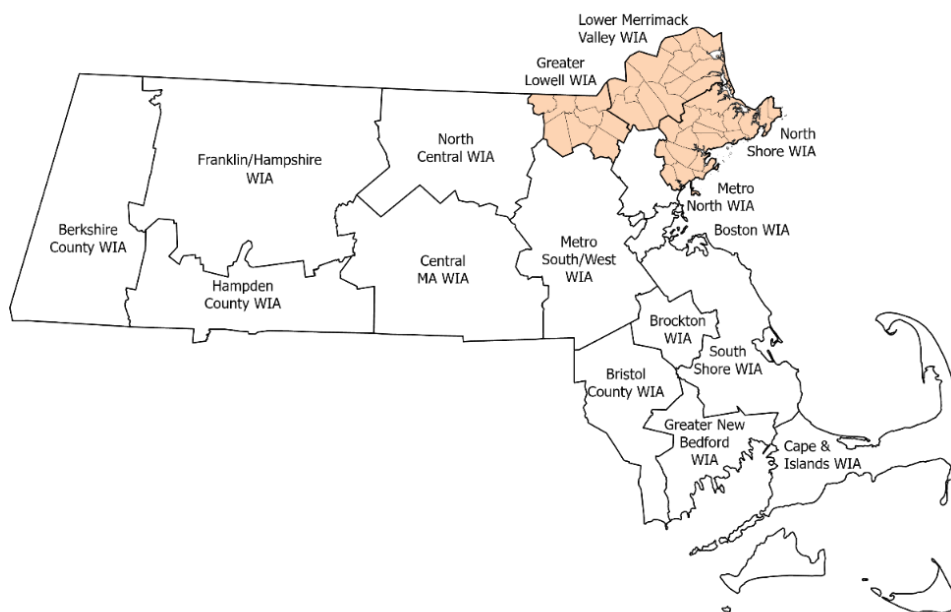
Regional Planning Process

In order to fill out the "Regional Blueprint Template" developed by MassHire, the UMass Donahue Institute (UMDI) conducted data collection and analysis of available secondary data in addition to hosting three facilitated discussions with the regional planning team. The facilitated discussions provided qualitative data on the labor force and regional dynamics that cannot be learned solely from the analysis of secondary data. The facilitated discussions were also helpful to validate the quantitative data and trigger deeper conversations concerning barriers, opportunities, active initiatives, and recommendations. The use of facilitated discussions complements the data collection by bringing together workforce leaders, businesses, economic development officials, and the providers of education and training to make the linkages between data and practices, establish priorities, and to create a vision to drive regional workforce training and development in coming years.

Regional Planning Participants

Including members from the three workforce boards, the following individuals were invited to be a part of the regional planning process in Northeast Massachusetts.

Table 1: List of Regional Planning Team Participants

Individual Name	Organization
Kevin Coughlin	MassHire Greater Lowell Workforce Board
Frank Bonet	MassHire Merrimack Valley Workforce Board
Mary Sarris	MassHire North Shore Workforce Board
Katie Crowder	MassHire North Shore Workforce Board
Kate O'Malley	MassHire North Shore Workforce Board
Ed O'Sullivan	MassHire North Shore Workforce Board
Melissa DesRoches	City of Lowell Manager's Office
Stratton Lloyd	Essex County Community Foundation
Bonnie Carr	Essex Tech
Heidi Riccio	Essex Tech
John Lavoie	Greater Lawrence Technical High School
Danielle McFadden	Greater Lowell Chamber of Commerce
Cheryl Bomal	Greater Lowell Technical High School
Jill Davis	Greater Lowell Technical High School
David Gagner	Lynn Vocational Technical Institute
Fred Gallo	Lynn Vocational Technical Institute
Shannon Norton	MassHire Lowell Career Center
James Henderson	MassHire Merrimack Valley Career Center
Leslie Parady	MassMEP
Joe Bevilaqua	Merrimack Valley Chamber of Commerce
Angela Brown	Metropolitan Area Planning Council
Stephanie Cronin	Middlesex 3 Coalition
Audrey Nahabedian	Middlesex Community College

Caitlin Campopiano	Middlesex Community College
Ellen Wright	Middlesex Community College
Judy Burke	Middlesex Community College
Katy Gentile	Middlesex Community College
Lisa Tuzzolo	Middlesex Community College
Phil Sisson	Middlesex Community College
Maria Di Stefano	MOBD
Denise Pigeon	Nashoba Valley Technical High School
Laura Swanson	North Shore Alliance for Economic Development & Enterprise Center at Salem State University
Jennifer James Price	North Shore Community College
Kathryn Nielsen	North Shore Community College
William Heineman	North Shore Community College
Maryanne Ham	Northeast Advanced Manufacturing Consortium
Allison Dolan-Wilson	Northern Essex Community College
Christopher Sicuranza	Northern Essex Community College
Dr. Lane Glenn	Northern Essex Community College
Christopher Glenn Hayes	Northern Middlesex Council of Governments
Jennifer Raitt	Northern Middlesex Council of Governments
John Keenan	Salem State University
Steven Maser	Salem State University
Tony McIntosh	Shawsheen Valley Technical High School
Nancy Ludwig	UMass Lowell
Tom O'Donnell	UMass Lowell
David Cunningham	Whittier Tech
Maureen Lynch	Whittier Tech
Tia Roy	Whittier Tech

Where are we now?

Regional Context

Northeast Massachusetts has a population of 1.1 million, which includes the 42 cities and towns that are served by Greater Lowell Workforce Board, Merrimack Valley Workforce Board, and the North Shore Workforce Board (Figure 2). The Greater Lowell area is made up of 8 communities, which includes the urban center of Lowell and its surrounding communities. The Merrimack Valley area consists of 15 cities and towns, including the larger cities of Haverhill and Lawrence, along the Merrimack River and the New Hampshire border. The North Shore area comprises 19 cities and towns, including the cities of Beverly, Gloucester, Peabody, and Salem and other shoreline communities. The combined Merrimack Valley and North Shore Workforce Boards comprise the entirety of Essex County while the Greater Lowell Workforce Board represents the northeastern corner of Middlesex County, the most populous county in Massachusetts.

Figure 2: Map of Workforce Development Areas (WDA) in Northeast Massachusetts
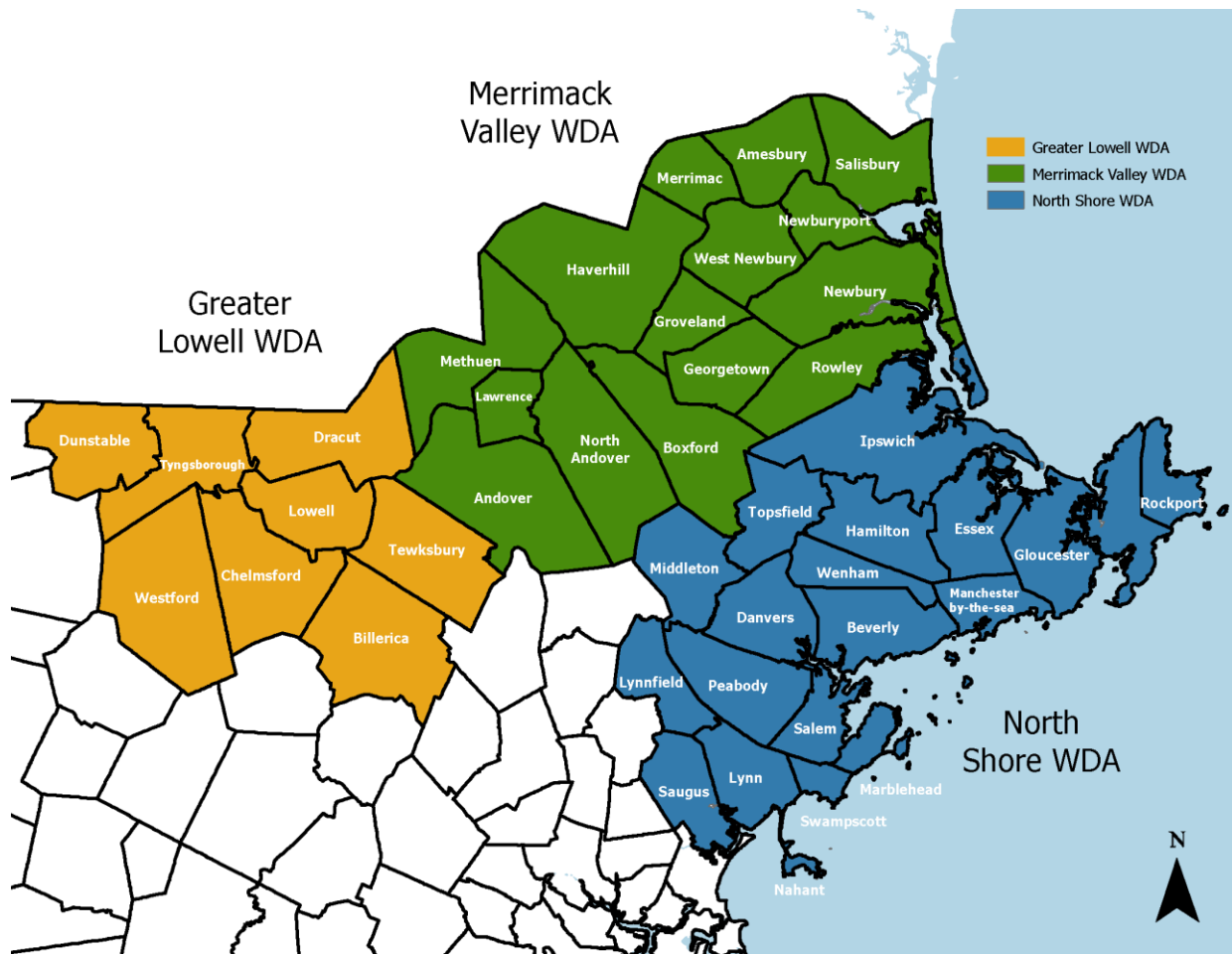
CRITICAL TRENDS IN POPULATION AND REGIONAL DEMOGRAPHICS THAT IMPACT THE WORKFORCE

The Northeast Massachusetts population has grown steadily over the past decades but is projected to slow over the next few decades (Figure 3). From 2010 to 2020, the regional population grew by nine percent, adding around 90,000 people. Between 2020 and 2050, the region is projected to gain around 25,000 in population, which is a two percent growth rate, a slower pace than the region has been growing.

Figure 3: Northeast Massachusetts Population, 1930-2020 Decennial Census Counts, Projected to 2050
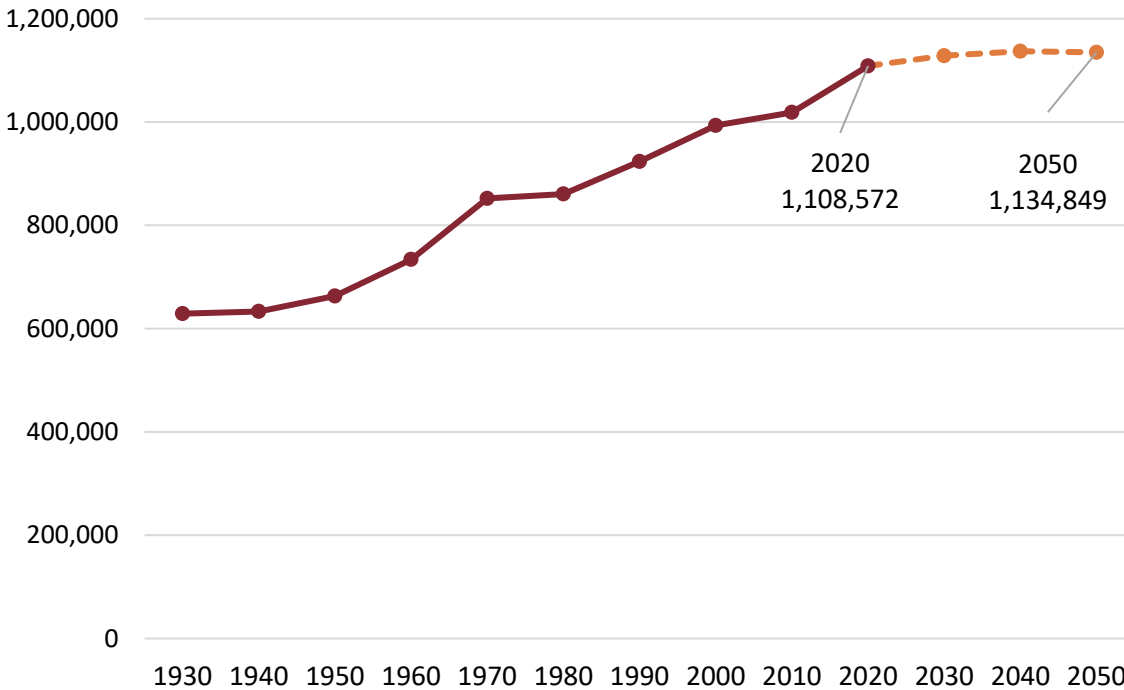
Source: Decennial Census data and UMDI v2024 Population Projections

The growth rate in Massachusetts overall is also projected to slow over the next few decades; between 2020 and 2050, the population in the state is expected to have little change with a projected decrease of less than one percent (Table 2). The population projections vary by region, however. In Greater Lowell, the population is projected to have a small one percent increase by 2030 followed by a small decrease of about two percent overall between 2020 and 2050. The North Shore follows a similar pattern but overall the population remains steady with only about a one percent increase projected by 2050. The greatest projected growth is in the Merrimack Valley, which is projected to grow by eight percent, adding around 30,000 people between 2020 and 2050 (Table 2). [1]

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[1] UMDI's population estimates are based on trends in births, deaths, and in- and out-migration. V2024 population projections series uses a cohort-component model based on a combination of trends in fertility, mortality, and migration from 2010 through 2020 and decennial Census data from 2000, 2010, and 2020. The V2024 projections methodology may also be described as a "status-quo" projections model; it assumes that recent trends in the demographic components of population change, such as fertility, mortality, and migration by age, will persist in future periods. See methodology notes at the end of the report for how projections are calculated. More information also available here: https://donahue.umass.edu/business-groups/economic-public-policy-research/massachusetts-population-estimates-program/population-projections

Table 2: Northeast Population Projections to 2050 by Region

	2010	2020	2030	2040	2050
Greater Lowell	275,404	298,405	301,366	298,515	292,009
Merrimack Valley	333,748	370,065	382,828	394,593	400,092
North Shore	409,411	440,102	444,202	443,942	442,748
Northeast Massachusetts	1,018,563	1,108,572	1,128,396	1,137,050	1,134,849
Massachusetts	6,547,629	7,039,139	7,115,199	7,102,574	7,021,497

Source: Decennial Census data and UMDI v2024 Population Projections

The population in Northeast Massachusetts is aging. Projections show that the share of the population that is age 65 and above will increase from the current 17 percent to 23 percent by 2040.[2] In that same period, the prime age working population, ages 25 to 54, is projected to grow by only four percent. Northeast Massachusetts is aging at a faster rate than the state.

This shift in the age of the population will affect the workforce as more people retire and leave the workforce. In addition to creating job vacancies, retirements can also lead to a loss of institutional knowledge. However, there is opportunity in growing sectors of the population like the foreign-born population. Northeast Massachusetts's foreign-born population has increased over the past decade, and it has a slightly higher foreign-born population than the state at 18.6 percent (Figure 4). More than half of the foreign-born population in the region comes from the Americas, which is a greater share than in Massachusetts overall.[3]

The region is becoming more diverse in terms of race and ethnicity and there is an opportunity to engage more diverse populations in the labor force. From 2010 to 2020, the region had almost a 50 percent increase in the Hispanic or Latino population (Table 3).

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[2] UMDI v2022 Population Projections
[3] U.S. Census Bureau, American Community Survey; UMDI analysis

Figure 4: Percent foreign-born, 2012-2022
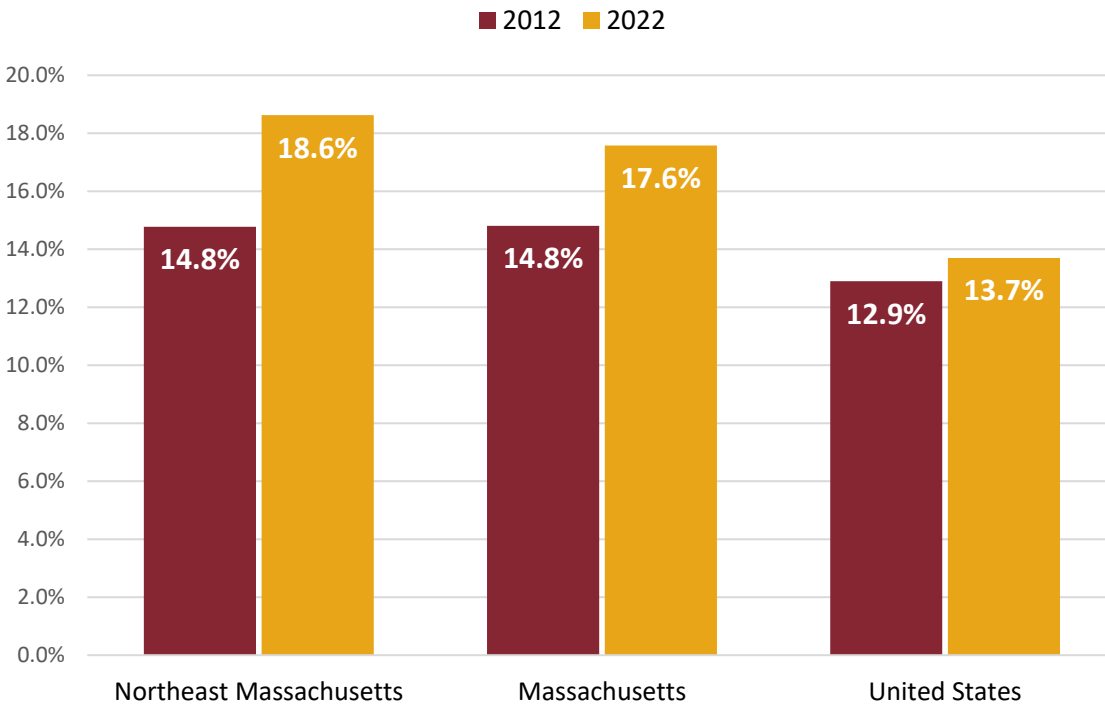
Source: U.S. Census Bureau, American Community Survey; UMDI analysis

Table 3: Change in Race and Ethnicity, Northeast Massachusetts, 2010 to 2020

Race Or Ethnicity	2010	2020	% Change
Race			
White	824,874	756,945	-8.2%
Black	37,698	49,695	31.8%
Asian	55,140	73,011	32.4%
American Indian & Alaska Native	3,211	4,687	46.0%
Some Other Race and NHPI	71,904	126,677	76.2%
Two or More Races	25,736	97,219	277.8%
Ethnicity			
Hispanic or Latino	*145,255*	*216,194*	*48.8%*
Non-Hispanic or Latino	*873,308*	*892,040*	*2.1%*
Total Population	**1,018,563**	**1,108,234**	**8.8%**

Source: Source: US Census 2010 SF1 and 2020 PL94 Data, UMass Donahue Calculations

The Hispanic or Latino population has lower educational attainment than other populations, but there could be strategies implemented to bring them into the labor force and into growing industries and career pathways. In Northeast Massachusetts, only 16 percent of the Hispanic or Latino population has a bachelor's degree or higher, compared to 45 percent of the white population (Figure 5). As this is a growing sector of the population, workforce strategies focused on the Hispanic population could help increase labor supply while also providing quality jobs for this group.

Figure 5: Educational Attainment by Race, Northeast Massachusetts, 2022
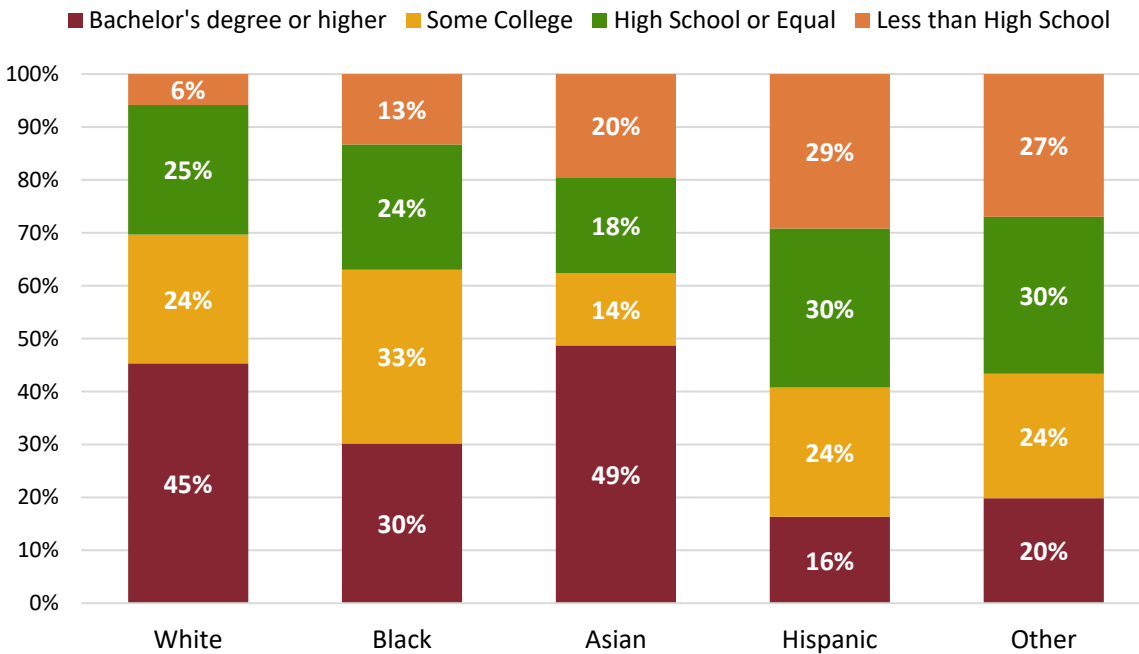
Source: U.S. Census Bureau, American Community Survey 5YR 2018-2022

As of 2023, Northeast Massachusetts has around 665,000 jobs, which includes both full and part time jobs (Table 4). As the most populated of the three subregions, the North Shore region makes up the largest portion of these jobs at 41 percent (

Figure 6). Merrimack Valley, the next largest subregion by population, makes up 32 percent and Greater Lowell makes up 27 percent of the jobs.

Table 4: Jobs by Subregion in Northeast Massachusetts

Geography	2013 Jobs	2023 Jobs	2033 Jobs (Projected)
Greater Lowell	159,020	178,937	205,730
Merrimack Valley	189,992	213,985	245,055
North Shore	235,717	272,419	314,285
Northeast Massachusetts	**584,729**	**665,342**	**765,070**
Massachusetts	**4,382,137**	**5,075,356**	**5,893,158**

Source: Lightcast, includes full and part time jobs

Figure 6: Share of Jobs by Subregion in Northeast Massachusetts, 2023
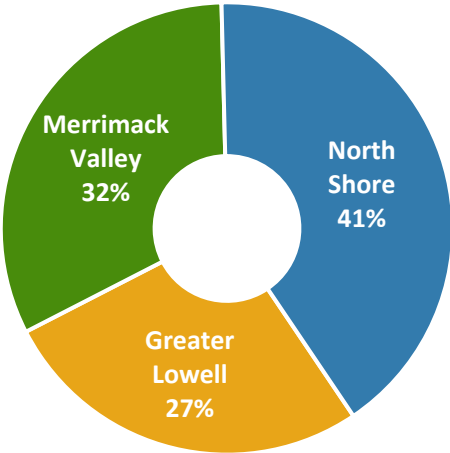
Source: Lightcast

In Northeast Massachusetts, more people commute out of the region for jobs than the number of people who commute into the region for jobs. Around 250,000 residents leave the region for work, 168,000 workers commute into the region for work, and 230,000 both live and work within the region (Figure 7). The Northeast Massachusetts location along several MBTA commuter rail lines has historically made much of the region popular for people working in the Boston-Cambridge urban core. These same people, if they were more aware about the job opportunities within Northeast Massachusetts, have the potential to add to the supply of labor for the region's employers.

Figure 7: On the Map, Primary Jobs in Northeast Massachusetts, 2021
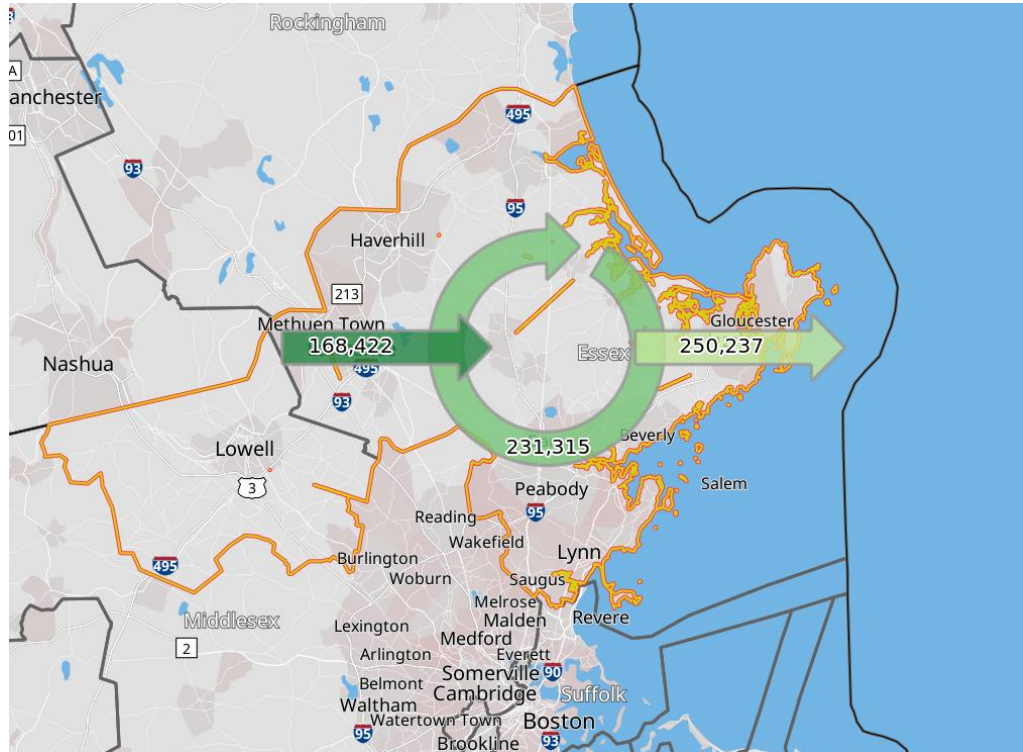
Source: U.S. Census, On the Map (for Primary Jobs in 2021)

Industry Demand Analysis (NAICS)

In the state's recently released workforce plan, they identify four priority industries to focus on: advanced manufacturing, healthcare and human services, life sciences, and clean energy (or "climate tech").[4] All four of these industries were brought up in facilitated discussions with the regional planning team as increasingly important sectors for the Northeast Massachusetts region and can help frame the regional strategies.

Northeast Massachusetts will be key in the growth of advanced manufacturing in the state. The region is already a hub for manufacturing and in particular, advanced manufacturing. The regional employment in manufacturing in Northeast Massachusetts is 1.45 times more concentrated than the national average.[5] Advanced manufacturing was also the most frequently discussed industry in the facilitated discussions with the regional planning team. The concentrations of robotics, semiconductor machinery manufacturing, aerospace, pharmaceuticals, medical equipment, computers, aerospace, and a range of defense-related industries, including secondary and tertiary suppliers (e.g., in fabricated metals) make manufacturing a cornerstone of the Northeast Massachusetts economy. Many of the region's existing workforce development strategies are for the advanced manufacturing workforce, and this can be strengthened as this sector continues to grow and evolve.

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[4] https://www.mass.gov/doc/executive-summary-massachusetts-workforce-agenda-2024-2028/download
[5] Lightcast

Regional planning members also noted the growing importance of advanced manufacturing in terms of federal funding and support like with the CHIPS and Science Act. In 2023, the Healey-Driscoll Administration announced that Massachusetts was awarded $19.7 million in funding through the federal CHIPS and Science Act to establish the Northeast Microelectronics Coalition Hub (NEMC), a regional hub to advance the microelectronics needs of the U.S. Department of Defense.[6] Regional workforce strategies can continue to build on strengths in advanced manufacturing to help support the growing sector in the state and capitalize on the opportunities from the increased federal funds.

Northeast Massachusetts has existing partnerships that support the regional advanced manufacturing industry. The three workforce boards, along with the Metro North Workforce Board, created the organization Northeast Advanced Manufacturing Consortium (NAMC) to focus on manufacturing for the northeast region. A regional planning team member discussed how this has been a great partnership and organization to develop this industry workforce. An initiative spearheaded by NAMC is the Advanced Manufacturing Training and Expansion Program (AMTEP), one of the largest workforce training programs outside of Boston. AMTEP is a special project funded by a grant from the GE Foundation and managed by the Essex County Community Foundation and Northshore MassHire. It runs in-person training programs at Lynn Vocational Tech, Gloucester High CTE, and Essex Tech in areas such as manual and CNC machining, welding, and electromechanical assembly. They also hold virtual education programs run by the North Shore Community College to help students learn the math skills necessary for modern advanced manufacturing practices. The extra funding from the GE Foundation allows AMTEP to run 8-10 training cycles per year, compared to 1-2 in other workforce areas which ultimately provides a greater scale in training. Participants in the facilitated discussion indicated that NAMC and AMTEP could also serve as a model for other industries (e.g., the nascent clean energy/climate tech industry) to have an organization focused on a specific industry or occupation in Northeast Massachusetts.

The clean energy (climate tech) sector is also a significant emerging opportunity for Northeast Massachusetts. Regional planning members discussed the growing importance of clean energy related fields. This includes the offshore wind terminal project in Salem that could create thousands of jobs, which includes jobs across many industries including advanced manufacturing and construction (e.g., electrical engineers, welders, pile drivers, turbine technicians, etc.). Additionally, climate tech is now a priority in Massachusetts economic development and is an explicit part of the Mass Leads Act, joining life sciences as a strategic long-term growth sector that will receive considerable state investments in coming years.

 With the strong economic development focus on climate tech, supportive workforce programs are now being put in place, including a pre-apprenticeship program targeted to opportunities related to Salem Offshore Wind. With the help of a grant from the Massachusetts Clean Energy Center (MassCEC), the MassHire North Shore Workforce Board's Clean Energy and Offshore Wind Program and Training Initiative is working to raise awareness and meet the early stage demands of the Salem Wind Port and the Clean Energy and Offshore Wind sector as a whole. The program will build direct pathways to employment by establishing Clean Energy and Offshore Wind building trades pre-apprenticeship

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[6] https://www.mass.gov/news/massachusetts-wins-proposal-to-host-northeast-microelectronics-hub-through-federal-chips-and-science-act

program to help fill diversity gaps within the clean energy sector. The training is targeting residents of environmental justice communities throughout the North Shore and Merrimack Valley.

Healthcare is also an important sector in the region as it is the largest industry by number of jobs and has high demand, as seen in high levels of job postings and vacancies. The regional planning team discussed the huge demand for health care occupations and challenges filling those roles, which includes low wages in some of those most in-demand positions.

PAST AND CURRENT HIGH-LEVEL INDUSTRY TRENDS IMPACTING WORKFORCE NEEDS

The largest industry sector in Northeast Massachusetts by number of jobs is Health Care and Social Assistance, which is also the largest industry in the state, overall. The next largest industry sectors in the region are Retail Trade, Government, Manufacturing, and Professional, Scientific, and Technical Services. In the Greater Lowell subregion, the Professional, Scientific, and Technical Services sector is actually the largest industry by number of jobs but is closely followed by Health Care and Social Assistance (see Appendix A). Health Care and Social Assistance is the largest industry in both Merrimack Valley and North Shore. Other regional differences can be found in the tables in the Appendices.

Over the past decade, the region was participating in a state and national economic expansion, though interrupted by the pandemic. Growth has resumed as the state and region head into the middle parts of the 2020s. The industries that have added the most net new jobs in the region are Transportation and Warehousing; Real Estate and Rental and Leasing; Construction; Professional, Scientific, and Technical Services; Finance and Insurance; and Health Care and Social Assistance (Table 5). Transportation and Warehousing added over 16,000 net new jobs in the region, which is a growth rate of over 100 percent. This was in keeping with the trend across the state as Massachusetts added over 100,000 net new jobs in this industry in that same time period.[7] The job increases in this industry can be attributed to new technological innovations over the past decade including increases in online shopping, which creates more demand for delivery services and distribution centers. There have also been increases in transportation jobs from ride services like Uber and Lyft as well as increases in jobs related to local delivery services such as grocery or food delivery.

Manufacturing lost a small number of jobs between 2013 and 2023, about a one percent loss, but remains one of the largest industries in the region, noting that manufacturing continuously introduces productivity enhancing approaches to production like automation that sometimes masks a strong, competitive industry despite lower gains (and even small losses) in the overall job numbers.

Over the next decade, the region is projected to add the most net new jobs in Health Care and Social Assistance, which is already the largest industry. This is followed by Government, which didn't have high growth over the previous decade, but is projected to add the most jobs in elementary and secondary schools and local government. There is also expected to be continued growth in Transportation and Warehousing; Real Estate and Rental and Leasing; Professional, Scientific, and Technical Services; and Finance and Insurance. Construction is still expected to grow and add jobs, but not by as much as it grew over the past decade.

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[7] Lightcast

Table 5: Historical and Projected Job Growth by Industry, Northeast Massachusetts, 2013 to 2033

NAICS	Description	2013 Jobs	2023 Jobs	2033 Jobs (Projected)	2013 - 2023 % Change	2023 - 2033 % Change (Projected)
62	Health Care and Social Assistance	82,974	91,185	106,442	10%	17%
44	Retail Trade	57,378	61,610	66,901	7%	9%
90	Government	61,744	61,600	71,207	(0%)	16%
31	Manufacturing	61,270	60,871	65,462	(1%)	8%
54	Professional, Scientific, and Technical Services	50,371	59,520	67,554	18%	13%
72	Accommodation and Food Services	39,428	41,454	46,840	5%	13%
23	Construction	30,792	40,108	45,489	30%	13%
81	Other Services (except Public Administration)	33,937	36,404	41,708	7%	15%
56	Administrative and Support and Waste Management and Remediation Services	31,347	35,766	40,632	14%	14%
53	Real Estate and Rental and Leasing	22,947	35,760	44,788	56%	25%
52	Finance and Insurance	24,648	32,964	40,418	34%	23%
48	Transportation and Warehousing	12,737	29,210	38,426	129%	32%
61	Educational Services	19,812	21,131	24,990	7%	18%
42	Wholesale Trade	17,130	18,562	20,775	8%	12%
71	Arts, Entertainment, and Recreation	14,804	16,293	17,875	10%	10%
51	Information	11,795	10,099	11,061	(14%)	10%
55	Management of Companies and Enterprises	7,827	7,741	8,549	(1%)	10%
11	Agriculture, Forestry, Fishing and Hunting	2,455	2,814	3,336	15%	19%
22	Utilities	1,056	2,018	2,339	91%	16%
21	Mining, Quarrying, and Oil and Gas Extraction	276	232	278	(16%)	20%
	Total:	584,729	665,342	765,070	14%	15%

Source: Lightcast
Note: Table is sorted by industries with the greatest number of jobs in 2023

The top growing industry sectors based on both historic and projected growth include the following:

- Transportation and Warehousing
- Real Estate and Rental and Leasing
- Construction
- Professional, Scientific, and Technical Services
- Health Care and Social Assistance
- Finance and Insurance
- Government (including public schools)
- Manufacturing

This growth can also be seen in Figure 8.

Figure 8: Net New Jobs by Industry Sector in Northeast Massachusetts, 2013 to 2033
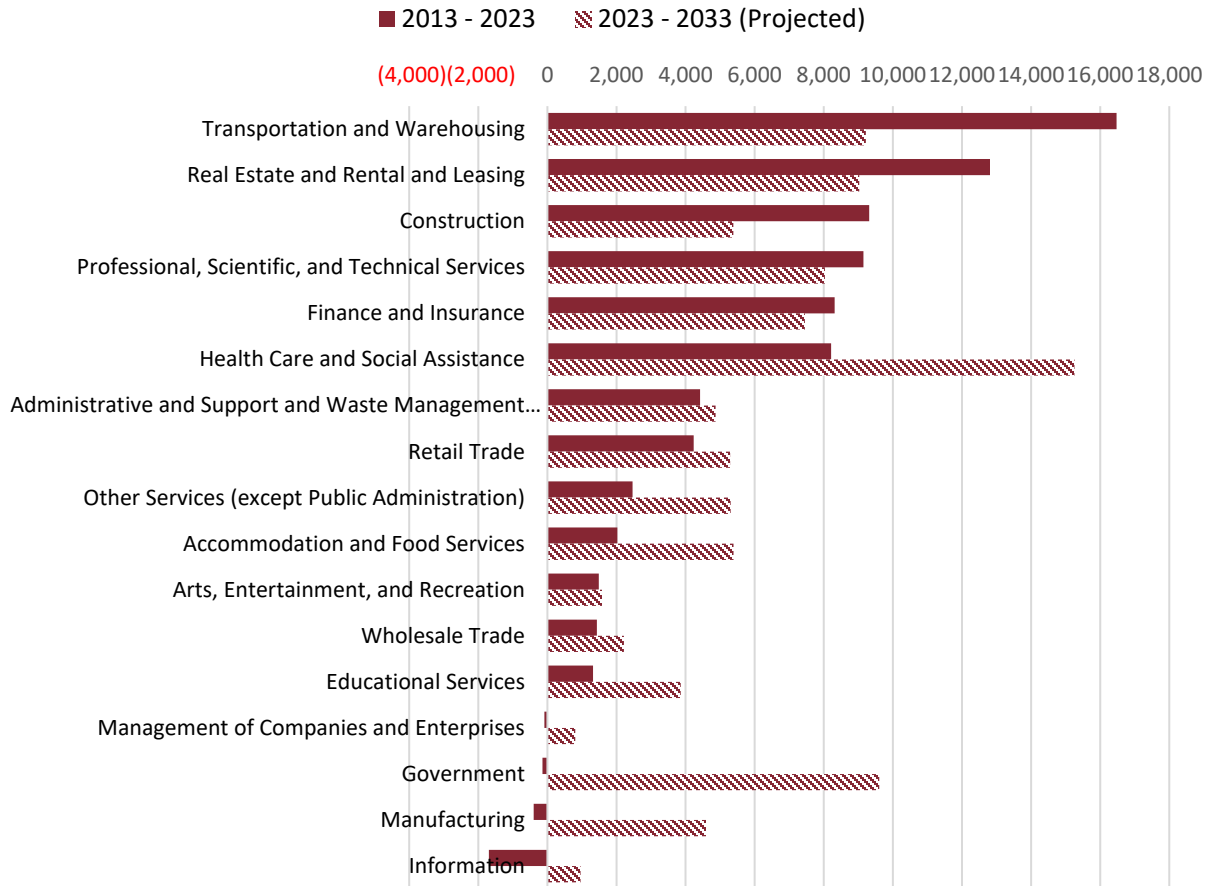
Source: Lightcast

TOP THREE INDUSTRIES THAT ARE MOST IMPORTANT TO THE NORTHEAST MASSACHUSETTS REGION'S ECONOMIC SUCCESS

Based on the industry data and qualitative data from the facilitated discussions with the regional planning team, the top three industries that are most important to the region's economic success are the following:

1. Advanced Manufacturing
2. Health Care
3. Professional, Scientific, and Technical Services

Other important industries include:

4. Clean Energy or Climate Tech
5. Education
6. Construction

Even though transportation and real estate sectors are adding the most jobs (Figure 8), there are other factors to consider in workforce planning such as the regional competitiveness, the earning potential, and skill or education level. Analyzing the employment concentrations, or "location quotients", of industries can give more insight into the competitiveness and regional advantages.

Manufacturing has the highest employment concentration in Northeast Massachusetts with 1.45x average national employment (Figure 9). There are eight industry sectors with employment concentration above one, meaning it is above the national average. Educational Services, Health Care and Social Assistance, and Professional, Scientific, and Technical Services also have high employment concentrations in the region.

Figure 9: Employment Concentration by NAICS Industry Sector, Northeast Massachusetts

■ 2013 Employment Concentration   ■ 2023 Employment Concentration
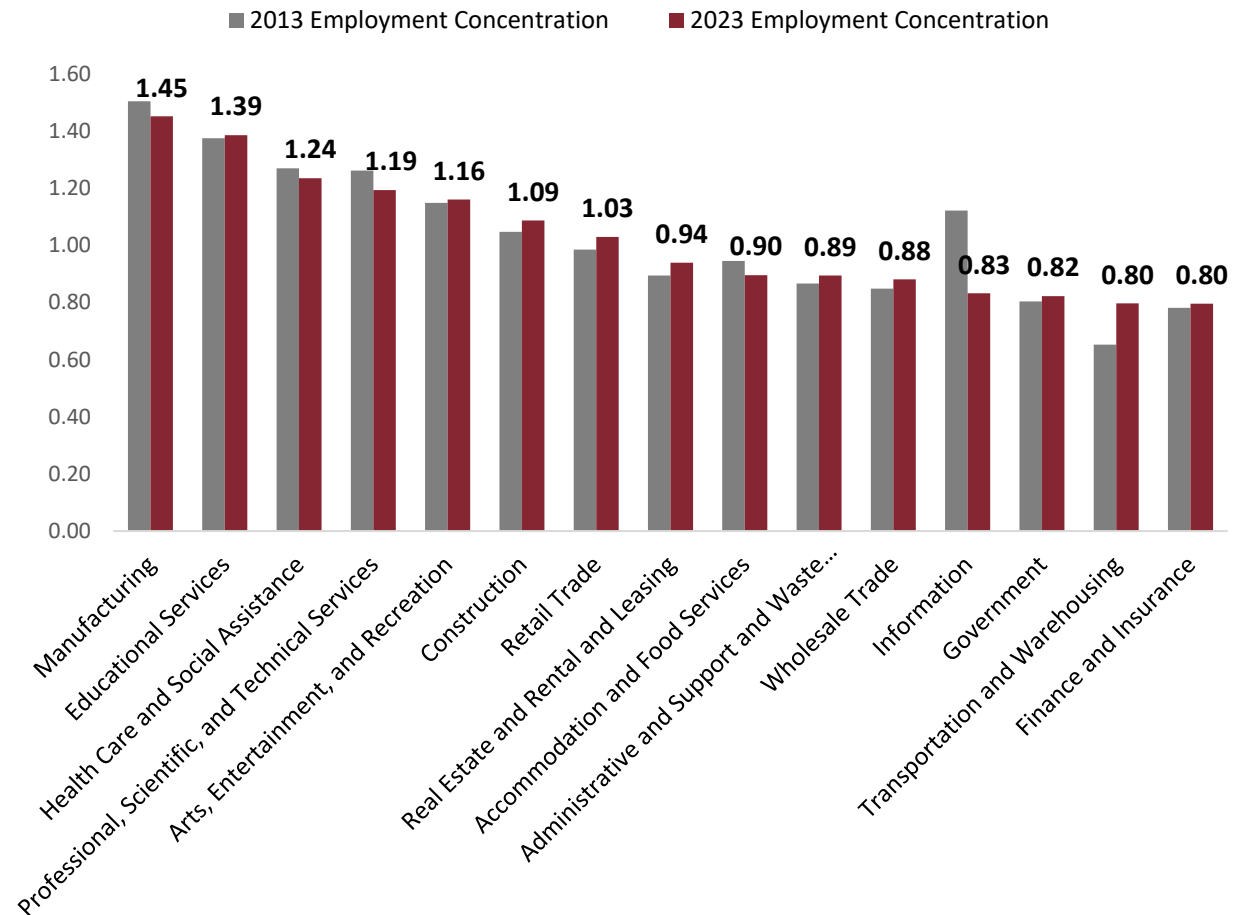
Source: Lightcast

Many of these industries with high employment concentrations also have high wages and earnings in the region. Professional, scientific, and technical services and manufacturing both have higher wages of over $100,000 (Figure 10). Construction, which also has an employment concentration above the national average, has higher wages of around $76,000.

The region's largest industry, health care and social assistance, has lower wages and earnings than the average across all industries, but it remains one of the most in-demand industries in the region. The low wages in this industry were an area of concern among the regional planning participants. Similarly, Educational Services has low wages but is the second largest industry sector in the region.

Figure 10: Current Wages, Salaries, & Proprietor Earnings by Industry Sector, Northeast Massachusetts, 2023
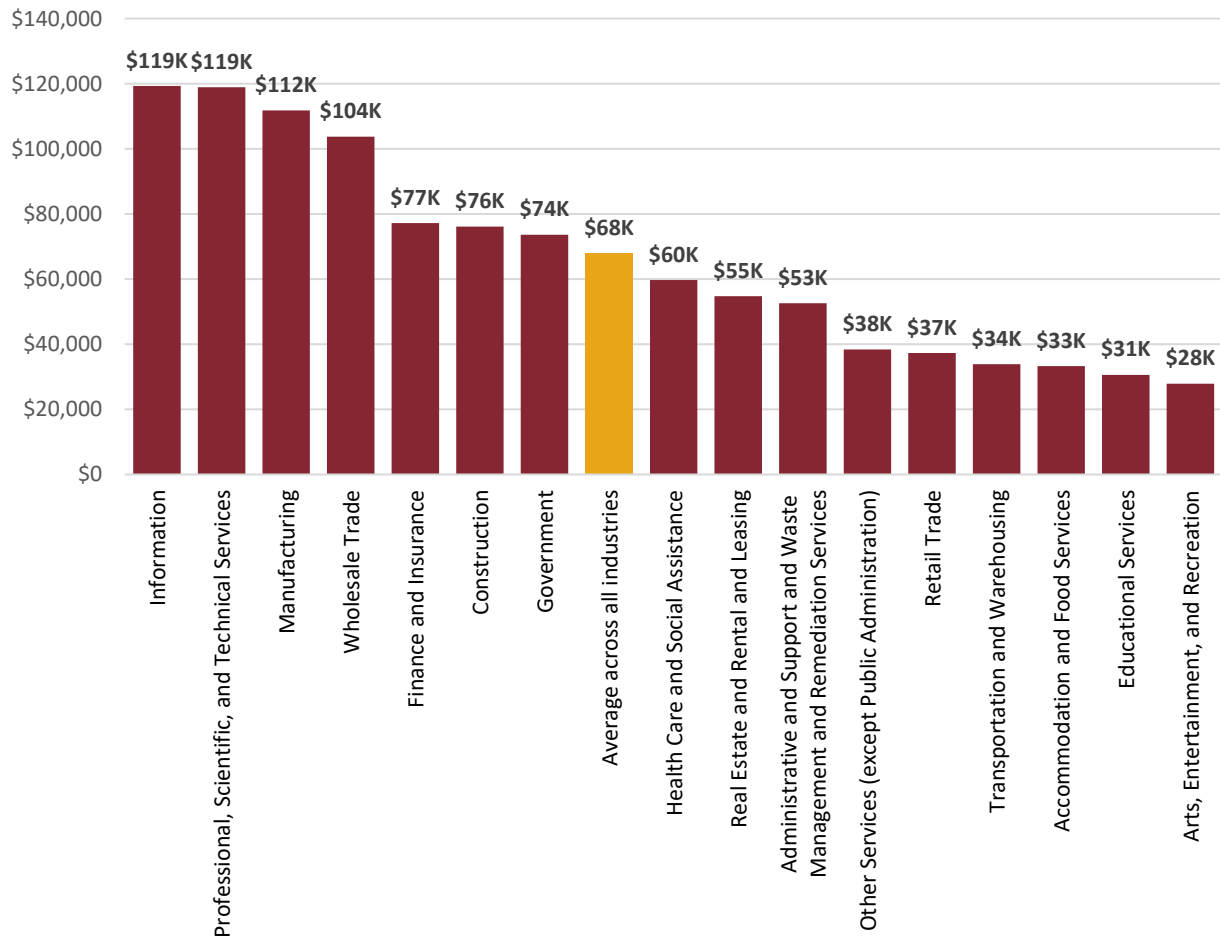
Source: Lightcast

Based on the high earning potential, high employment concentration of manufacturing, and the existing advanced manufacturing ecosystem, advanced manufacturing is a priority industry for the region. Advanced manufacturing is also related to the clean energy sector and can help support this industry as well. Both advanced manufacturing and clean energy are priorities for Massachusetts.

Health care is also a priority industry as it is the largest industry in the region, has a high employment concentration and continues to have high demand from job postings. The earning potential in this sector is lower than the average across all industries. The wages in the industry vary considerably depending on occupation, but workforce strategies can aim to make these jobs higher quality, higher paying jobs to meet the demand in the region.

Professional, scientific, and technical services is a priority industry as it has one of the highest industry earnings in the region and has a high employment concentration. The industry includes many of the activities like engineering, research & development, and computer systems design that are crucial to the Northeast Massachusetts innovation economy. This industry has also been growing and is projected to

continue to grow in the region. Initiatives like the "Lowell Innovation Network Corridor" centered on UMass Lowell's East Campus and now supported by an expansion of Cambridge's Draper Labs will further drive professional, scientific, and technical services in Northeast Massachusetts. Workforce initiatives supporting the growth and competitiveness of this industry can help workers enter an expansive field of high-paying careers.

In addition to clean energy/climate tech, some other priority industries that were discussed for the region include education and construction. There was some concern among a labor shortage for teachers and vacancies in these positions. There is also high projected growth for jobs in elementary and secondary schools and a skilled and specialized workforce will be needed to meet this demand. Construction is another area where there are labor shortages and high demand. The demand for construction will also continue with the build out of climate tech projects in the region, such as the offshore wind terminal in Salem. These workforce needs should be considered in the overall workforce planning for the region, however, the top three industries for the region to focus on are advanced manufacturing, health care, and professional, scientific, and technical services.

MOST SIGNIFICANT WORKFORCE DEVELOPMENT CHALLENGES IDENTIFIED BY BUSINESS AND INDUSTRY PARTNERS FROM THOSE INDUSTRIES

The workforce development challenges identified in the top three industries (advanced manufacturing, health care, and professional, scientific, and technical services) are related to labor supply issues and the barriers to increasing the labor supply. The regional planning team identified labor shortages as a challenge across all industries. One regional planning member said, "Every single industry is desperate to hire people. I do not believe I've seen any company saying, 'I'm fully staffed, and I don't need any help finding people.'" While there are shortages across all industries, the regional planning team would like to focus on quality jobs that can best support the Northeast Massachusetts economy. Additionally, there are some workforce development challenges more specific to certain industries. For example, many of the regional planning members discussed the low wages in the health care industry and the challenges in training and recruiting for those positions. Some of the biggest challenges identified in the region's labor supply include the following:

- Lack of awareness of careers among high school students and other potential new workers
- Barriers for the immigrant or foreign-born population
- High cost of living or other financial barriers
- Aging workforce and increasing retirements
- Lack of capacity or funding for existing programs that address these issues
- Short-term funding mechanisms that mitigate continuity and the effectiveness of workforce training
- Low wages, specifically in several high-demand occupations in the health care industry

Lack of awareness of careers among high school students and other potential new workers

One of the regional planning members described comprehensive high schools as "the biggest population that you can grab" for future workforce pipelines. However, many high school students are unaware of the career opportunities in critical industries, especially those that do not require a college degree, such as many of the positions available in advanced manufacturing. MassHire has many existing programs with both technical and comprehensive high schools in the region, however, it is difficult to reach every

student. One member said, "In general we find that most school staff are not aware of post high school options and that they are not being shared within the schools unless MassHire is sharing it." They also noted that many schools are still focused on sharing information for attending college and do not have as much information about the career opportunities available for students who are not going to college.

Other planning members also discussed the issue with high schools still focusing on college and not educating students on the good career opportunities available without a degree. This can be an issue for industries like advanced manufacturing where students can be trained to enter a career without a college degree, but they may not be aware of those opportunities. A planning member said, "there is no systemic connection to MassHire for young adults completing high school but are not going to college." Another planning member said, "There is a real high need to inform people about what manufacturing is and what it looks like."

The Northeast Advanced Manufacturing Consortium (NAMC) has existing programs with technical high schools and is looking at bringing additional programs to the comprehensive high schools to reach more students. The career and technical high schools have limited capacity, however, and NAMC is looking at ways to broaden opportunities to enter the advanced manufacturing workforce. This includes a potential pre-apprenticeship program over the summer at the technical high schools where students have access to the teachers and equipment. This can increase awareness of the career opportunities for students not going to college. NAMC is also planning to put a counselor focused on manufacturing careers in Salem High School, Peabody High School, and Reading High School. The counselors will also talk to students in elementary and middle schools as well as parents to increase awareness of these careers at earlier ages. Increasing these types of programs for advanced manufacturing as well as the other priority industries (e.g., in climate tech/clean energy) can help source new workers for employers while also getting students hired out of school.

In a similar vein, and with the help of a grant from the Massachusetts Clean Energy Center (MassCEC), the MassHire North Shore Workforce Board's Clean Energy and Offshore Wind Program and Training Initiative is working to raise awareness and meet the early stage demands of the Salem Wind Port and the Clean Energy and Offshore Wind sector as a whole. The program will build direct pathways to employment by establishing Clean Energy and Offshore Wind building trades pre-apprenticeship program to help fill diversity gaps within the clean energy sector. The training is targeting residents of environmental justice communities throughout the North Shore and Merrimack Valley. A planning team member said some employers might complain about people wanting to work, but the issue is not that they do not wish to work, but they do not know what the jobs are. They also said that while MassHire does a lot of work on increasing awareness of jobs, they cannot reach every student. A regional planning team member said,

> "I think we need to do that on a much larger scale than we're able to do with our current workforce within MassHire so educating the school personnel to be able to do that as well and educating employers that you know, we can't really complain that we aren't getting skilled workers if we aren't going out to young people and sharing that information at a much earlier stage."

Another planning team member talked about how manufacturing employers have become more engaged now with high schools because of their high demand for workers. They also noted that these

employers are paying higher salaries now because they are competing for workers. Manufacturing employers and industry partners like NAMC have done a lot of work trying to increase their labor supply; however, they still say increasing awareness of the career opportunities is one of the most important strategies for them. This includes marketing initiatives outside of schools such as billboards or PSA announcements.

Other industries can also follow some of these strategies and programs that the manufacturing industry is implementing. Health care, for example, is also in high demand of workers, including those in lower-level positions like home health aides, which does not require a formal degree. These occupations can still lead to higher paying jobs in health care through a career pathway. The regional planning team wants to generally increase awareness to high school students about the various career pathways that are available to them. Programs aimed at the high school population can help source workers for these critical industries.

Barriers for the immigrant or foreign-born population

The immigrant or foreign-born population can be another source of new workers for critical industries, however, there are barriers in getting them into the workforce. One of those barriers is language and education as much of this population is likely to not speak English well or not have formal education credentials in the United States (although they may have credentials from their country of origin).

A couple of regional planning members mentioned issues around work status and authorization as additional barriers in getting this group of workers in the workforce. In addition to getting official work status, another regional planning member noted the cost of working and figuring out how to work can be more complicated with factors like transportation. They might need financial support during training, especially if they cannot work and earn money while in training.

The regional planning members also talked about a few ideas that employers could do to help engage foreign-born workers. They could be more flexible in the educational requirements for jobs and think of ways to create pathways for individuals to earn credentials after they start working. They said, "The goal is to try to get them in the door, and then to kind of move them up." In this strategy, the employers would take on more responsibility for the workforce training. Again, this can also be helpful because it can be difficult for individuals to receive training if it means they cannot work while in training. Lowering the educational requirements on job postings could be a helpful strategy not just for the foreign-born population, but for anyone with less than a bachelor's degree educational attainment.

Similarly, another workforce planning member said that English speaking should not be a requirement for employment or for training programs, encouraging employers or program leaders to think differently in how to fill jobs. This includes being more accommodating to workers who speak other languages. Initiatives such as dual language training, technical courses offered in Spanish, and wrap-around support (e.g., case managers, jobs placement specialists, resume assistance, etc.) are gaining traction, facilitating immigrants' integration into the workforce.

High cost of living or other financial barriers

The high cost of living in Northeast Massachusetts can also be a challenge for workers, especially for those in lower wage positions. The regional planning team expressed concern about workers being able to afford housing in the area along with the cost of other factors like transportation and childcare.

Several regional planning members brought up concerns about outmigration and people, particularly younger people, leaving the region to live in more affordable areas like New Hampshire or states in the Southeast. The members discussed strategies to address this like providing financial support during training, however, the workers still need to make living wages when they leave training. A few regional planning members discussed the need for employers to pay higher wages. One planning member said,

> "I think that businesses can play a bigger role in ensuring that they're providing and offering quality jobs, whether it's pay, or benefits, or the workforce environment that they are bringing people into. I think that plays a key role in keeping people interested in wanting to grow in an industry and a career path."

The financial barriers that come along with workforce training prevent some people from either participating in or completing training. Even if training is free, there is a cost for transportation and potentially for childcare. There is also a loss of income if you cannot earn money while going to training. MassHire recently had a program that provided stipends to help people participate in training, but that grant is not currently funded. Other planning board members talked about issues getting people to complete trainings once they get started. Some drop out of training programs because they have to work "survival jobs" for themselves and often to support their families.

Transportation is another barrier to training that can be limited by finances. Many lower income workers or students do not have their own car and there are limited public transportation options in Northeast Massachusetts. One planning board member also talked about transportation affecting students getting internships. If students can't get to their internships or jobs reliably or efficiently, they might not be able to take or sustain them. Implementing workforce programs like internships or apprenticeships also need to consider these other factors that prevent people from joining or completing them.

Aging workforce and increasing retirements

One reason for the existing labor shortages is increasing retirements among the older workers. Retirements will only increase as workers continue to get older. Several regional planning board members discussed the concern over the aging workforce, the "silver tsunami", as well as the outmigration of the younger population.

In addition to losing workers, members are concerned about the loss of knowledge and experience especially in industries with specialized practices that ar. There were several workforce ideas discussed surrounding how to continue to engage the 65+ population. This could include getting retired or soon-to-be retired workers to help with training or even having part-time jobs training new workers.

Another idea was to try to engage retired workers to take part-time jobs that are in demand such as transportation jobs. One planning member mentioned that there is a need for drivers at places like

senior centers or social service agencies that need to transport individuals for certain services. Older or retired workers might be inclined to take on a part-time job like this and that would help re-engage them in the labor force.

Lack of capacity in training programs

In general, MassHire has designed and implemented numerous programs to address the workforce development challenges facing Northeast Massachusetts. However, they deal with issues of capacity and have sufficient staff and resources to increase their impact.

One common recommendation by multiple regional planning members was the need for extended grant periods. They noted that often the grant time periods are too short, or they stop and start, and make it difficult for the program to operate effectively. One planning member said, "We need to urge longer term grants that allow us to have some opportunity to really have an impact without worrying about the budget period, the state, when that's coming out, when it's not coming out, and just know we have this time to do this sort of work."

Another planning member confirmed this need for longer term, multiyear grants saying it's important "that the state look at that because the starting and the stopping, and then the pausing waiting six months for a grant to get executed between the ending and the start. It's way too long a time and it's disruptive." An example of this is with internship and apprenticeship programs for high school students. With the grant "stop and start" issues, they can't recruit for internships until they know they have grant funding, and by the time they know, it's too late in the school year to recruit students. They need more consistency and time to plan these programs in order for them to be effective.

A regional planning member also mentioned that there are "stop and start" grant issues with adult education programs as well. It makes it difficult to know when there are programs available and often the timeline is uncertain of when programs will be offered. The regional planning team wants more consistency in funding, so the programs are as reliable as K-12 education.

Another planning member gave an example of a successful workforce program, AMTEP (Advanced Manufacturing Training and Expansion Program), that has long-term funding. It has been funded by the GE Foundation over the past several years, allowing for continuity and reliability in planning. According to this member, the program recruits, trains, and employs 125 individuals a year in advanced manufacturing and 85 percent are immediately employed upon completion of a five-month certificate and they see a 25 percent wage increase from before the five months certificate to after the five-month certificate. This is just one example of where a consistently funded training program can have a stronger impact on and help increase the scale of training capacity.

In addition to having consistently funded programs, there are successful workforce training programs that could be implemented on a larger scale with more resources and capacity. For example, the programs discussed in educating high school students about career opportunities could be expanded. One planning member said, "I think we need to do that on a much larger scale than we're able to do with our current workforce within MassHire so educating the school personnel to be able to do that as well and educating employers."

The technical high schools have had many successful workforce training programs. A planning member talked about CTI training programs at the technical schools in the region where students are often hired in advanced manufacturing careers before graduating and there are still not enough graduates to meet the high demand. However, they also noted that many of these technical schools have waiting lists for the programs. These are successful training programs with direct placement into jobs, however, the technical school programs do not have enough capacity to train enough students to meet the employer demand.

Low wages in health care

The regional planning team members generally agreed that health care jobs are in very high demand in Northeast Massachusetts, but many of the occupations have low wages which makes them harder to fill. There is also an increasing need for health care workers as the population gets older and requires more health care services. Members specifically noted the high demand for home health aides, which is one of the lowest paid jobs in the health care industry. One member also discussed Certified Nursing Assistants (CNA) and medical assistants, which are important, but low paying jobs for the industry. This member said they should be making $50 an hour for the work they are doing. The team overall agrees that these workers are underpaid and want to find ways to increase pay for these jobs that are essential to the health care industry.

In addition to lower wages, a regional planning member brought up that the nature of the health care industry might deter potential workers from entering this field, especially after the pandemic. The burnout in the industry led to more retirements and it can be emotionally and physically demanding work. Another planning member mentioned that the high cost of earning a bachelor's in nursing (BSN) degree could deter people from becoming Registered Nurses (RN). Even though RNs make more money than CNAs or home health aides, the pay might not be enough for the cost of the degree and again the potentially demanding nature of the work. Some existing programs can help with tuition reimbursement or other costs with the degree, but given the high demand for nursing positions, there is a need for more programs to increase the supply of nurses.

The low pay was also discussed specifically for behavioral health jobs as well. One member talked about a high demand for mental health counselors at hospitals in Northeast Massachusetts, but the jobs do not pay well enough to attract workers. Another member suggested investing in behavioral health occupations that do not pay well but are needed. Another member suggested specifically investing in positions like "career navigators" within health organizations that can help workers stay in their positions and receive training to move up in the organization.

Another planning member mentioned that childcare workers are paid minimum wage, which is surprising given the high cost of childcare. The low pay of these jobs can deter people from this line of work, which can constrain the childcare capacity even further.

Occupational Demand Analysis (SOC)

As Northeast Massachusetts continues to rebuild itself and expand in a post-COVID world, a major set of outstanding questions concerns the type of jobs that will be in demand, as well as the forms of work most beneficial to the broader economy and the region's underlying competitiveness. This section of the report assesses the types of jobs, based on standardized occupational definitions, which will be in demand in coming years.

CRITICAL TRENDS IN OCCUPATIONAL EMPLOYMENT HISTORY IN THE REGION

The occupation groups in Northeast Massachusetts that have added the most net new jobs over the past decade are Management, Business and Financial Operations, Transportation and Material Moving, Healthcare Support, Sales and Related, and Construction (Table 6). The occupation groups that are projected to add the most new jobs in the region over the next decade are those same groups as well as Educational Instruction and Library and Office and Administrative Support (Table 6 and Figure 11). Tables for each of the three sub-regions that comprise Northeast Massachusetts are included in the Appendix.

Figure 11: Net New Jobs by Occupation Groups, Northeast Massachusetts, 2013 to 2033
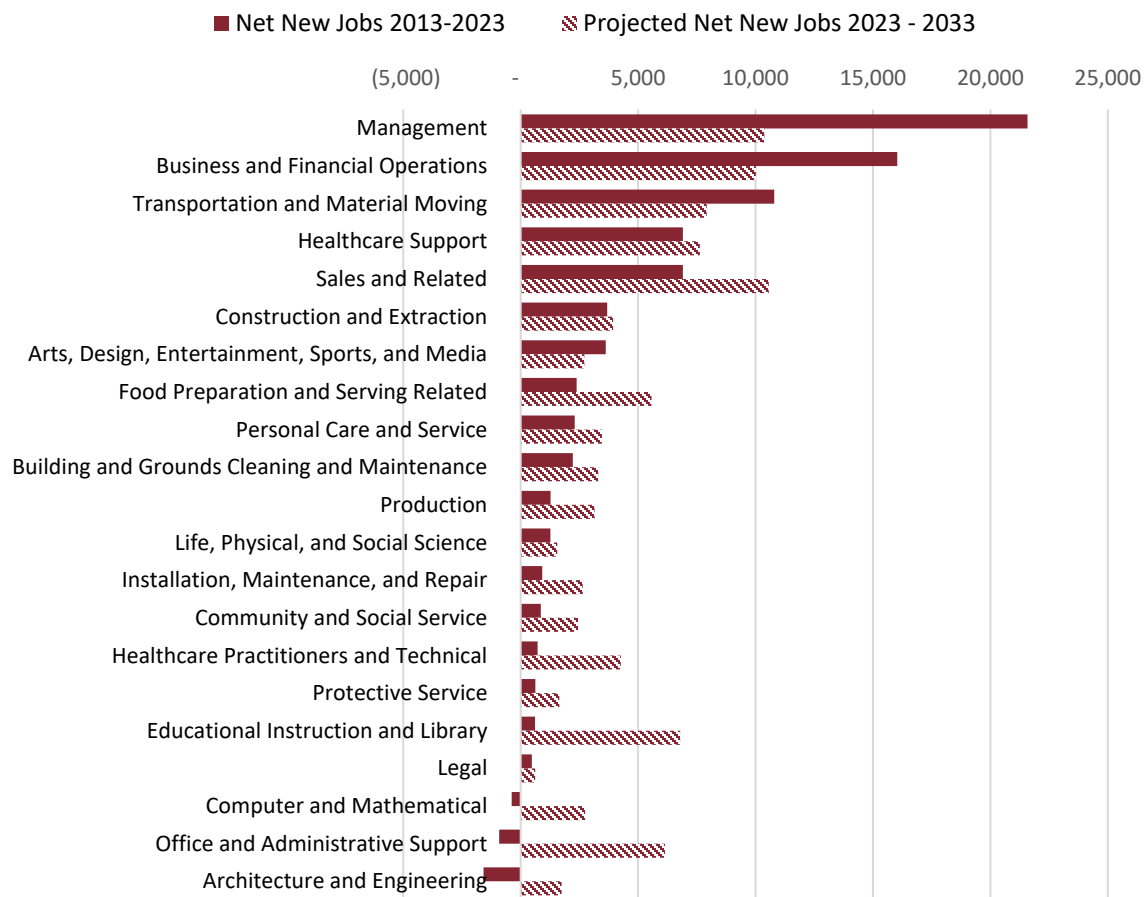
Source: Lightcast

Table 6: Historical and Projected Job Growth by Occupation, Northeast Massachusetts, 2013 to 2023

SOC (2-digit)	Occupation Group	2013 Jobs	2023 Jobs	2033 Jobs (Projected)	2013 - 2023 % Change	2023 - 2033 % Change (Projected)
41	Sales and Related	67,966	74,868	85,432	10%	14%
11	Management	44,616	66,193	76,565	48%	16%
43	Office and Administrative Support	61,632	60,716	66,856	(1%)	10%
13	Business and Financial Operations	36,326	52,361	62,372	44%	19%
53	Transportation and Material Moving	32,388	43,180	51,100	33%	18%
35	Food Preparation and Serving Related	38,642	41,022	46,592	6%	14%
25	Educational Instruction and Library	35,884	36,493	43,284	2%	19%
29	Healthcare Practitioners and Technical	32,366	33,082	37,347	2%	13%
51	Production	30,765	32,037	35,184	4%	10%
31	Healthcare Support	24,496	31,400	39,024	28%	24%
47	Construction and Extraction	26,729	30,411	34,345	14%	13%
27	Arts, Design, Entertainment, Sports, and Media	21,999	25,620	28,331	16%	11%
39	Personal Care and Service	21,881	24,182	27,638	11%	14%
37	Building and Grounds Cleaning and Maintenance	21,148	23,364	26,665	10%	14%
15	Computer and Mathematical	19,095	18,712	21,453	(2%)	15%
49	Installation, Maintenance, and Repair	17,088	18,006	20,643	5%	15%
17	Architecture and Engineering	14,550	12,967	14,709	(11%)	13%
21	Community and Social Service	11,931	12,788	15,233	7%	19%
33	Protective Service	9,355	9,977	11,626	7%	17%
19	Life, Physical, and Social Science	7,881	9,143	10,699	16%	17%
23	Legal	4,823	5,299	5,919	10%	12%
45	Farming, Fishing, and Forestry	1,654	1,981	2,261	20%	14%
	Total	**584,729**	**665,342**	**765,070**	**14%**	**15%**

Source: Lightcast

The occupation groups with the highest employment concentrations in the region are Life, Physical, and Social Science and Architecture and Engineering (Figure 12). Other occupation groups with employment concentrations above the national average (above 1) that are relevant to the priority industry sectors include Healthcare Support, Educational Instruction and Library, Production, Construction and Extraction.

Figure 12: Occupation Groups with Employment Concentrations Above National Average in Northeast Massachusetts 2023

Occupation Group	Value
Life, Physical, and Social Science	1.53
Architecture and Engineering	1.42
Community and Social Service	1.28
Arts, Design, Entertainment, Sports, and Media	1.24
Healthcare Support	1.20
Educational Instruction and Library	1.16
Management	1.11
Personal Care and Service	1.09
Production	1.05
Construction and Extraction	1.05
Computer and Mathematical	1.03
Healthcare Practitioners and Technical	1.02
Building and Grounds Cleaning and Maintenance	1.02

Source: Lightcast

The two occupation groups with the highest employment concentrations also have some of the highest wages: Life, Physical, and Social Science and Architecture and Engineering (Figure 13). Some of the other occupation groups relevant to the key industry sectors have lower wages like Healthcare Support and Production.

Figure 13: Median Annual Earnings by Occupation Group, Northeast Massachusetts, 2023
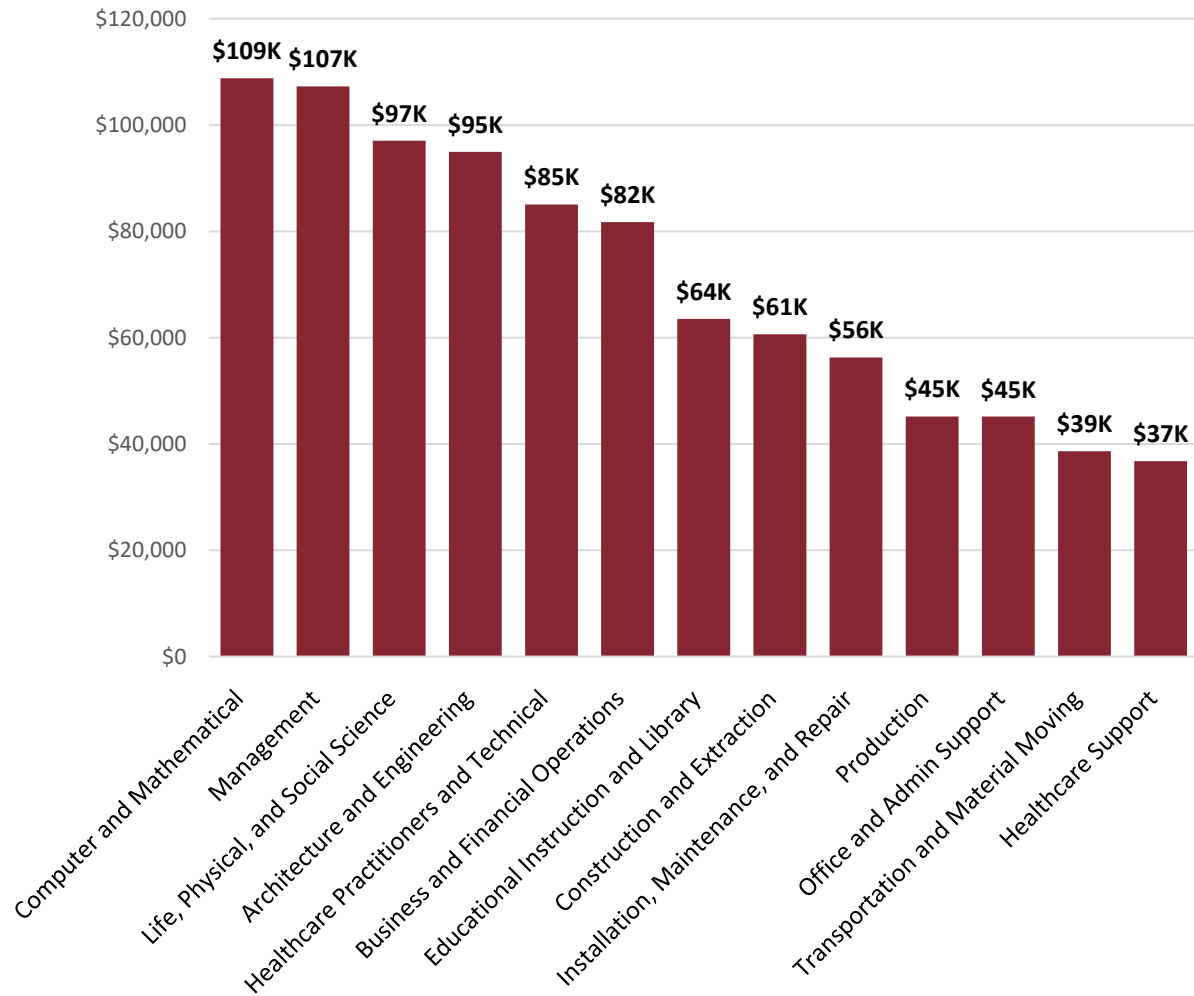
Source: Lightcast

Across all occupation groups, there will be high demand from replacement jobs, which are the jobs that become available as people retire or leave an occupation permanently (Figure 14). As seen in the demographic part of this analysis, shown earlier, Northeast Massachusetts like the rest of the state is becoming older. As people age out of their jobs in larger numbers, identifying, finding, and developing the skills for the workers that will replace them is and will continue to be an imperative for Northeast Massachusetts. Encouraging older workers to stay on their jobs, even with reduced hours and to remain available to contribute to training for younger, less experienced workers are ways to keep older people involved and assist in the transformative transition towards a new cohort of workers.

Figure 14: Projected Replacement Jobs, Northeast Massachusetts, 2023 to 2023

■ Projected Replacement Jobs (2023 - 2033) ■ Net new jobs (2023 - 2033)

Sales and Related	**90,758**
Office and Administrative Support	**72,028**
Transportation and Material Moving	**57,822**
Management	**52,914**
Healthcare Support	**50,554**
Business and Financial Operations	**43,313**
Production	**36,747**
Educational Instruction and Library	**36,172**
Construction and Extraction	**27,262**
Arts, Design, Entertainment, Sports, and Media	**26,267**
Healthcare Practitioners and Technical	**18,863**
Installation, Maintenance, and Repair	**16,848**
Community and Social Service	**11,767**
Computer and Mathematical	**11,590**
Architecture and Engineering	**8,799**
Life, Physical, and Social Science	**7,500**
Legal	**2,842**

Source: Lightcast

THE TOP OCCUPATIONS OR OCCUPATIONAL GROUPS IN WHICH THE REGION IS FACING THE MOST SIGNIFICANT EMPLOYEE SHORTAGES

According to the state's regional occupational list, the occupations that are priority and in "5-star" demand in *all three* workforce regions include the following:

- Carpenters
- Electricians
- General and Operations Managers
- Industrial Machinery Mechanics
- Nurse Practitioners
- Plumbers, Pipefitters, and Steamfitters
- Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel
- Software Developers

The construction and trade occupations like carpenter, electrician, and plumber are priority because of their relevance to the emerging climate tech/clean energy industry – a long-term growth priority for the Commonwealth of Massachusetts. General and operations manager is also a priority for the clean energy sector but is also aligned with advanced manufacturing and life sciences.

Industrial machinery mechanics, software developers, general and operations managers, and sales representatives of services are all priority occupations for the advanced manufacturing sector – a sector as pointed out earlier in the report that has both a legacy and a particular concentration of jobs in Northeast Massachusetts. All four of these occupations are also aligned with life sciences, an additional strength for the region as well an identified strategic priority for Massachusetts. Nurse practitioner is a priority occupation within the region's large and extensive health care industry.

There is some variation among the regions within Northeast Massachusetts, but these are the occupations that are priorities for the state and have 5-star demand in all three of the workforce regions.

The qualitative findings from the three facilitated discussions carried out for this study further reinforced many of the trends seen in the quantitative data. Health care was one of the major areas that the regional planning team members said is experiencing labor shortages.

One planning member said that they could fill an entire job fair with home healthcare companies looking to hire home health aides. Other members confirmed they are seeing high demand for home health aides, but the wages are low, which makes it difficult to fill those vacancies. Home health aide is not indicated in the state's occupation list as a priority occupation despite the high number of vacancies and demand for this position. The occupation list does indicate Registered Nurse (RN) and Licensed Practical and Licensed Vocational Nurse (LPN) as 4-star demand and priority occupations for the health care industry. These are higher wage nursing positions, but there is demand for nursing positions at all levels. A career pathway in nursing can help move workers up in this career, however, to reach the level of LPN, RN, or even Nurse Practitioner (NP).

Similarly, planning members discussed the shortages in behavioral health positions and the challenges filling these positions that often have low wages. The state has substance abuse, behavioral disorder, and mental health counselor as a 5-star demand, priority occupation for the North Shore and a 4-star demand, priority occupation for Merrimack Valley. Child, family, and school social worker, and healthcare social worker are also both 3-star demand, priority occupations for North Shore and Merrimack Valley. Mental health and substance abuse social worker is a 3-star demand, priority occupation for Greater Lowell and Merrimack Valley. There is high demand for various counselor and social worker occupations across the region, but the low wages make the positions difficult to fill. The region recently received a behavioral health care hub grant, which several regional team planning members mentioned as a way to help grow this workforce.

Another planning team added that there is also a demand for independent physicians. In general, there is high demand for a spectrum of jobs across the health care industry, including behavioral health. However, the non-competitive wage jobs within this industry frequently make vacancies challenging to fill.

A couple of planning team members also talked about shortages and demand for teachers in the region. One member cited an example of a local school where there was a third-grade class with no teacher, and it took several months to fill the position and teachers had to take turns teaching the class. The state's occupation data does show various teaching occupations for elementary and secondary schools as having high demand, including 3-,4-, and 5-star demand. However, these are not priority occupations in terms of the state's four priority industry sectors. Still, these are crucial positions that remain in high demand across Northeast Massachusetts.

OCCUPATIONS OFFERING A "CAREER PATHWAY" FOR WORKERS TO MOVE TO HIGHER SKILLS AND WAGES, ESPECIALLY WORKERS STARTING AT ENTRY-LEVEL

The regional planning team discussed the idea of career pathways and how they can be applied to most occupations where workers can move up to become supervisors or managers. However, they want to focus on career pathways that lead to good, quality jobs. The workforce boards already have mapped out some career pathways for their critical occupation needs.

The specific occupations that were discussed in terms of career pathways were health care occupations, including nursing occupations and behavioral health occupations, manufacturing occupations, transportation occupations, and IT and computer-related occupations like software developers.

Health care occupations

There is high demand for nursing occupations from home health aides up to nurse practitioners. The regional planning team discussed the high demand for the lower level, low wage positions like home health aides and nursing assistants. These roles are challenging to fill and to keep workers in because of the low wages and difficult work. The planning team wants to develop strategies to make these jobs more attractive, but it mostly comes down to what the employers will pay for those jobs. Additionally, the regional planning team felt that even at the higher-level nursing positions like Registered Nurse (RN), the wages can be too low for the type of work and for the high cost of living in the area.

Still, nursing occupations have clearly defined career pathway where the lower-level positions like home health aides can learn new skills and earn certifications and move up to positions like Certified Nursing Assistant and Licensed Practical Nurse (LPN), and eventually move up to even higher positions like RN.

The region has existing programs and a healthcare hub grant that funds the nursing pathway programs. These pathways help workers go to a CNA up to an LPN and then beyond. These pathways are clearly defined and have some funding, however, there is still a challenge in recruiting for the entry level positions to get enough workers to enter the pathway.

For behavioral health jobs, there is also a career pathway to move workers up to higher-level, higher wage positions. One regional planning team member discussed how there is potential high paying jobs in behavioral health, but it takes time and money to earn those higher degrees to get to that point:

> "There is a career pathway around mental health in the mental health industry that you can move up through leading to a bachelor's or master's degree in social work, which pays really well once you get up to that point. But it's a long journey to make it up there. So, you know, they're critical. We need to be paying attention to them. We need to be supporting people in

them, but we need to be helping them move up a career pathway within it. And we, I think we need to be making noise about why is the salary so low."

Another planning team member recommended that for both healthcare and behavioral healthcare occupations, organizations should invest in positions like "career navigators" to help people stay in the organizations and help show them how they can receive training and move up.

Manufacturing occupations

As a priority industry in the region, advanced manufacturing also has opportunities for career pathways in the occupations within this industry.

A regional planning team member mentioned how UMass Lowell and MIT are working collaboratively on curriculum for a middle occupation between technician and engineer, which is called the "Technologists". They said there is a high need for this type of occupation and this curriculum will be taught at the community colleges. This new occupation will provide a chance for technicians, which is a lower paying job, to advance to a higher paying job and is a pathway to continue to advance up to engineer.

The regional planning team also discussed the first line supervisor group leader position in manufacturing. This is another job that is an opportunity for lower-level workers to upskill to make higher wages in a supervisory position. They also said there is a high need for this position in manufacturing.

Computer occupations

For IT and computer related jobs like software developers, a regional planning team member said, "Any computer related job inherently builds in our certifications where employees go back and get recertified or get certified in new programs. And so automatically, that's like a built-in career pathway. So, they're constantly improving their skills and homing in on the new skills that are ever changing."

They also said that the challenge with these jobs can be getting the entry level workers into this pathway. There are entry level positions that only require some computer training and do not require a college degree. Once they have entered the career pathway, they can continue to build their skills and get certifications to move up in these positions. The high-level computer occupations like software developers are high paying jobs and have potential for upward mobility. However, having a clearly defined pathway and strategies to recruit the entry level workers for the pathway are needed.

Workforce Supply

Northeast Massachusetts is populous with over a million people and is a sub-region of the much larger Boston Combined Statistical Area (CSA) which is one of the largest in the country with a population of over eight million. With that, Northeast Massachusetts is a component of a large and diverse labor shed with numerous educational assets. However, even with these advantages, employers in Northeast Massachusetts nearly universally are confronting challenges in bringing in enough workers to meet their needs. This section looks at the pipeline of potential workers for the region.

DESCRIPTION OF THE REGION'S EXISTING PIPELINES OF NEW WORKERS (CREDENTIALS) ACROSS PUBLIC AND PRIVATE SECONDARY AND POST-SECONDARY INSTITUTIONS

The Integrated Postsecondary Education Data System (IPEDS) data from 18 educational institutions in the region show that there were over 14,000 program completions in 2022 (Table 7). This includes certificate programs and degrees at all award levels. The institution with the largest number of completions is UMass Lowell, followed by Salem State University, Merrimack College, and Endicott College.

Table 7: Program Completions in Northeast Massachusetts by Postsecondary Institution, 2022

Description	2022 Completions for All Programs
University of Massachusetts-Lowell	4,894
Salem State University	1,915
Merrimack College	1,780
Endicott College	1,254
Middlesex Community College	898
North Shore Community College	887
Northern Essex Community College	669
New England Tractor Trailer Training School of Massachusetts	623
Gordon College	516
Gordon-Conwell Theological Seminary	386
Montserrat College of Art	74
Northpoint Bible College	63
Greater Lowell Technical School	63
Massachusetts School of Law	49
Spa Tech Institute-North Andover	36
EINE Inc	35
Shawsheen Valley School of Practical Nursing	25
Lowell Academy Hairstyling Institute	23
Total completions	**14,190**

Source: Lightcast, IPEDS
Note: Program completions include certificate programs, associate degrees, bachelor's degrees, master's degrees, and doctoral degrees. Only includes postsecondary instituions so does not include completions from technical high schools.

Of these 14,000 completions, business programs have the most in the region followed by health professions and education (**Error! Reference source not found.**). This is based on the Classification of Instructional Programs (CIP) codes for post-secondary programs.

Figure 15: Program Completions by CIP Code in Northeast Massachusetts Across All Award Levels, 2022

Category	Completions
Business, Management, Marketing, and Related Support Services	2,582
Health Professions and Related Programs	1,969
Education	1,557
Engineering	1,009
Homeland Security, Law Enforcement, Firefighting and Related Protective Services	825
Computer and Information Sciences and Support Services	753
Liberal Arts and Sciences, General Studies and Humanities	706
Psychology	590
Transportation and Materials Moving	538
Theology and Religious Vocations	434
Visual and Performing Arts	424
Biological and Biomedical Sciences	346

Source: Lightcast, IPEDS

Looking at just the certificate completions, transportation and materials moving has the most, followed by health professions (Figure 16). There are also completions for mechanic and repair technologies, engineering, and engineering related technologies, which are three programs that could be related to advanced manufacturing careers. Taken together, these three programs had 183 completions in 2022. However, in talking with the regional planning team members, the demand is even higher than the number of graduates from these programs.

Figure 16: All Certificate Completions by CIP Code in Northeast Massachusetts, 2022

Category	Value
Transportation and Materials Moving	534
Health Professions and Related Programs	441
Business, Management, Marketing, and Related Support Services	142
Education	133
Homeland Security, Law Enforcement, Firefighting and Related Protective Services	131
Culinary, Entertainment, and Personal Services	107
Mechanic and Repair Technologies/Technicians	89
Computer and Information Sciences and Support Services	68
Engineering	49
Theology and Religious Vocations	47
Engineering/Engineering-related Technologies/Technicians	45
Psychology	40

Source: Lightcast, IPEDS

In addition to the universities and colleges in the region, the technical high schools in the region have robust programming that supports many of the critical industries like advanced manufacturing. As of the 2023-2024 school year, there are around 10,000 students enrolled in pathway programs across all grades in the region's technical high schools (Table 8). This includes students in CTE programs, Early College, and Innovation Pathways. There are about 2,500 senior students who would be graduating in 2024. These programs help produce many workers across industries each year and the graduates are in high demand. Students are hired before they graduate, especially in critical industries.

Multiple regional planning team members discussed the great work that the technical schools are doing and the extremely high placement rates for their graduates. One planning team member from a technical school said, "Our placement rates are very high. Students are hired before they graduate, and we do not have enough students graduating to fill the open jobs (in particular in construction, health, vet, and manufacturing)." This member also said, "We are also running several CTI cohorts and working with our partners and placement rates are high."

Table 8: Pathway Program Enrollment Numbers in Regional Technical High Schools, 2023-2024

School Name	Grade 9	Grade 10	Grade 11	Grade 12	Total
Essex North Shore Agricultural and Technical School	476	450	429	390	1,745
Gr Lawrence Regional Vocational Technical	485	449	433	407	1,774
Gr Lowell Regional Vocational Technical	581	576	577	559	2,314
Lynn Vocational Technical Institute	0	270	278	262	810
Nashoba Valley Technical High School	214	199	193	167	773
Shawsheen Valley Vocational Technical High School	321	325	333	327	1,306
Whittier Regional Vocational	320	310	314	313	1,257

Source: Massachusetts Department of Elementary and Secondary Education
Note: Includes the number of students in CTE programs, Early College, and Innovation Pathways by grade, including grades 9-12 and special education beyond grade 12

Another regional planning team member from a community college talked about high placement rates as well across many of their programs. They said they have been successful because as part of the grant writing process, they build the curriculum with employers so that they are providing training and teaching the skills that will get students hired at those companies. The technical high schools are a strong existing asset in the region.

LABOR SUPPLY CHALLENGES FACING THE REGION'S PRIORITY OCCUPATIONS AND CAREER PATHWAYS

There are approximately 280,000, or one-third of people age 16+ in Northeast Massachusetts that are not in the labor force (Figure 17). The regional planning team wanted to better understand the demographics of the people not in the labor force to determine how to engage them and potentially bring them into the labor force.

Figure 17: Labor Force Status for Population 16+ (2022)
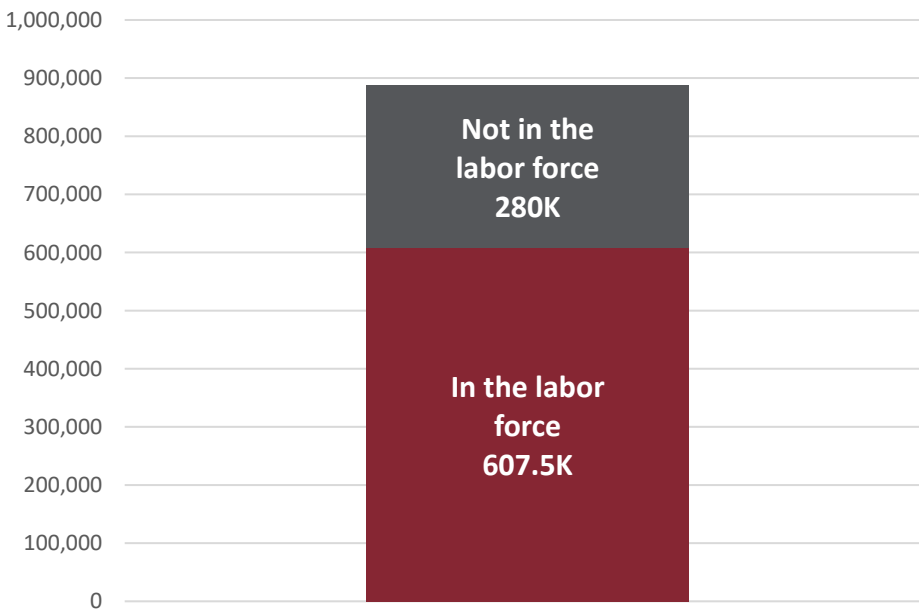
Source: ACS 5-Year 2018-2022, IPUMS USA, UMDI Analysis

Of these 280,000 that are not in the labor force, almost half (134,000) are age 65 and above, indicating this group of people is retired (Figure 18, Table 9). There are still some strategies that can try to bring older workers back into the workforce or ways to gain some of their industry-specific knowledge. For example, the regional planning team members discussed the possibility of programs that bring in industry experts for new workforce training initiatives.

Figure 18: Age of Population Not in the Labor Force in Northeast Massachusetts, 2022
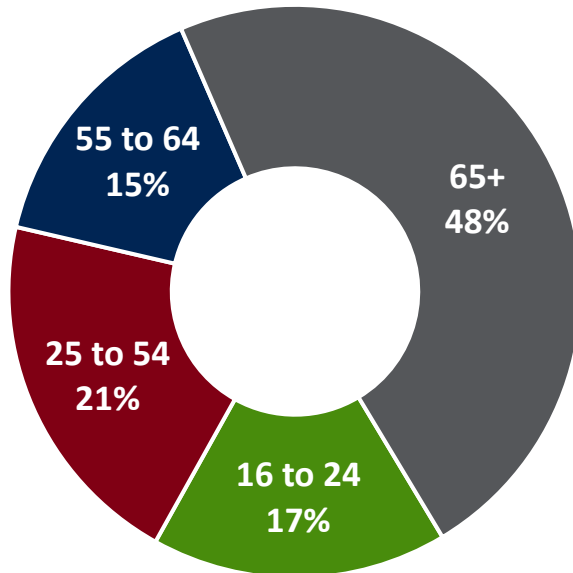
Source: ACS 5-Year 2018-2022, IPUMS USA, UMDI Analysis

Table 9: Age and Labor Force Status, Northeast Massachusetts, 2022

Age	Not in labor force	In labor force
16 to 24	*46,770*	83,827
25 to 54	*57,468*	363,683
55 to 64	*41,620*	117,034
65+	*134,093*	42,906
Total	**279,951**	**607,450**

Source: ACS 5-Year 2018-2022, IPUMS USA, UMDI Analysis

Still, the analysis of the population not in the labor force focuses on those in prime working age, in the age group 25 to 54, to understand what barriers may exist for them entering the workforce.

Language and Education Barriers

There is a higher share of Hispanic or Latino population not in the labor force compared to those in the labor force. This suggests language could be a factor or barrier in entering the labor force. About 26 percent of the region's population ages 25 to 54 that is not in the labor force is Hispanic or Latino, compared to only 20 percent in this population in the labor force (Figure 19).

Figure 19: Race and Ethnicity of Population Age 25 to 54 in Northeast Massachusetts, 2022
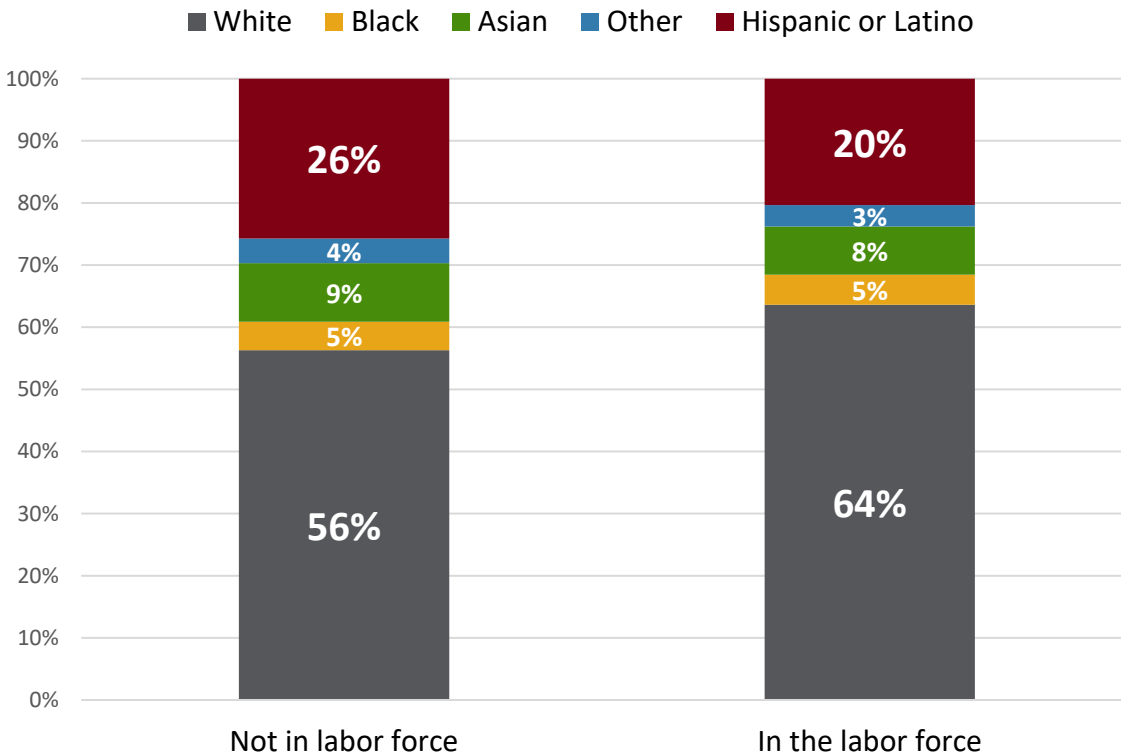
Source: ACS 5-Year 2018-2022, IPUMS USA, UMDI Analysis

Additionally, 30 percent of those of prime working age (25 to 54) who are not in the labor force are foreign born. This is a slightly higher share than the 27 percent foreign-born population of this age group that is *in* the labor force.[8] Workforce strategies that address potential language barriers could help the non-English speaking population enter the workforce.

The region's population ages 25 to 54 in the labor force has higher educational attainment than those not in the labor force. Twenty percent of the prime working age population that is not in the labor force has *less than* a high school diploma (Figure 20). Over 50 percent have a high school diploma or less.

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[8] ACS 5-Year 2018-2022, IPUMS USA, UMDI Analysis

Figure 20: Educational Attainment by Labor Force Status for Population 25 to 54, Northeast Massachusetts, 2022
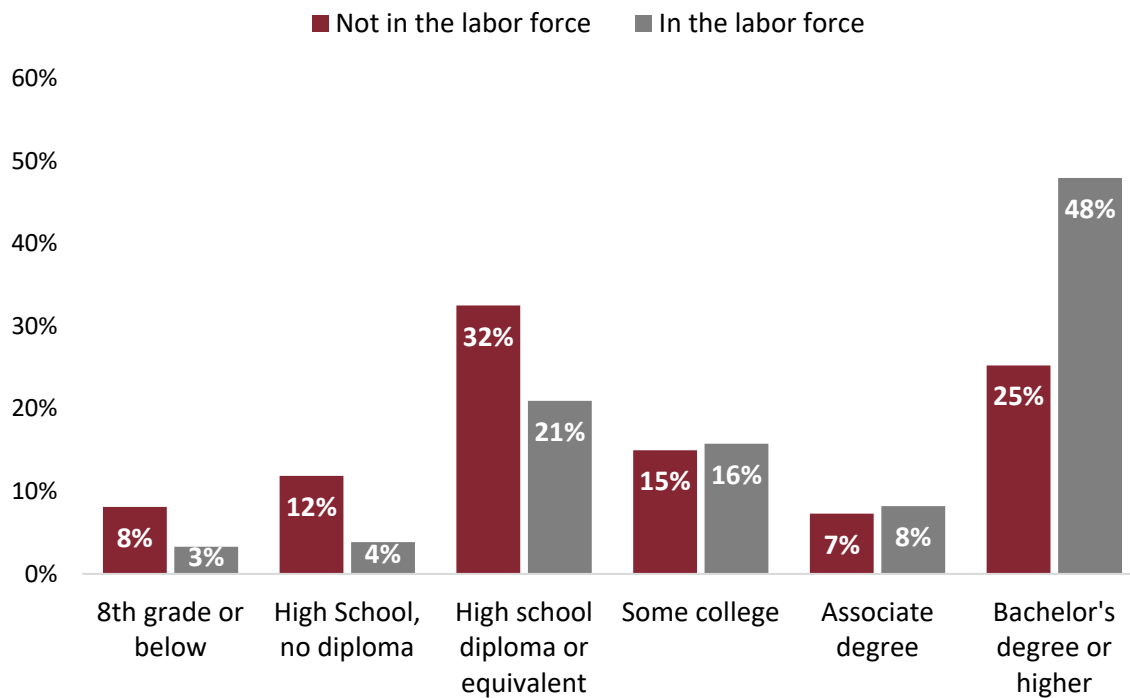
Source: ACS 5-Year 2018-2022, IPUMS USA, UMDI Analysis

Other Demographics: Sex and Age of Workers

As mentioned in the discussion on population trends, the population in Northeast Massachusetts is aging. Projections show that share of the population that is age 65 and above will increase from 17 to 23 percent by 2040.[9] In that same period, the prime age working population, ages 25 to 54, is projected to grow by only four percent. Northeast Massachusetts is aging at a faster rate than the state. This shift in the age of the population will affect the workforce as more people retire and leave the workforce. In addition to creating job vacancies, retirements can also lead to a loss of institutional knowledge.

Analyzing the median age by industry also shows which industries might be the most affected by this trend. The age of workers is older than the state in some key industry sectors including professional, scientific, and technical services and educational services (Figure 21).

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[9] UMDI v2022 Population Projections

Figure 21: Median Age of Workers in Key Industry Sectors, 2022
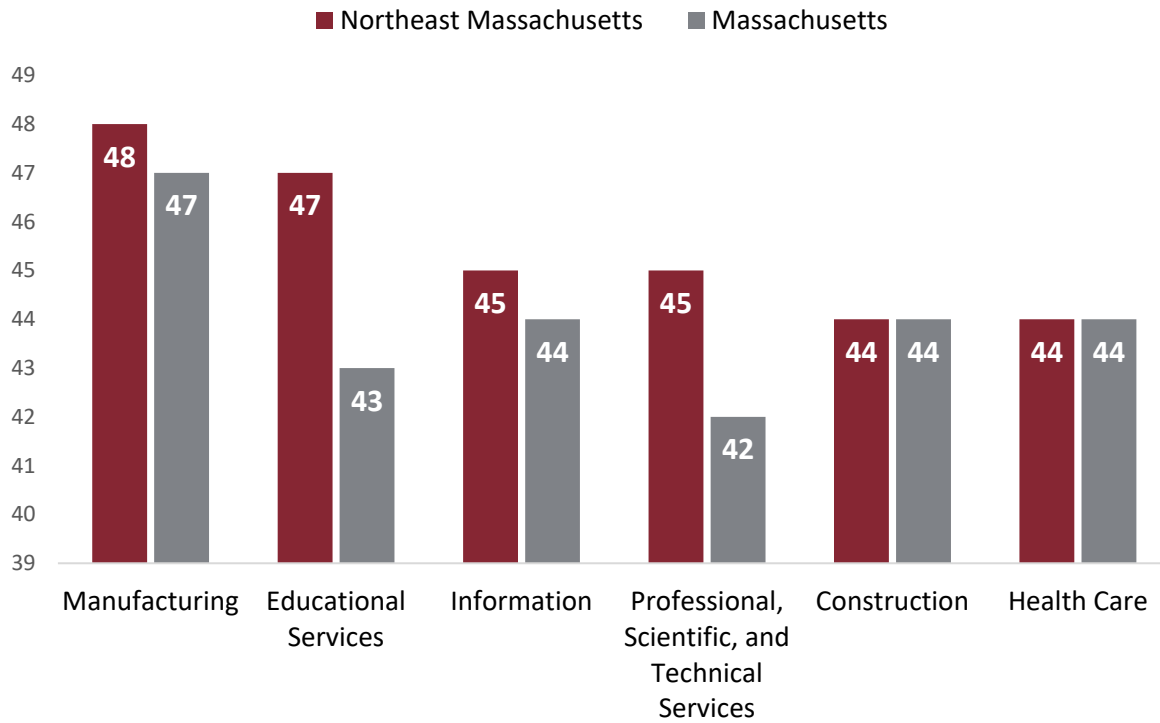
Source: ACS 5-Year 2018-2022, IPUMS USA, UMDI Analysis

Looking at median age by occupation shows that the region also has older workers in computer, engineering, and science occupations compared to the state (Figure 22). These occupations are important in the professional, scientific, and technical services industry sector. Northeast Massachusetts does have slightly younger workers in production occupations, which are key to the region's advanced manufacturing industry sector.

Figure 22: Median Age by ACS Occupation Groups, 2022

Legend: ■ Northeast Massachusetts ■ Massachusetts

Occupation Group	Northeast Massachusetts	Massachusetts
Management, Business, & Finance	48	46
Office & Admin Support	46	45
Production	46	48
Education, Legal, Community Service, Arts, & Media	45	43
Healthcare	44	44
Computer, Engineering, & Science	43	39
Construction & Extraction	43	43
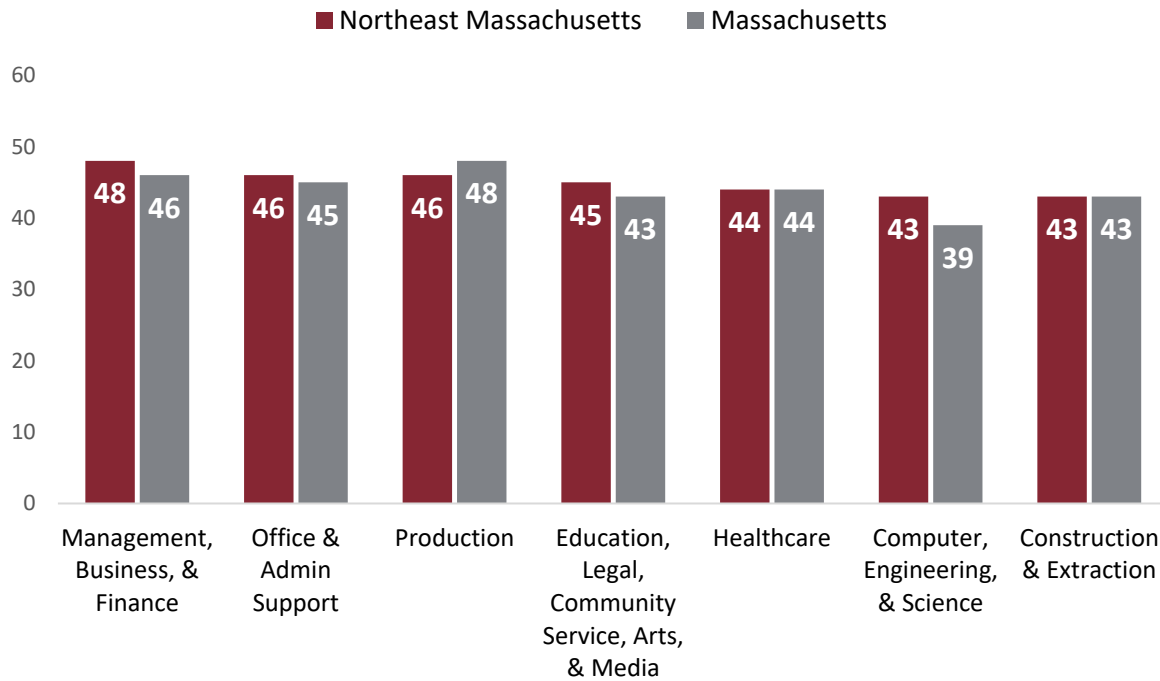
Source: ACS 5-Year 2018-2022, IPUMS USA, UMDI Analysis

Breaking down the labor force by sex, the analysis finds that 63 percent of those of the region's prime working age population (ages 25-54) not in the labor force are female (Figure 23). This could suggest that more women are staying home to take care of children or for other reasons. Workforce strategies can help address childcare barriers and try to engage the working age female population.

Figure 23: Sex of Population 25-54 and not in the Labor Force, Northeast Massachusetts, 2022

Male 37%
Female 63%
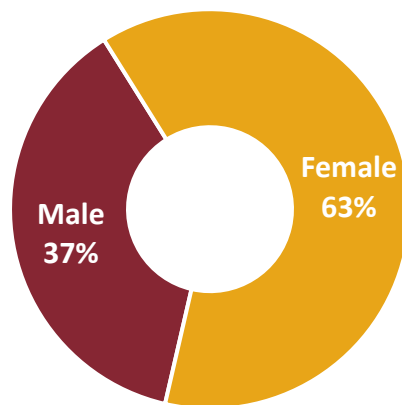
Source: ACS 5-Year 2018-2022, IPUMS USA, UMDI Analysis

Potential Strategies

The state workforce agenda includes various strategies aimed at removing barriers for people not in the labor force to enter the labor force. Some of these strategies could be especially helpful for Northeast Massachusetts as they try to engage the population not in the labor force and try to remove barriers for this population. Some of the state strategies to consider include:

- Increasing resources for ESOL and creating re-credentialing center for immigrants
- Launch a stipend initiative with stipends for caregiving, transportation, and more
- Subsidize housing costs for new workers entering the labor market including individuals in shelters
- Expanding affordable, high-quality childcare in the state

The state strategy for increasing resources for ESOL and creating re-credentialing center for immigrants could be useful for the Northeast region as there is an opportunity to recruit more workers from the Hispanic population. There are also other workforce strategies that can be developed to support engagement with the Hispanic population. The regional planning team discussed how employers can be supportive of these initiatives. Employers could remove educational requirements from job postings where possible. They can also hire non-English speakers and either have a supervisor that speaks the same language or offer opportunities to improve their English skills after hiring.

The stipend initiative is also one that could be useful to address the workforce barriers that people face. The regional planning team discussed some of their previous stipend programs that no longer have funding. They would like the state to establish a statewide stipend program that could help support people while in workforce training.

The strategy to subsidize housing costs for new workers entering the labor market could be helpful to the region also as there is a high cost of living and entry level jobs in particular are low wage and make it difficult to afford to live in the region.

The strategy to expand affordable childcare in the state would be helpful in removing a barrier for parents, and in particular, the female population, which might not be able to participate in the labor force because of the lack of availability or unaffordability of childcare.

Some other strategies that the regional planning team discussed include expanding tuition reimbursement programs, creating grant programs with longer term funding, and expanding internship and apprenticeship programs in high schools.

One planning team member recommended tuition reimbursement programs if workers work in the state for a certain amount of time for positions such as teachers, nurses, and childcare workers.

The regional planning team also emphasized the importance of having longer term grant funds so the programs can be more consistent and effective.

Where do we want to go?

Based on the data analysis and three facilitated discussions conducted for this study, this section identifies the industry and occupational priorities, vision, mission, and goals for Northeast Massachusetts.

Priority Industries & Occupations

TOP THREE REGIONAL WORKFORCE PRIORITY INDUSTRIES BY 2-DIGIT NAICS

1. Manufacturing (31-0000)
2. Health Care and Social Assistance (62-0000)
3. Professional, Scientific, and Technical Services (54-0000)

LIST OF NOTABLE INDUSTRIES BUT NOT PRIORITY INDUSTRIES

1. Clean Energy or Climate Tech industries (hybrid of industries)
2. Construction (23-0000)
3. Education (61-0000)

LIST 3-5 PRIORITY OCCUPATIONS OR OCCUPATIONAL GROUPS BY SOC CODE FROM THE "HIGH DEMAND" LIST

1. Software Developers (15-1252)
2. Industrial Machinery Mechanics (49-9041)
3. General and Operations Managers (11-1021)
4. Behavioral health occupations
    a. Substance Abuse, Behavioral Disorder, and Mental Health Counselors (21-1018)
5. Nursing occupations (with emphasis on a nursing career pathway)
    a. Nurse Practitioners (29-1171)
    b. Registered Nurses (29-1141)
    c. Licensed Practical and Licensed Vocational Nurses (29-2061)

LIST OF NOTABLE OCCUPATIONS BUT NOT PRIORITY OCCUPATIONS

1. Construction occupations (47-0000)
    a. Carpenters (47-2031)
    b. Electricians (47-2111)
    c. Plumbers, Pipefitters, and Steamfitters (47-2152)

Assets

Northeast Massachusetts is well positioned as a location to grow the emerging sectors seen as priority areas for the Massachusetts economy, including healthcare and life sciences, advanced manufacturing, and climate tech (e.g., Salem Offshore Wind as well as clean energy technologies and equipment). Northeast Massachusetts combines innovation, a foundation of businesses and suppliers, and educational and research resources to nourish the growth and competitiveness of these industries. Northeast Massachusetts' proximity to Boston-Cambridge also presents complementary opportunities to attract workers and businesses from one of the world's premier innovation hubs by capitalizing on the region's comparatively lower costs of living and doing business combined with noteworthy quality of life attributes (e.g., outdoor recreation, history, cultural activities, sports, etc.). While Northeast Massachusetts has a number of enviable assets and a legacy for industry (e.g., in advanced manufacturing), workforce development efforts will need to be responsive to current labor force and demographic trends to further the region's dynamism, competitiveness, and economic growth.

ADVANCED MANUFACTURING

- Existing advanced manufacturing cluster and ecosystem – Northeast Massachusetts is a leader in a number of advanced industries, including semiconductor manufacturing equipment, medical devices, computer hardware and software, and aircraft engines. The region is also strong in fabricated metals businesses which are frequently secondary and tertiary suppliers to other industries like robotics, medical equipment, missiles, submarines, etc.

- Workforce training in advanced manufacturing in the region, notably in the North Shore is supported by the Advanced Manufacturing Training and Expansion Program (AMTEP), a project derived from the Northeast Advanced Manufacturing Consortium (NAMC) and funded by a grant from the GE Foundation and managed by the Essex County Community Foundation and Northshore MassHire.

- Advanced manufacturing in Northeast Massachusetts is further supported by universities and educational institutions, including UMass Lowell, community colleges, technical high schools, and employer partnerships. Numerous manufacturers are actively involved in outreach to schools in the region, provide internships, and work with area colleges and universities to develop and customize workforce training.

HEALTH CARE

- Universities and educational institutions – Northeast Massachusetts have four schools that provide the region with graduates in nursing – UMass Lowell, Endicott College, Merrimack College, and Salem State University. Two-year degrees in nursing are provided by the region's three community colleges – North Shore Community College, North Essex Community College, and Middlesex Community College. On the innovation side (and straddling both health care and advanced manufacturing), UMass Lowell houses the Massachusetts Medical Device Development Center (M2D2) that works to commercialize technologies that raise healthcare outcomes.

- Healthcare/Behavioral Health Hub Grants – both the MassHire North Shore and Greater Lowell Workforce Boards have received funding from the Commonwealth to support investments in collaborative efforts focused on addressing healthcare and behavioral health workforce needs. The funding will provide training and placement services for hundreds of underemployed and incumbent worker participants in a range of professions, including technicians, nursing, counseling, and addiction recovery among many others.

PROFESSIONAL, SCIENTIFIC, AND TECHNICAL SERVICES

- An appreciable recent development for Northeast Massachusetts is the Lowell Innovation Network Corridor ("LINC") situated in the East Campus area of UMass Lowell that will augment both the advanced manufacturing and professional, scientific, and technical services sectors. Cambridge-based Draper Labs plans to expand to the corridor, potentially bringing in hundreds of staff focused on applied research and engineering related to microelectronics. The combination of Draper, UMass Lowell, and the presence of a cluster of regional tech businesses will help further cement Northeast Massachusetts as an innovation hub. Leveraging this new development, from the standpoints of workforce and economic development, represents a strategic opportunity for the region.

CLIMATE TECH/CLEAN ENERGY/CONSTRUCTION

- Salem Offshore Wind Terminal - One of the premier upcoming clean tech projects in Northeast Massachusetts is the Salem Offshore Wind terminal. This project will transform existing infrastructure to create a deep-water port capable of constructing and installing floating offshore wind in the Gulf of Maine. Construction is expected to create over 120 new jobs prior to operations and sustain up to 200 new jobs during operation. The company behind the project plans to work with local high schools, colleges, and nonprofits to provide Global Offshore Wind training and other workforce development programs necessary for the Offshore Wind Terminal to be able to hire locally once completed. Trades jobs related to construction, including electricians, welders, crane operators, machinery technicians, etc. will need to be filled for this major project.

- Climate Tech is a priority industry in the Mass Leads Act - Massachusetts is in the midst of a long-term transition to clean energy, with hundreds of millions of dollars pledged (as part of the Mass Leads Act) to reach the goal of net-zero carbon emissions. Similar to the successful effort to grow the Massachusetts life sciences industry into a global leader, the new climate tech initiative also supported by funds to develop a climate tech workforce in the state, is aimed to propel Massachusetts as a national and world leader to compete in the emerging clean energy sector.

Vision, Mission, Goals, Strategies and Outcomes

Vision

Job seekers and businesses in Northeast Massachusetts benefit from efficient, effective, innovative, inclusive, and equitable workforce initiatives jointly planned by employers and public sector education, economic development, and workforce development.

Mission

A skilled, educated, and diverse workforce is the backbone of a strong and competitive economy. The mission of the Northeast Regional Planning Team is to create a workforce development ecosystem – managed and supported by the Region's economic development, workforce training, and education partners – that provides career pathways and opportunities for our residents while ensuring our region has the talent needed to sustain a strong, competitive, and innovative economy in critical industries.

Goals, Strategies, and Outcomes

With the priority industries of advanced manufacturing, health care, and professional, scientific, and technical services, the Northeast Massachusetts region seeks to create a strong regional economy with career pathways to satisfying, living wage jobs for its residents.

The region wants to tap new sources of labor to provide employers with workers while also matching those workers with good, quality jobs. Many of these quality jobs in critical industries have entry level positions that do not require a college degree, and the regional planning team wants to build strong career pathways for workers who do not have a college degree or students who do not intend to pursue a four-year bachelor's degree at a college or university.

Some broad goals and key strategies include:

- Implement strategies to get people into the labor market
- Help to define growing career and competency pathways in critical industries with employers and educational institutions
- Increase awareness of career pathways and industries through a marketing campaign
- Develop more partnerships with employers across the critical industries.

Some key themes that emerged in the facilitated discussions related to the vision, mission, and goals for the Northeast Massachusetts region include the following:

1. Equity
2. Collaboration
3. Community Engagement
4. Flexibility

Strategies for Northeast Massachusetts are discussed below as they relate to the four key themes.

1. **EQUITY**

Employers being more flexible with the workers they hire

As the workforce boards and programming work to engage more diverse candidates in the labor market, employers need to do their part and be more flexible in their hiring requirements. For example, they should not have inflated educational requirements in job postings (i.e., a very high percentage of postings in Northeast Massachusetts require a bachelor's degree or higher when they are not needed) and instead do skills-based hiring as there is a disadvantage in which populations have more advanced degrees.

A regional planning team member discussed how some employers will say they are desperate for workers, but then are very selective about who they hire and only want the workers who have two or three years (or more years) of experience. The planning team wants employers to be more flexible and hire workers if they meet basic skills requirements and then train them after they are hired. Similarly, concerning language skills, employers can hire workers with limited English who can either communicate with a bilingual supervisor or can take English classes upon hiring. Again, being flexible in hiring practices can increase equity, it just requires more early-stage investment in training on the employer side.

A regional planning team member suggested that there could even be a subsidy or incentive for employers to hire entry level employees that might require more training. There could be programs at the state or regional level to help support employers who are willing to take on workers with less experience.

Other regional planning team members talked about how employers should invest more in employee retention through strategies like developing career pathways within their organization. Then they can show entry level employees ways to upskill to move up in the organization and earn more income. This can help employers with retention while also helping employees with upward mobility.

Reducing barriers for potential new workers

Initiatives such as dual language training, technical courses offered in Spanish, and wrap-around support (e.g., case managers, jobs placement specialists, resume assistance, etc.) are gaining traction in Northeast Massachusetts, helping to reduce barriers and facilitating integration into the region's workforce. These types of efforts need to become more universal in consideration of the shifting demographics of Northeast Massachusetts.

> "And of course, we need to treat those people with respect, for them to come to work, meaning to go to training, learn to speak English proficiently, and eventually make your way to work, they need help financially along the way. We provided stipends last year in a lot of our training programs for people who attend, but this year we don't have the money for it at this point. We're hopeful the state picks that up and brings that over but they need to get financial help to re-enter the labor market and that you know includes food, transportation, daycare, everything you can imagine to get them to go to training to get back to work."

Transportation is also a key factor in engaging new workers such as immigrants. Many potential workers do not own a car or have access to a car and thus cannot get to training or work. Providing or supporting

transportation to employment and training is an important strategy to remove barriers to new worker populations.

2. **COLLABORATION**

In order to achieve the goals and vision for the region, the regional planning team believes collaborative and collective workforce strategies will be essential.

Increased employer partnerships in different industries

Many of the goals and the vision of the regional planning team could be improved with increased partnerships with employers across different industries. Several planning team members discussed the disconnect with employers. Some industries, like manufacturing, have more partnerships than others, however, there could be increased partnerships across all industries. Working with employers can help ensure that the workforce training in high schools, community colleges, colleges, and universities is aligned with business needs. This can also increase placement into jobs after graduation of training programs.

A regional planning team member indicated, "High schools, community colleges, universities are all educating the workforce but the relationships with industry partners aren't always there: Relationship building is huge, and it isn't always happening."

The regional planning team had concerns about the disconnect between training programs and employers. While some training programs work directly with employers in building their curriculum, not all programs are like this, which can make finding employment after training can be more difficult. The programs that work directly with employers have high placement rates because they are training for exactly what the hiring companies need. Collaboration with employers is something the regional planning team wants to improve as a key component of Northeast Massachusetts workforce development strategies in coming years.

One regional planning team member suggested that training programs have dedicated staff to building these relationships and partnerships with employers. This could also be an opportunity to hire older workers who are already retired or about to retire and leverage their experience and industry knowledge.

Collaboration in applying for funding

There was a suggestion to have funding or incentives that encourage collaboration. One regional planning team member said:

> "The great thing is we have all those parties, and they're super capable, and they can do all the work. The challenge is that they're not funded or incentivized to work together. So it'd be great if there's there was more funding to enable that and get the educators around the table to articulate how we truly build a seamless career pathway for the individual, not for the institution, but as optimized for the individual so that they can be recruited, trained, and employed as fast as possible into these many living wage jobs that are available."

The region's many educational institutions are an asset, but they can be even stronger if they collaborate on strategies like career pathways. There are some existing partnerships between universities, colleges, technical schools, and employers. However, there could be increased collaboration and partnerships across different industries. The planning team member suggested a "backbone" organization to coordinate all of the different organizations and institutions with one mission and the same strategies. The workforce boards could potentially play this role as the backbone organization. A backbone organization is especially important with applying for funding. If there is funding that incentivizes collaboration, there needs to be one organizing entity.

3. COMMUNITY ENGAGEMENT

The regional planning team wants to continue to be responsive to the community's needs for both workers and employers. Community engagement can help with recruitment and can help to understand barriers to labor force participation and the workforce boards can design programs based on those needs. There was a suggestion for the workforce boards to have designated positions or liaisons for community engagement that are deeply involved with community organizations. The team wants to design programs that address the specific challenges that workers in the community are facing.

A regional planning team member noted that the career center has increased community engagement in terms of going out to recruit workers rather than waiting for them to come into the office. However, these initiatives require having designated staff for community outreach so there might be more resources needed to continue to increase engagement. These efforts, however, can be useful in understanding the needs of the community while also increasing awareness and recruitment.

Marketing and awareness campaign

The regional planning team discussed the need for marketing as a strategy to increase the awareness of career pathways in the community. In particular, for high school students but also for adult education as well. One regional planning team member commented that they need some type of "cool" marketing campaign to show the fun and good side of manufacturing jobs:

> "The industries need to be involved in this. Something a lot cooler in terms of explaining what some of these industries are, manufacturing itself needs a "Got Milk" campaign - that there's upward mobility, that they're fun jobs, that there's very different elements of manufacturing. It's not your grandfather's manufacturing, it's not dirty."

Other regional team planning members discussed the lack of awareness among parents and high school students. They talked about how parents or counselors go to great lengths to review college options but provide little or no coverage on alternative career pathways like manufacturing or trades occupations. One planning team member said they think students should be learning of these pathways in elementary school so that there is increased awareness of pathways outside of going to a four-year college. Another planning team member specified that there is a need to show students how career pathways in manufacturing and trades can lead to longer-term economic prosperity without incurring tuition debt.

The regional planning team members want to market the career pathways in the critical industries to high school students and middle and elementary school students. This marketing would also be aimed at

parents (including immigrant parents) who may not be aware of other opportunities for their children that do not include college. There could also be a separate marketing campaign for adults who are out of school but are unemployed or underemployed and unaware of these training opportunities and career paths.

One specific suggestion for marketing was to create detailed videos of jobs and training programs to show students the actual work that these programs entail. This could help because people often do not understand or are unable to readily visualize certain industries, so there is a need for general education of what industries exist and what they are. Another planning team member identified specific programs that could use increased awareness and education campaigns including advanced manufacturing, construction craft laborers, and marine technology.

4. FLEXIBILITY

Flexibility is an overarching theme that should be considered in all of the discussed strategies. Workforce needs are always evolving, and any workforce program needs to have some component of flexibility to adapt to change. For example, the regional planning team discussed nascent Artificial Intelligence (AI) technologies and how they might be able to anticipate changes in the workforce with new technological innovations.

Being adaptive to the future of work

The regional planning team emphasized the importance of being flexible or adaptable across many different aspects of workforce development. There have been changes to the workforce since COVID, and with a short labor supply, the employers need to adapt to the new working environment. One planning team member commented, "they can't hire the way they used to hire."

Another aspect that requires flexibility is workforce training itself, as it might need to respond to changing employer needs. A regional planning team member mentioned how the healthcare hub grant that they currently have is a three-year grant, but it's broken up into three one-year chunks, so the grant programs can change over the course of the three-year term. They noted that this is important so they can be flexible with the types of training programs they are offering and who they are training.

Recommendations

In synopsis, the results of this analysis yield several high-level recommendations for Northeast Massachusetts to consider pursuing in coming years as they develop workforce programs and strategies.

1. Create workforce programs aimed at recruiting and adding to the skills of the Hispanic and immigrant population to expand the labor pool and increase labor force participation. There is an overrepresentation of Hispanic or Latino residents who are not in the labor force and lower educational attainment among this population. There should be more targeted programs for this population to remove barriers of entering the labor force such as language and transportation.
   a. Offer programs in multiple languages and encourage employers and training programs to hire or train non-English speakers, accommodating the different languages.
   b. Provide transportation or incentives to employers to provide transportation to these populations to get them to workforce training and/or jobs.
   c. Consider creating a workforce center that specializes in validating educational credentials of immigrants, providing ESOL programs, assisting with work permits, and helping find education and training programs.
   d. Consider and support initiatives such as dual language training, technical courses offered in Spanish, and wrap-around support (e.g., case managers, jobs placement specialists, resume assistance, etc.) to facilitate integration into the workforce.

2. Increase awareness of career pathways in key industries (e.g., advanced manufacturing) and occupations (e.g., trades) in elementary, middle, and high schools, especially in comprehensive high schools.

3. Engage retired or soon-to-be retired workers who have specific industry knowledge and can work part time jobs, assist with training, and pass on institutional knowledge. These workers can also be hired within workforce training programs to serve as liaisons with employers to help build relationships and increase collaboration.

4. Increase partnerships with regional employers and encourage them to be more flexible in their hiring practices.

5. Continue stipend programs as many people cannot take off work to attend training, even if the training is free. Free tuition income-based stipends and paid internships open up learning opportunities to a much wider range of the population, benefiting residents and employers.

6. Support childcare initiatives, such as providing stipends for childcare, to help increase labor participation, particularly of the female population.

7. Encourage multi-year grant terms for stability, continuity, and sustainability of workforce programs. The multi-year grants should also allow the workforce programs the flexibility to make modifications and adapt to the changing environment.

8. Increase collaboration among workforce development partners. Strategic alliances among Northeast Massachusetts institutions, including a willingness to pool resources and expertise for mutual benefit, can be a force multiplier for the region by advancing workforce development. By formalizing connectivity between tech schools, community colleges, non-profits, workforce agencies, colleges, universities and businesses, Northeast Massachusetts can improve the effectiveness and encourage feedback loops of worker skills development, including training and matching residents with jobs.
    a. Build on partnership opportunities like the potential shared campus model for Whittier Regional Vocational Technical High School and Northern Essex Community College (NECC). The model has met with success elsewhere in the country and would enhance both vocational education and academic advancement, alongside workforce skill training. This type of partnership creates opportunities for new pathway programs to support the region's priority industries and expands the training capacity of the workforce training in the region.

9. Capitalize on UMass Lowell's LINC (Lowell Innovation Network Corridor) project for workforce opportunities. LINC is a transformative project that will be a catalyst for innovation, growth, and increased competitiveness for the Northeast Massachusetts region. Cambridge-based Draper is already planning to locate its microelectronics practice in LINC, bringing hundreds of jobs into the area. Following closely, Mass General Brigham will expand into LINC to collaborate with UMass Lowell on human performance (both cognitive and physical) research. These successes have transpired quickly even though the LINC initiative is still in its infancy. As the project gains momentum and recognition, LINC is expected to attract the attention of other employers and be a seedbed for startups. LINC also includes strengthening neighborhoods and the urban revitalization of a large swath of the city, which will generate jobs in other areas beyond tech, including in hospitality.
    a. Workforce agencies, training providers, and educational institutions should coordinate with the LINC initiative to match workers with available jobs, develop curriculum reflective of LINC employer needs, and ensure structures are in place for immigrant and other communities to access and grow from the opportunities at LINC.

Methodology Notes

IPUMS USA

IPUMS USA (originally, the "Integrated Public Use Microdata Series") is a website and database providing access to over sixty integrated, high-precision samples of the American population drawn from sixteen federal censuses, from the American Community Surveys of 2000-present.

IPUMS USA supplies microdata, which means that it provides information about individual persons and households. This makes it possible for researchers to create tabulations tailored to their particular questions.

IPUMS data was used for some of the data in this report using Public Use Microdata Areas (PUMAs). The PUMAs in Northeast Massachusetts do not perfectly align with the 42 towns in the three workforce development areas, which was the region used for the majority of the report.

The IPUMS USA data used the PUMAs in the map below:
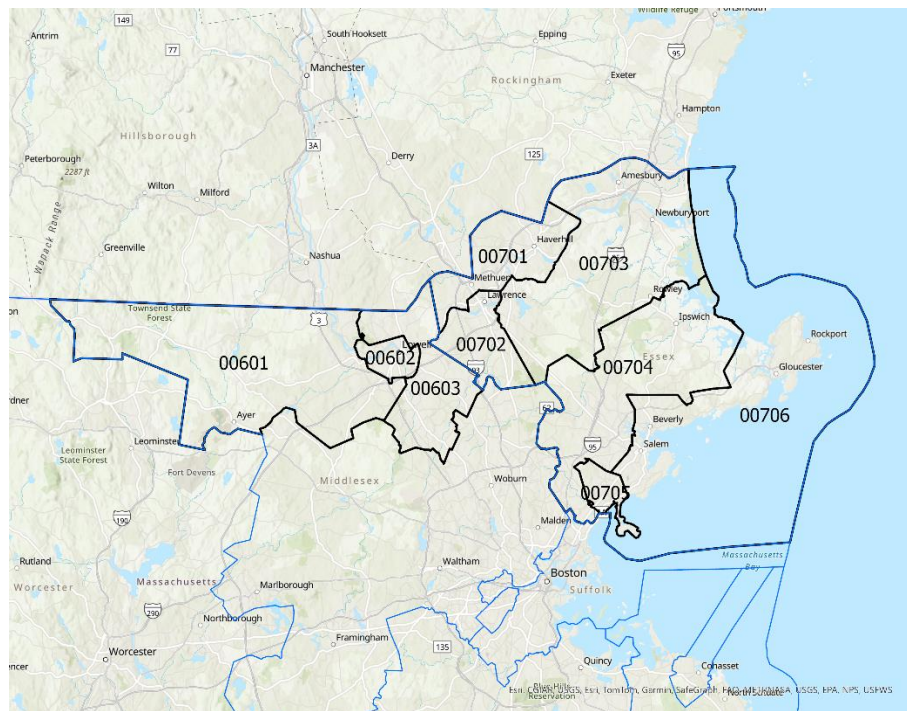
IPUMS citation:

Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler. IPUMS USA: Version 15.0 [2022 ACS 5yr]. Minneapolis, MN: IPUMS, 2024. https://doi.org/10.18128/D010.V15.0

Lightcast

Much of the analysis on jobs uses data from Lightcast, which is a merger of Emsi and Burning Glass Technologies. Lightcast gathers and integrates economic, labor market, demographic, education, profile, and job posting data from dozens of government and private-sector sources, creating a comprehensive and current dataset that includes both published data and detailed estimates.

Some of the tables include projections from Lightcast. For projections, Lightcast uses a combination of Bureau of Labor Statistics (BLS) data, state data sets, and internal projection methods.

In the industry data, Lightcast separates out government jobs, using 90 as the industry code. This differs from the traditional NAICS code which includes government jobs in the relevant NAICS code. For example, a local Community College, classified in NAICS 611210 in standard NAICS, would be found in NAICS 903612, "Colleges, Universities, and Professional Schools (Local Government)". Therefore, in Lightcast data, all establishments in the main NAICS hierarchy (all sectors other than 90) are privately owned only, including 611 (Educational Services) and 62 (Health Care and Social Assistance). Additionally, all establishments in NAICS 92 are reclassified under NAICS 90. Lightcast follows the conventions of Current Employment Statistics (CES), Occupational Employment Statistics (OES), and BEA data sources, and re-classifies all government-run establishments into the appropriate Government NAICS.

UMDI Population Projections

The UMDI Vintage 2024 (V2024) population projections are based on a demographic accounting framework for modeling population change, commonly referred to as a *cohort-component* model. The cohort-component method recognizes that there are only four ways that a region's population can change from one time-period to the next. It can add residents through either births or in-migration, or it can lose residents through deaths or out-migration. Figure 1 below displays the basic concept of a cohort-component model.

Figure 24. Cohort-Component Model Overview

Launch Population	+	**Births** fertility rate by age of mother X launch female population	-	**Deaths** mortality rate by age/sex X launch population	+	**Migration** rate by age/sex X launch population
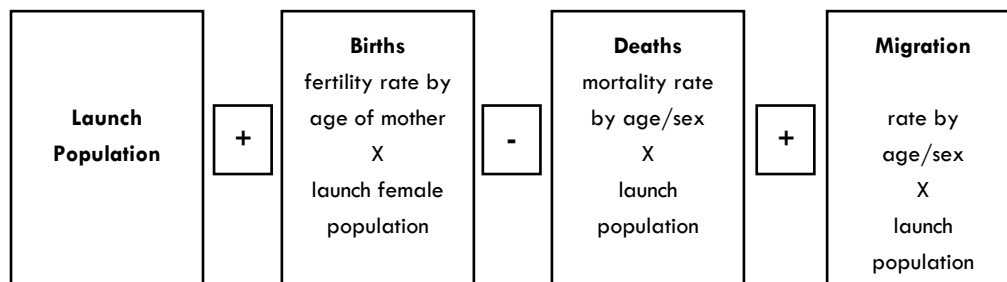
The cohort-component approach also accounts for population change associated with the aging of the population. The current age profile is a strong predictor of future population levels, and growth and decline and can differ greatly from one region to another based on their profiles, as the likelihood of birth, death, and in- and out-migration all vary by age. For example, because fertility rates are highest among women in their twenties and thirties, a place that is anticipating a large number of women

coming into their twenties and thirties in the next decade will likely experience more births. Similarly, mortality rates are notably higher for persons 70-years and older, such that an area with a large concentration of elderly residents will experience more deaths in decades to come.

The V2024 projections methodology may also be described as a "*status-quo*" projections model; it assumes that recent trends in the demographic components of population change, such as fertility, mortality, and migration by age, will persist in future periods. While it is reasonable to expect that these rates will change in future years, predicting the directionality of these trends invites additional assumptions into the model and, with them, additional uncertainty. The recent COVID-19 pandemic is an example of how an unexpected event can reverse an apparently steady component trend, with mortality rates increasing after a long period of gradual decrease in most age groups. Likewise, fertility rates have been slowing over a long period, but economic or social influences could just as readily disrupt that trend, as happened with the unforeseen "baby boom" that kicked off in the late 1940s. Fluctuations in immigration and migration are even less predictable. For example, there was a steep drop off in net immigration to Massachusetts following the 2016 elections. This trend was further exacerbated by a global pandemic in 2020, but substantially reversed again by 2023 under a new administration. For these reasons, the UMDI V2024 series may be defined strictly as "projections" and not as "scenarios" or "forecasts."

In the V2024 population projections series, UMDI uses a cohort-component model based on a combination of trends in fertility, mortality, and migration from 2010 through 2020 and decennial Census data from 2000, 2010, and 2020. The method produces population projections for three different geographic levels: municipalities, counties, and sub-state "migration" regions defined by the Census 2010 migration-PUMA (MIGPUMA) boundaries. These regional levels are controlled to one another using a "top-down" approach by which age/sex projections for smaller geographies are controlled "up" to the larger geography age/sex projections.

The "MIGPUMA" regional-level method makes use of American Community Survey sample data on migration rates by age and uses a gross, multi-regional approach in forecasting future levels of migration.[10] The county and municipal-level estimates both rely on residual net migration rates computed from vital statistics and decennial Census data. Municipal age/sex projections are controlled to the regional or county age/sex projections -- or both, depending on the region.

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[10] PUMAs are the smallest geographic units used by the U.S. Census Bureau for reporting data taken from the detailed (micro) records of the American Community Survey (ACS) – our primary source of migration data. PUMA boundaries are defined so that they include no fewer the 100,000 persons, while Migration PUMAs (MIGPUMAs) must also incorporate the entirety of any county within their borders, leading to the aggregation of PUMAs into much larger MIGPUMAs in some areas of Massachusetts.

Appendix A: Greater Lowell Industry and Occupation Data

Table 10: Job Growth by Industry, Greater Lowell, 2013 to 2033

NAICS	Industry	2013 Jobs	2023 Jobs	2033 Jobs	Net new jobs (2013 - 2023)	2013 - 2023 % Change	Projected net new jobs (2023 - 2033)	2023 - 2033 % Change	2023 Employment Concentration
54	Professional, Scientific, and Technical Services	17,519	21,518	25,163	3,999	23%	3,645	17%	1.60
62	Health Care and Social Assistance	17,540	20,534	24,751	2,994	17%	4,216	21%	1.03
31	Manufacturing	18,140	19,566	20,274	1,426	8%	1,892	18%	1.74
90	Government	18,749	18,731	22,249	(17)	(0%)	72	23%	0.93
44	Retail Trade	13,204	13,848	14,751	645	5%	1,392	15%	0.86
23	Construction	8,566	10,701	11,863	2,135	25%	1,162	11%	1.08
72	Accommodation and Food Services	10,207	10,578	12,469	371	4%	1,701	25%	0.85
56	Administrative and Support and Waste Management and Remediation Services	7,632	10,056	11,223	2,424	32%	3,517	19%	0.94
81	Other Services (except Public Administration)	8,928	9,121	10,512	193	2%	85	2%	0.92
48	Transportation and Warehousing	5,773	8,036	9,574	2,263	39%	903	7%	0.82
53	Real Estate and Rental and Leasing	4,908	7,562	9,465	2,654	54%	707	4%	0.74
61	Educational Services	6,795	6,818	8,519	23	0%	458	14%	1.66
42	Wholesale Trade	5,895	5,332	5,417	(563)	(10%)	37	16%	0.94
52	Finance and Insurance	4,498	5,330	6,550	832	18%	1,166	12%	0.48
71	Arts, Entertainment, and Recreation	3,412	3,934	4,307	523	15%	1,903	25%	1.04
51	Information	4,108	3,328	3,786	(780)	(19%)	8	8%	1.02
55	Management of Companies and Enterprises	2,713	3,299	4,097	585	22%	1,538	19%	1.33
11	Agriculture, Forestry, Fishing and Hunting	171	321	394	150	87%	1,220	23%	0.11

22	Utilities	213	232	269	18	9%	798	24%	0.46
21	Mining, Quarrying, and Oil and Gas Extraction	48	92	100	44	92%	373	9%	0.10
	Total	**159,020**	**178,937**	**205,730**	**19,917**	**13%**	**26,793**	**15%**	

Source: Lightcast
Note: Industries listed in order of the most jobs in 2023

Table 11: Historical Job Growth by Occupation Group, Greater Lowell, 2013 to 2023

SOC	Description	2013 Jobs	2023 Jobs	Net new jobs (2013 – 2023)	% change (2013 – 2023)
11-0000	Management Occupations	12,726	18,764	6,039	47%
13-0000	Business and Financial Operations Occupations	10,190	14,030	3,840	38%
53-0000	Transportation and Material Moving Occupations	9,932	11,358	1,426	14%
31-0000	Healthcare Support Occupations	4,700	5,883	1,183	25%
51-0000	Production Occupations	7,522	8,564	1,043	14%
29-0000	Healthcare Practitioners and Technical Occupations	7,833	8,845	1,012	13%
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	6,392	7,337	945	15%
47-0000	Construction and Extraction Occupations	7,292	8,154	863	12%
19-0000	Life, Physical, and Social Science Occupations	2,763	3,582	818	30%
41-0000	Sales and Related Occupations	16,445	17,199	754	5%
37-0000	Building and Grounds Cleaning and Maintenance Occupations	6,175	6,929	754	12%
39-0000	Personal Care and Service Occupations	4,855	5,388	532	11%
33-0000	Protective Service Occupations	3,210	3,735	526	16%
21-0000	Community and Social Service Occupations	2,988	3,477	489	16%
35-0000	Food Preparation and Serving Related Occupations	9,777	10,114	338	3%
25-0000	Educational Instruction and Library Occupations	9,543	9,702	159	2%
45-0000	Farming, Fishing, and Forestry Occupations	152	285	132	87%
49-0000	Installation, Maintenance, and Repair Occupations	5,001	5,108	107	2%
23-0000	Legal Occupations	958	1,017	59	6%
55-0000	Military-only occupations	260	225	(36)	(14%)
17-0000	Architecture and Engineering Occupations	5,067	4,804	(263)	(5%)
43-0000	Office and Administrative Support Occupations	16,940	16,502	(439)	(3%)
15-0000	Computer and Mathematical Occupations	8,240	7,796	(444)	(5%)
	Total	**159,020**	**178,937**	**19,917**	**13%**

Table 12: Projected Job Growth by Occupation Group, Greater Lowell, 2023 to 2033

SOC	Description	2023 Jobs	2033 Jobs	Projected net new jobs (2023 – 2033)	Projected % change (2023 – 2033)
11-0000	Management Occupations	18,764	21,699	2,934	16%
13-0000	Business and Financial Operations Occupations	14,030	16,613	2,583	18%
25-0000	Educational Instruction and Library Occupations	9,702	11,753	2,051	21%
41-0000	Sales and Related Occupations	17,199	19,141	1,942	11%
35-0000	Food Preparation and Serving Related Occupations	10,114	11,815	1,701	17%
29-0000	Healthcare Practitioners and Technical Occupations	8,845	10,523	1,678	19%
31-0000	Healthcare Support Occupations	5,883	7,452	1,569	27%
43-0000	Office and Administrative Support Occupations	16,502	18,037	1,535	9%
53-0000	Transportation and Material Moving Occupations	11,358	12,708	1,350	12%
15-0000	Computer and Mathematical Occupations	7,796	8,940	1,145	15%
39-0000	Personal Care and Service Occupations	5,388	6,437	1,049	19%
47-0000	Construction and Extraction Occupations	8,154	9,072	918	11%
37-0000	Building and Grounds Cleaning and Maintenance Occupations	6,929	7,789	861	12%
17-0000	Architecture and Engineering Occupations	4,804	5,635	831	17%
19-0000	Life, Physical, and Social Science Occupations	3,582	4,411	829	23%
33-0000	Protective Service Occupations	3,735	4,552	817	22%
21-0000	Community and Social Service Occupations	3,477	4,266	789	23%
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	7,337	8,077	740	10%
49-0000	Installation, Maintenance, and Repair Occupations	5,108	5,843	735	14%
51-0000	Production Occupations	8,564	9,058	494	6%
23-0000	Legal Occupations	1,017	1,140	123	12%
45-0000	Farming, Fishing, and Forestry Occupations	285	342	58	20%
55-0000	Military-only occupations	225	255	30	13%
	Total	**178,937**	**205,730**	**26,793**	**15%**

Source: Lightcast

Appendix B: Merrimack Valley Industry and Occupation Data

Table 13: Job Growth by Industry, Merrimack Valley, 2013 to 2033

NAICS	Industry	2013 Jobs	2023 Jobs	2033 Jobs	Net new jobs (2013 - 2023)	2013 - 2023 % Change	Projected net new jobs (2023-2033)	2023-2033 % Change	2023 Employment Concentration
62	Health Care and Social Assistance	26,437	29,819	34,520	3,382	13%	4,701	16%	1.26
31	Manufacturing	25,194	23,829	26,007	(1,365)	(5%)	2,178	9%	1.77
90	Government	21,022	20,001	22,361	(1,020)	(5%)	2,360	12%	0.83
54	Professional, Scientific, and Technical Services	16,308	18,051	20,055	1,743	11%	2,004	11%	1.13
44	Retail Trade	15,077	16,657	18,313	1,581	10%	1,656	10%	0.87
23	Construction	9,956	13,771	15,647	3,815	38%	1,876	14%	1.16
56	Administrative and Support and Waste Management and Remediation Services	12,423	12,822	14,603	399	3%	1,781	14%	1.00
81	Other Services (except Public Administration)	11,742	12,573	14,262	831	7%	1,688	13%	1.07
72	Accommodation and Food Services	11,407	11,987	13,342	580	5%	1,355	11%	0.81
53	Real Estate and Rental and Leasing	6,966	11,055	13,804	4,089	59%	2,749	25%	0.90
52	Finance and Insurance	7,552	10,117	12,328	2,565	34%	2,210	22%	0.76
48	Transportation and Warehousing	2,905	9,592	13,223	6,687	230%	3,631	38%	0.81
42	Wholesale Trade	5,488	7,055	8,115	1,567	29%	1,060	15%	1.04
61	Educational Services	5,402	5,528	6,332	125	2%	804	15%	1.13
71	Arts, Entertainment, and Recreation	4,482	4,155	4,570	(327)	(7%)	415	10%	0.92
55	Management of Companies and Enterprises	3,559	3,256	3,258	(303)	(9%)	2	0%	1.09

51	Information	3,198	2,572	2,904	(626)	(20%)	332	13%	0.66
22	Utilities	378	691	829	313	83%	139	20%	1.14
11	Agriculture, Forestry, Fishing and Hunting	444	425	549	(19)	(4%)	123	29%	0.12
21	Mining, Quarrying, and Oil and Gas Extraction	52	27	32	(24)	(47%)	5	18%	0.03
	Total	**189,992**	**213,985**	**245,055**	**23,993**	**13%**	**31,069**	**15%**	

Source: Lightcast
Note: Industries listed in order of the most jobs in 2023

Table 14: Historical Job Growth by Occupation Group, Merrimack Valley, 2013 to 2023

SOC	Description	2013 Jobs	2023 Jobs	Net new jobs (2013 – 2023)	% Change (2013 – 2023)
11-0000	Management Occupations	14,645	21,047	6,402	44%
13-0000	Business and Financial Operations Occupations	11,920	16,668	4,748	40%
53-0000	Transportation and Material Moving Occupations	9,707	14,138	4,431	46%
41-0000	Sales and Related Occupations	19,892	22,770	2,878	14%
31-0000	Healthcare Support Occupations	8,470	10,971	2,501	30%
47-0000	Construction and Extraction Occupations	9,068	10,487	1,419	16%
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	6,713	7,658	945	14%
39-0000	Personal Care and Service Occupations	7,442	8,103	661	9%
35-0000	Food Preparation and Serving Related Occupations	11,638	12,243	605	5%
29-0000	Healthcare Practitioners and Technical Occupations	9,687	10,001	314	3%
19-0000	Life, Physical, and Social Science Occupations	1,994	2,294	300	15%
37-0000	Building and Grounds Cleaning and Maintenance Occupations	6,644	6,875	231	3%
21-0000	Community and Social Service Occupations	3,833	4,059	226	6%
49-0000	Installation, Maintenance, and Repair Occupations	5,540	5,766	226	4%
23-0000	Legal Occupations	1,979	2,078	99	5%
45-0000	Farming, Fishing, and Forestry Occupations	231	292	61	27%
55-0000	Military-only occupations	424	365	(59)	(14%)
51-0000	Production Occupations	12,828	12,754	(74)	(1%)
33-0000	Protective Service Occupations	2,812	2,610	(202)	(7%)
25-0000	Educational Instruction and Library Occupations	12,484	12,276	(208)	(2%)
15-0000	Computer and Mathematical Occupations	6,170	5,900	(270)	(4%)
43-0000	Office and Administrative Support Occupations	20,252	19,779	(472)	(2%)
17-0000	Architecture and Engineering Occupations	5,561	4,726	(835)	(15%)
	Total	**189,992**	**213,985**	**23,993**	**13%**

Source: Lightcast

Table 15: Projected Job Growth by Occupation Group, Merrimack Valley, 2023 to 2033

SOC	Description	2023 Jobs	2033 Jobs	Projected net new jobs (2023 – 2033)	Projected % Change (2023 – 2033)
41-0000	Sales and Related Occupations	22,770	26,308	3,538	16%
53-0000	Transportation and Material Moving Occupations	14,138	17,195	3,057	22%
11-0000	Management Occupations	21,047	24,100	3,052	15%
13-0000	Business and Financial Operations Occupations	16,668	19,499	2,831	17%
31-0000	Healthcare Support Occupations	10,971	13,496	2,525	23%
43-0000	Office and Administrative Support Occupations	19,779	21,837	2,057	10%
25-0000	Educational Instruction and Library Occupations	12,276	14,287	2,011	16%
35-0000	Food Preparation and Serving Related Occupations	12,243	13,745	1,502	12%
51-0000	Production Occupations	12,754	14,159	1,405	11%
47-0000	Construction and Extraction Occupations	10,487	11,765	1,278	12%
39-0000	Personal Care and Service Occupations	8,103	9,156	1,053	13%
29-0000	Healthcare Practitioners and Technical Occupations	10,001	11,044	1,043	10%
37-0000	Building and Grounds Cleaning and Maintenance Occupations	6,875	7,878	1,002	15%
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	7,658	8,490	832	11%
49-0000	Installation, Maintenance, and Repair Occupations	5,766	6,596	830	14%
15-0000	Computer and Mathematical Occupations	5,900	6,727	827	14%
21-0000	Community and Social Service Occupations	4,059	4,806	748	18%
17-0000	Architecture and Engineering Occupations	4,726	5,203	477	10%
19-0000	Life, Physical, and Social Science Occupations	2,294	2,642	347	15%
33-0000	Protective Service Occupations	2,610	2,887	277	11%
23-0000	Legal Occupations	2,078	2,294	216	10%
45-0000	Farming, Fishing, and Forestry Occupations	292	374	82	28%
55-0000	Military-only occupations	365	416	51	14%
	Total	**213,985**	**245,055**	**31,069**	**15%**

Source: Lightcast

Appendix C: North Shore Industry and Occupation Data

Table 16: Job Growth by Industry, North Shore, 2013 to 2033

NAICS	Industry	2013 Jobs	2023 Jobs	2033 Jobs	New Jobs (2013 - 2023)	2013 - 2023 % Change	Projected New Jobs (2023 - 2033)	2023 - 2033 % Change	2023 Employment Concentration
62	Health Care and Social Assistance	38,996	40,831	47,171	1,835	5%	6,340	16%	1.35
44	Retail Trade	29,098	31,105	33,836	2,007	7%	2,731	9%	1.27
90	Government	21,974	22,868	26,597	894	4%	3,729	16%	0.75
54	Professional, Scientific, and Technical Services	16,544	19,951	22,336	3,407	21%	2,384	12%	0.98
72	Accommodation and Food Services	17,815	18,890	21,029	1,075	6%	2,140	11%	1.00
52	Finance and Insurance	12,598	17,516	21,541	4,918	39%	4,024	23%	1.03
31	Manufacturing	17,935	17,476	19,181	(459)	(3%)	1,705	10%	1.02
53	Real Estate and Rental and Leasing	11,073	17,143	21,519	6,070	55%	4,376	26%	1.10
23	Construction	12,270	15,637	17,979	3,366	27%	2,343	15%	1.04
81	Other Services (except Public Administration)	13,267	14,710	16,934	1,443	11%	2,224	15%	0.98
56	Administrative and Support and Waste Management and Remediation Services	11,291	12,888	14,806	1,597	14%	1,918	15%	0.79
48	Transportation and Warehousing	4,059	11,582	15,629	7,523	185%	4,048	35%	0.77
61	Educational Services	7,614	8,785	10,139	1,171	15%	1,354	15%	1.41
71	Arts, Entertainment, and Recreation	6,911	8,204	8,998	1,293	19%	794	10%	1.43
42	Wholesale Trade	5,747	6,175	7,243	428	7%	1,068	17%	0.72
51	Information	4,489	4,199	4,370	(290)	(6%)	171	4%	0.85

11	Agriculture, Forestry, Fishing and Hunting	1,839	2,067	2,394	228	12%	327	16%	0.45
55	Management of Companies and Enterprises	1,554	1,186	1,194	(368)	(24%)	8	1%	0.31
22	Utilities	465	1,095	1,241	630	135%	145	13%	1.42
21	Mining, Quarrying, and Oil and Gas Extraction	176	112	146	(64)	(36%)	34	30%	0.08
	Total	**235,717**	**272,419**	**314,285**	**36,702**	**16%**	**41,866**	**15%**	

Source: Lightcast
Note: Industries listed in order of the most jobs in 2023

Table 17: Historical Job Growth by Occupation Group, North Shore, 2013 to 2023

SOC	Description	2013 Jobs	2023 Jobs	Net new jobs (2013 – 2023)	% Change (2013 – 2023)
11-0000	Management Occupations	17,245	26,382	9,137	53%
13-0000	Business and Financial Operations Occupations	14,215	21,662	7,447	52%
53-0000	Transportation and Material Moving Occupations	12,749	17,685	4,936	39%
41-0000	Sales and Related Occupations	31,628	34,899	3,270	10%
31-0000	Healthcare Support Occupations	11,327	14,546	3,219	28%
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	8,894	10,625	1,731	19%
35-0000	Food Preparation and Serving Related Occupations	17,228	18,665	1,438	8%
47-0000	Construction and Extraction Occupations	10,370	11,770	1,399	13%
37-0000	Building and Grounds Cleaning and Maintenance Occupations	8,330	9,560	1,230	15%
39-0000	Personal Care and Service Occupations	9,584	10,691	1,107	12%
25-0000	Educational Instruction and Library Occupations	13,856	14,515	659	5%
49-0000	Installation, Maintenance, and Repair Occupations	6,547	7,132	585	9%
15-0000	Computer and Mathematical Occupations	4,685	5,016	331	7%
23-0000	Legal Occupations	1,886	2,204	318	17%
51-0000	Production Occupations	10,415	10,718	303	3%
33-0000	Protective Service Occupations	3,334	3,632	298	9%
19-0000	Life, Physical, and Social Science Occupations	3,123	3,267	144	5%
21-0000	Community and Social Service Occupations	5,110	5,252	143	3%
45-0000	Farming, Fishing, and Forestry Occupations	1,271	1,404	133	10%
43-0000	Office and Administrative Support Occupations	24,440	24,435	(5)	(0%)
55-0000	Military-only occupations	653	562	(91)	(14%)
17-0000	Architecture and Engineering Occupations	3,922	3,437	(485)	(12%)
29-0000	Healthcare Practitioners and Technical Occupations	14,845	14,236	(610)	(4%)
	Total	**235,717**	**272,419**	**36,702**	**16%**

Source: Lightcast

Table 18: Projected Job Growth by Occupation Group, North Shore, 2023 to 2033

SOC	Description	2023 Jobs	2033 Jobs	Projected net new jobs (2023 – 2033)	Projected % Change (2023 – 2033)
41-0000	Sales and Related Occupations	34,899	39,984	5,085	15%
13-0000	Business and Financial Operations Occupations	21,662	26,260	4,597	21%
11-0000	Management Occupations	26,382	30,766	4,384	17%
31-0000	Healthcare Support Occupations	14,546	18,077	3,531	24%
53-0000	Transportation and Material Moving Occupations	17,685	21,197	3,513	20%
25-0000	Educational Instruction and Library Occupations	14,515	17,244	2,729	19%
43-0000	Office and Administrative Support Occupations	24,435	26,983	2,548	10%
35-0000	Food Preparation and Serving Related Occupations	18,665	21,032	2,367	13%
47-0000	Construction and Extraction Occupations	11,770	13,507	1,738	15%
29-0000	Healthcare Practitioners and Technical Occupations	14,236	15,779	1,544	11%
37-0000	Building and Grounds Cleaning and Maintenance Occupations	9,560	10,999	1,439	15%
39-0000	Personal Care and Service Occupations	10,691	12,046	1,355	13%
51-0000	Production Occupations	10,718	11,966	1,248	12%
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	10,625	11,764	1,139	11%
49-0000	Installation, Maintenance, and Repair Occupations	7,132	8,204	1,073	15%
21-0000	Community and Social Service Occupations	5,252	6,160	908	17%
15-0000	Computer and Mathematical Occupations	5,016	5,786	770	15%
33-0000	Protective Service Occupations	3,632	4,187	555	15%
17-0000	Architecture and Engineering Occupations	3,437	3,871	433	13%
19-0000	Life, Physical, and Social Science Occupations	3,267	3,646	379	12%
23-0000	Legal Occupations	2,204	2,485	281	13%
45-0000	Farming, Fishing, and Forestry Occupations	1,404	1,545	140	10%
55-0000	Military-only occupations	562	641	79	14%
	Total	**272,419**	**314,285**	**41,866**	**15%**

Source: Lightcast