# EXPANDING ACCESS TO VOCATIONAL-TECHNICAL EDUCATION IN MASSACHUSETTS

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Pioneer Institute is an independent, non-partisan, privately funded research organization that seeks to improve the quality of life in Massachusetts through civic discourse and intellectually rigorous, data-driven public policy solutions based on free market principles, individual liberty and responsibility, and the ideal of effective, limited and accountable government.

**This paper is a publication of the Center for School Reform**, which seeks to increase the education options available to parents and students, drive system-wide reform, and ensure accountability in public education. The Center's work builds on Pioneer's legacy as a recognized leader in the charter public school movement, and as a champion of greater academic rigor in Massachusetts' elementary and secondary schools. Current initiatives promote choice and competition, school-based management, and enhanced academic performance in public schools.

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## Executive Summary

It is clear from assessment, graduation, and follow-up data that career-vocational technical education (CVTE), as it is practiced in Massachusetts, is a success. Although it is acknowledged that college is not the path for every high school graduate, CVTE high schools make sure that every student is prepared for college, so that he or she has the choice between college and career, and the option is not taken away because of lack of preparation. Vocational-technical education, once looked down upon as "less than" traditional high school, is coming into its own, and families across the commonwealth are appreciating the relevance and rigor inherent in completing a full academic schedule every other week, alternating with the in-depth study of a trade or career of their choice.

As you will read in this white paper, CVTE is becoming so popular that there are up to 5,000 more applicants for places in Massachusetts' vocational technical schools than there are openings, creating waiting lists. Parents recognize that the discipline needed to complete a Department of Elementary and Secondary Education standards-based curriculum as well as to earn a certificate of proficiency in a career-tech program is an excellent way to prepare for a successful life. According to a statewide survey of business owners, and others by the Dukakis Center at Northeastern University, vocational school graduates are more job-ready than general education or college preparatory high school graduates—a number of respondents felt that vocational high school graduates were often more job-ready than college graduates. Employers at a 2015 Worcester County Chamber of Commerce Manufacturing Round Table agreed that CVTE graduates are often more team-oriented, disciplined, and prepared to enter the workforce.

These elements have combined to create a need for more access to Chapter 74 certified vocational technical education. This paper examines the conditions that have brought us to the present predicament whereby we have waiting lists for vocational education, and 52 Massachusetts cities and towns do not have access to either district or regional career vocational technical programs. It also examines funding for vocational-technical education; while vocational-technical education is more expensive than traditional high school, it would cost the state less than ½% of the FY16 education budget to provide 5,000 more CVTE placements in Massachusetts.

## Introduction

Career vocational-technical education (CVTE) has a successful history in Massachusetts.[1] CVTE schools provide tens of thousands of students each year with both a traditional Massachusetts academic standards-based high school education and applied training in a variety of programs that gives them an excellent opportunity to find middle- and high-skill high-wage careers. Businesses surveyed by Northeastern University plan to hire 100,000 employees over the next decade. These same businesses also reported difficulty finding skilled employees and that they look to vocational-technical schools to fill the gap.

The CVTE schools, and in particular the regional vocational technical schools, also do an excellent job teaching traditional academic subjects. They have lower dropout rates than traditional high schools, as well as strong attendance and performance on MCAS, and a high percentage of graduates go on to post-secondary institutions.[2]

Perhaps because of their success, vocational schools have proven popular, and yet many do not have the capacity to accommodate all the students who apply. For many years, political leaders have touted the benefits of vocational-technical education, but programs have not expanded and the waitlists remain.

The primary factor limiting the expansion of CVTE schools is probably the way that they are financed. Vocational-technical education is, by its nature, more expensive than traditional schools, and the regional nature of many vocational schools means that they compete with local schools for funding. Many years ago, the state provided incentives for regionalization that encouraged municipalities to join regional vocational-technical schools, but these incentives have long since been eliminated from the annual budget. This paper explores the possibility of expanding vocational-technical education in Massachusetts, with an emphasis on the financial implications.

## Vocational-Technical Education in Massachusetts – Background

Students and their families have several options for school choice in Massachusetts. The two major options beyond local district schools are charter public schools, which enroll 38,000 students, and vocational-technical programs, which enroll 47,000. The voc-tech options include regional vocational-technical school districts as well as independent vocational-technical schools and comprehensive schools.

The enrollment figure above refers to programs that meet the definition of vocational technical education contained in Chapter 74 of the Massachusetts General Laws and are approved by DESE. There are an additional 11,000 students in career and technical education programs that meet the federal Perkins Act definition of career and technical education but are not approved under Chapter 74 — meaning that they have not completed the rigorous two-year DESE protocol for earning an approved Classification of Instructional Programs (CIP) Code.

For many families, a vocational-technical education may be their only alternative to the traditional local school. This could occur if there are no charter public schools nearby; because three out of every four charter schools are in urban areas.[3] Even if there is a charter school in an area, families with older students may not have access to them. Forty four percent of charter schools serve only students up to middle school, and 75 percent of the charter schools that serve high schools start accepting students at lower grades (i.e. they serve 6-12 or K-12). The combination of these factors leaves few slots open at charter schools for older students and many families with no real alternative to their local district school.

While vocational-technical schools offer choice to many families, students are not always free to apply to the programs they choose. If a student lives in a city or town that offers vocational-technical program(s) at its local district high

school, the student may be unable to attend neighboring regional vocational-technical schools. The existence of the local program prevents students from accessing what are often more extensive and well equipped offerings at a nearby regional vocational-technical school.

Massachusetts has 44 approved occupational programs, ranging from agricultural to telecommunications programs. The table below shows the most popular programs over the past decade. Many programs have remained popular over time, although the top 10 programs enroll fewer students than they did in the past – 16,000 rather than 23,000 – as enrollment is spread across more programs.

Many vocational-technical programs have proven very popular in Massachusetts, particularly at the regional vocational schools. According to Department of Elementary and Secondary Education (DESE) data, 16 percent of Massachusetts students in grades 9-12 are enrolled in a vocational program.[4] A partial survey by Northeastern University Law School found waiting lists of more than 4,500 students and the report argued that the full waiting list was likely much longer.[5] Waiting lists were longer in districts serving at risk populations, such as minority and low-income students and students whose first language is not English. The high numbers of applications exceeding available seats—sometimes as many as two for every opening— at many regional vocational schools clearly indicate that parents believe in the schools.

Previous Pioneer Institute reports document that one of the reasons for the popularity of vocational programs is that the programs, and particularly the regional vocational schools, appear to successfully educate their students.[6] According to the most recent DESE data, regional vocational schools have better attendance rates and lower dropout rates than traditional high schools, despite having a higher share of low income students: 44% in regional vocational schools compared to 39% statewide. In fact, their success is particularly striking among low income students, as seen in Table 2. At the same time, student performance on the MCAS roughly matches the statewide averages.

While the performance of regional vocational students has been impressive, direct comparisons of student achievement are difficult because

**Table 1. Most Popular Vocational Programs, 2004-05 and 2014-15**

| 2014-15 | | 2004-05 | |
|---|---|---|---|
| **Program** | **Students** | **Program** | **Students** |
| Culinary Arts | 2,823 | Business And Office Occupations | 4,554 |
| Health Assisting | 2,674 | Culinary Arts | 2,597 |
| Automotive Technology | 2,244 | Technology Education | 2,492 |
| Electricity | 2,065 | Computer Technology | 2,436 |
| Carpentry | 1,932 | Automotive Mechanic/Tech | 2,252 |
| Cosmetology | 1,712 | Carpenter | 2,220 |
| Marketing | 1,531 | Electrician | 1,948 |
| Early Education and Care | 1,465 | Cosmetology | 1,649 |
| Graphic Communications | 1,239 | Health Services | 1,424 |
| Metal Fabrication & Joining Tech. | 1,196 | Vocational Home Economics | 1,399 |

**Table 2. Dropout Rates 2013-14**

| | Dropout Rate | | |
|---|---|---|---|
| | All Students | Low Income Students | % Low Income |
| Statewide | 2.0% | 3.6% | 39% |
| Regional Vocational Schools | 0.7% | 0.9% | 44% |

**Table 3. 10th Grade MCAS, Percent Proficient or Advanced, 2015**

| | ELA | Math |
|---|---|---|
| Statewide | 91% | 79% |
| Regional Vocational Schools | 94% | 76% |

the vocational schools with more applicants than available spaces have the ability to assess prospective students on a rubric for attendance, behavior, and vocational interest, using Admissions Plans approved by the Department of Elementary & Secondary Education.

## Enrollment Patterns in Vocational and Traditional Schools

Altogether, Chapter 74 CVTE programs enroll almost 47,000 students in grades 9 to 12. Of these, almost 28,500 enroll in regional vocational schools and 18,000 participate in other vocational programs. The popularity of CVTE varies quite a bit around the state. Excluding Nantucket and Martha's Vineyard, vocational enrollment varies from a low of 6 percent in Suffolk County to a high of 32 percent in Bristol County (Table 4).

The counties also vary widely in the share of vocational students attending regional schools. While regional schools account for roughly 60 percent of overall vocational enrollment, the shares range from less than 10 percent in Dukes and Hampden County to more than 75 percent in Middlesex and Barnstable County and 100 percent in Franklin County.

The enrollment by county data show very low overall vocational enrollment in Suffolk County, which are driven mostly by Boston. This suggests that vocational enrollment in urban centers might be lower than in other areas. However, as Table 5 shows, the municipal districts in the 10 largest cities in the state send a higher percentage of students to vocational programs than the overall state average: 22 percent in these cities compared to 15 percent in other areas. These cities also have many more students in vocational programs that have not been approved under Chapter 74 – an additional 4,200 students are enrolled in these programs, nearly three times the percentage in other areas.

While these cities send a large number of students to vocational programs, the figures vary tremendously. Boston stands out on the low end, enrolling only about 6 percent of its students in local CVTE programs, with another 6 percent at non-Chapter 74 programs. On the other end of the spectrum, more than one quarter of the students in Worcester and Cambridge attend local vocational programs, while in Quincy the figure is almost half. Several of the cities also send large numbers of students to regional schools; for example New Bedford doesn't have local Chapter 74 CVTE programs but it sends 1,700 students to the Greater New Bedford Regional Vocational Technical School District.

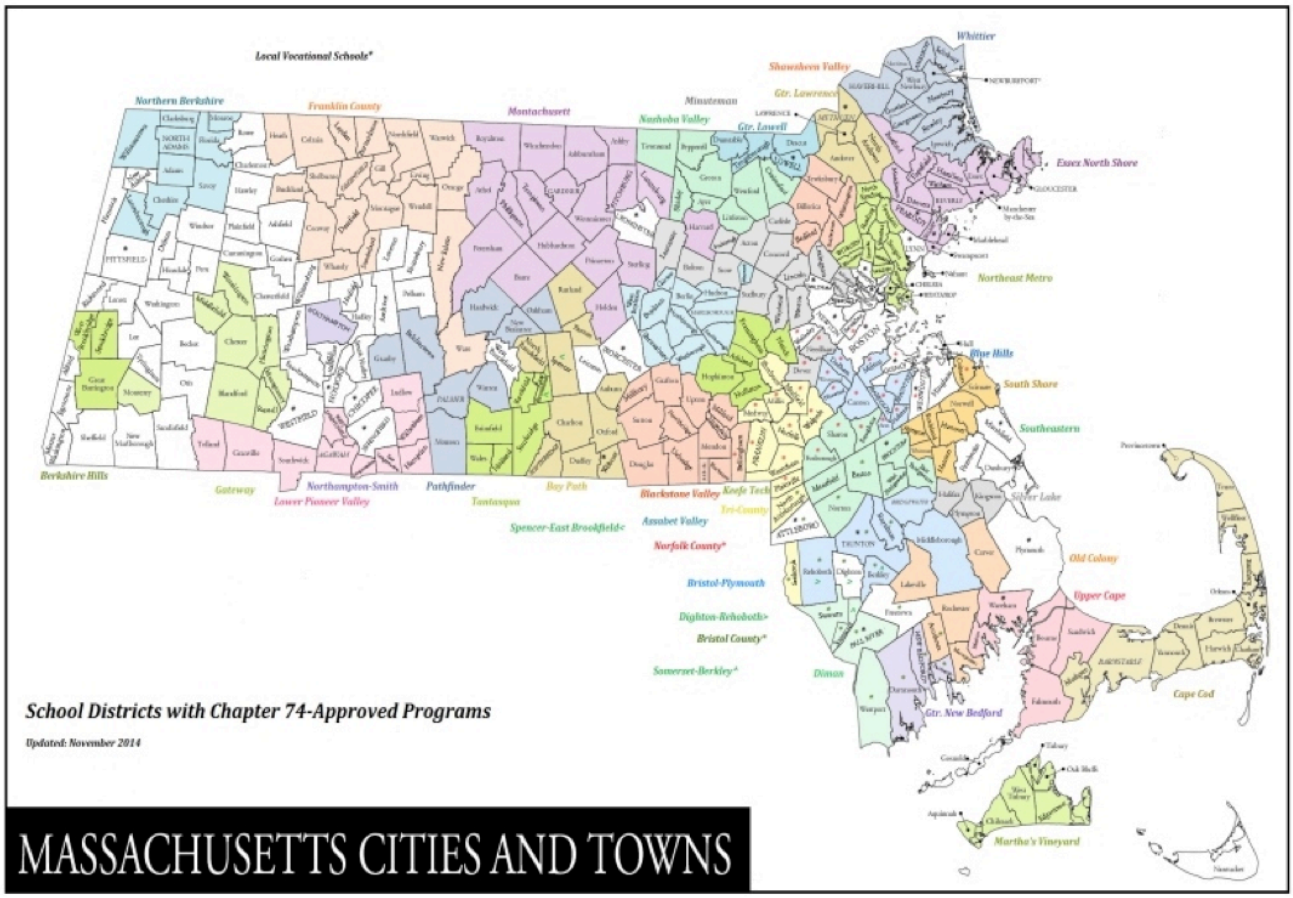
The map on page 10, reproduced from a DESE publication, illustrates the location of local and regional vocational-technical programs.[8]

## Table 4. Vocational Enrollment by County and Type of Program, 2014-15[7]

| County | Ch. 74 Program Enrollment | % Grades 9-12 Students in Ch. 74 Programs | Regional Voc. School Enrollment | Regional Voc. as % of Total Ch. 74 | Regional Voc. Schools & Ag Schools |
|---|---|---|---|---|---|
| Barnstable | 1,347 | 16.9% | 1,166 | 86.6% | 2 |
| Berkshire | 939 | 18.4% | 493 | 52.5% | 1 |
| Bristol | 8.417 | 32.2% | 5,977 | 71.0% | 5 |
| Dukes | 144 | 20.6% | - | 0.0% | 0 |
| Essex | 5,525 | 15.9% | 3,666 | 66.4% | 3 |
| Franklin | 503 | 17.7% | 503 | 100.0% | 1 |
| Hampden | 3,215 | 14.2% | 264 | 8.2% | 1 |
| Hampshire | 810 | 13.9% | 234 | 28.9% | 0 |
| Middlesex | 9,023 | 13.8% | 6,810 | 75.5% | 7 |
| Nantucket | - | 0.0% | - | NA | 0 |
| Norfolk | 3,941 | 13.0% | 2,139 | 54.3% | 3 |
| Plymouth | 4,076 | 17.1% | 2,621 | 64.3% | 2 |
| Suffolk | 1,429 | 6.1% | 510 | 35.7% | 0 |
| Worcester | 7,491 | 19.2% | 4,126 | 55.1% | 3 |
| **State Total** | **46,860** | **16.2%** | **28,509** | **60.8%** | **28** |

## Table 5. Vocational Enrollment in 10 Largest Municipal Districts, 2014-15

| District | Total 9-12 Enrollment | Regional Ch. 74 | Total Ch. 74 | Ch. 74 as % of Total | Non Ch. 74 Voc. | Non Ch. 74 as % of Total |
|---|---|---|---|---|---|---|
| Boston (Madison Park) | 16,241 | 0 | 919 | 5.7% | 970 | 6.0% |
| Brockton | 5,482 | 821 | 1,046 | 19.1% | 364 | 6.6% |
| Cambridge | 1,832 | 0 | 502 | 27.4% | 93 | 5.1% |
| Fall River | 3,578 | 1,138 | 1,595 | 44.6% | 283 | 7.9% |
| Lowell | 4,639 | 1,599 | 1,845 | 39.8% | 862 | 18.6% |
| Lynn (Lynn Tech) | 4,104 | 0 | 704 | 17.2% | 50 | 1.2% |
| New Bedford | 3,963 | 1,708 | 1,708 | 43.1% | 336 | 8.5% |
| Quincy | 2,702 | 29 | 1,304 | 48.3% | 54 | 2.0% |
| Springfield (Putnam) | 6,966 | 0 | 1,139 | 16.4% | 159 | 2.3% |
| Worcester (Tech) | 6,978 | 0 | 1,921 | 27.5% | 1,064 | 15.2% |
| **10 City Total** | **56,485** | **5,295** | **12,683** | **22.5%** | **4,235** | **7.5%** |
| **Remainder of State** | **232,449** | **23,237** | **34,200** | **14.7%** | **6,747** | **2.8%** |




Many areas are served by more than one vocational-technical program. Regional vocational-technical schools serve 240 municipalities. The regional membership overlaps almost entirely with the county agricultural schools which serve 48 cities and towns; the two systems together serve a total of 246 municipalities (Table 6). At the same time, 38 local districts have local vocational-technical programs, and 23 of those are in municipalities that are not members of either the regional or county districts. Finally, 12 regional high schools also have vocational-technical programs – these schools serve 37 cities and towns, 30 of which are not in other systems.

In total, 299 municipalities around the Commonwealth have direct access to vocational-technical programs through regional voc-techs, county agricultural schools, local vocational schools or programs, or a program within a regional district. This leaves 52 cities and towns that are not members of a regional vocational

**Table 6. Municipalities Served by Voc-Tech Programs**

| Type of Program | Municipalities Served |
|---|---|
| Regional and County Voc-Tech | 246 |
| Municipal District Vocational-Technical Program | 38 |
| Regional High School Vocational-Technical Program | 37 |
| Total (w/o double counting) | 299 |
| Not Served | 52 |

**Table 7. Location of Municipalities with Limited Access to CVTE**

| County | # of Municipalities | # of Students |
|---|---|---|
| Berkshire | 20 | 4,301 |
| Hampshire | 12 | 5,497 |
| Middlesex | 2 | 10,071 |
| Plymouth | 4 | 11,590 |
| Worcester | 6 | 11,595 |

school and do not have vocational programs at the local or regional high school level. These municipalities serve roughly 45,000 students, including more than 13,000 high school students.

As Table 7 shows, the majority of these towns – 32 out of 52 – are in Berkshire and Hampshire counties. At the same time, many students in Middlesex, Plymouth, and Worcester counties are in this situation. These figures refer to vocational-technical programs approved under Chapter 74; some of these areas have career and technical education programs that were not approved under Chapter 74.

As detailed in previous Pioneer Institute reports, statewide enrollment has fallen in the past decade by about 30,000 students, or 3 percent.[9] The decline was particularly severe in Western Massachusetts, but almost every part of the state has lost students.

Despite the decline in the number of students statewide, enrollment at vocational schools grew by 5,342 students or 13 percent (Table 8) during these years. The increased enrollment took place in all types of vocational schools – enrollment in regional vocational schools increased by 2,700 and enrollment in other vocational programs increased by 2,642. Enrollment growth in vocational programs was particularly strong in Bristol and Worcester Counties, growing by almost 2,000 students in each region. At the same time, vocational enrollment fell in Suffolk and Berkshire Counties.

While regional vocational schools have grown an average of 10.5 percent, some schools have seen rapid enrollment growth and others have seen modest declines. The fastest expansion came in Worcester County, where Assabet Valley, Blackstone Valley Tech, and Bay Path (Southern Worcester) all expanded, and total enrollment grew by 21 percent. Similarly, the five schools in Bristol County had combined growth of 860 students. There are a handful of regional schools that saw enrollment decline, most severely at Cape Cod Tech and Minuteman Tech.

Although many vocational schools have expanded in the past decade, vocational programs still have substantial waiting lists. As stated previously, the total number of students waiting for spots in recent years was at least 4,400 and probably much higher. It would require a substantial expansion of vocational programs to satisfy this level of demand.

**Table 8. Change in Chapter 74 Vocational Enrollment, 2004-05 to 2014-15**

| | 2004-05 | 2014-15 | Change | Change % |
|---|---|---|---|---|
| Regional Vocational Schools | 25,832 | 28,532 | 2,700 | 10.5% |
| Other Vocational Programs | 15,709 | 18,351 | 2,642 | 16.8% |
| Total Vocational Enrollment | 41,541 | 46,883 | 46,883 | 12.9% |

**TABLE 9. CHANGE IN ENROLLMENT AT REGIONAL VOCATIONAL SCHOOLS, 2004-05 TO 2014-15**

| School | County | Enrollment 2004-05 | Enrollment 2014-15 | Change | % Change |
|---|---|---|---|---|---|
| Cape Cod Region Voc Tech | Barnstable | 717 | 647 | -70 | -9.8% |
| Upper Cape Cod Voc Tech | Barnstable | 643 | 699 | 56 | 8.7% |
| Northern Berkshire Voc | Berkshire | 468 | 500 | 32 | 6.8% |
| Bristol-Plymouth Voc Tech | Bristol | 1,000 | 1,322 | 322 | 32.2% |
| Greater Fall River | Bristol | 1,251 | 1,381 | 130 | 10.4% |
| Greater New Bedford | Bristol | 1,906 | 2,141 | 235 | 12.3% |
| Old Colony Reg Voc Tech | Bristol | 547 | 571 | 24 | 4.4% |
| Southeastern Reg Voc Tech | Bristol | 1,197 | 1,324 | 127 | 10.6% |
| Bristol County Agr | Bristol | 426 | 448 | 22 | 5.2% |
| Greater Lawrence RVT | Essex | 1,429 | 1,352 | -77 | -5.4% |
| Whittier Voc | Essex | 1,236 | 1,307 | 71 | 5.7% |
| Essex North Shore[10] | Essex | 880 | 1,128 | 248 | 28.2% |
| Franklin County | Franklin | 529 | 519 | -10 | -1.9% |
| Pathfinder Voc Tech | Hampden | 659 | 621 | -38 | -5.8% |
| Assabet Valley | Middlesex | 907 | 1,058 | 151 | 16.6% |
| Greater Lowell Voc Tec | Middlesex | 1,949 | 2,080 | 131 | 6.7% |
| So Middlesex Voc Tech (Keefe) | Middlesex | 718 | 678 | -40 | -5.6% |
| Minuteman Voc Tech | Middlesex | 727 | 673 | -54 | -7.4% |
| Nashoba Valley Tech | Middlesex | 545 | 735 | 190 | 34.9% |
| Northeast Metro Voc | Middlesex | 1,162 | 1,267 | 105 | 9.0% |
| Shawsheen Valley Voc Tech | Middlesex | 1,228 | 1,368 | 140 | 11.4% |
| Blue Hills Voc | Norfolk | 780 | 859 | 79 | 10.1% |
| Tri County | Norfolk | 839 | 1,107 | 178 | 21.2% |
| Norfolk County Agr | Norfolk | 434 | 498 | 64 | 14.7% |
| South Shore Reg Voc Tech | Plymouth | 572 | 599 | 27 | 4.7% |
| Blackstone Valley Tech | Worcester | 850 | 1,185 | 335 | 39.4% |
| Montachusett Voc Tech Reg | Worcester | 1,212 | 1,435 | 223 | 18.4% |
| Bay Path (Southern Worcester) | Worcester | 1,021 | 1,120 | 99 | 9.7% |
| **Total** | -- | **25,832** | **28,532** | **2,700** | **10.5%** |

## Vocational School Finance

The financial impact of an expansion of vocational education in Massachusetts is determined by the school finance system. As with all schools, vocational schools are financed by a combination of local and state funding. State aid to fund operating expenses is governed primarily by the Chapter 70 funding formula, while state aid for capital expenditures on new construction or substantial repair or renovation of existing facilities is provided by the Massachusetts School Building Authority (MSBA).

Vocational programs are more expensive to operate than traditional schools because the vocational programs must offer both academic classroom instruction as well as certified instruction in specific vocational fields. The costs of vocational programs vary, but all require additional resources beyond a traditional high school. Additionally, vocational programs must adapt to changes in technology and workforce needs more quickly than traditional schools, further increasing costs.

In FY2014, regional vocational schools spent roughly $19,800 per student.[11] This compares to average spending in other schools of $13,800 and a statewide average of $14,000. However, it is not appropriate to compare vocational schools to these averages for several reasons. One reason is that the traditional school averages include elementary and middle schools, which are generally less expensive to operate than high schools. At the same time, the other averages also include some vocational programs within districts, which muddies the comparison.

An accurate assessment would compare the cost of a vocational program to the cost of the traditional high school program that a student would otherwise have attended. However, this comparison is difficult because expenditure data is more easily compared across districts rather than schools. To avoid this complication, one way to gauge the extra cost of vocational education is to compare regional vocational schools with regional high schools, as shown in the table below.

Not surprisingly, regional vocational schools spend more per pupil than regional high schools. The difference is smaller than the $6,000 difference between regional vocational schools and the state average, but it is significant. Some of the largest differences, as might be expected, are in classroom specialists, equipment and technology, and operations and maintenance. The differences in instructional spending are not driven by higher teacher salaries at regional vocational schools; teacher salaries at regional vocational schools are only marginally above the state average[12]—rather, regional CVTE students complete two programs, with the necessary extra human capital needed for instruction.

The state aid formula, Chapter 70, recognizes the extra expense of CVTE in the calculation

**Table 10. Spending Per Pupil 2014-15, Regional Voc-Tech Schools and Regional High Schools**

| | Regional Voc-Techs | Regional High Schools | Difference |
|---|---|---|---|
| Administration | 1,073 | 602 | 471 |
| Classroom Specialists and Teachers | 7,107 | 6,489 | 618 |
| Materials, Equipment, and Technology | 1,273 | 475 | 798 |
| Operations and Maintenance | 1,915 | 1,303 | 612 |
| Insurance, Retirement, and Other Costs | 3,339 | 2,427 | 912 |
| Other | 5,084 | 5,033 | 51 |
| **Total Expenditures Per Pupil** | **19,791** | **16,330** | **3,461** |

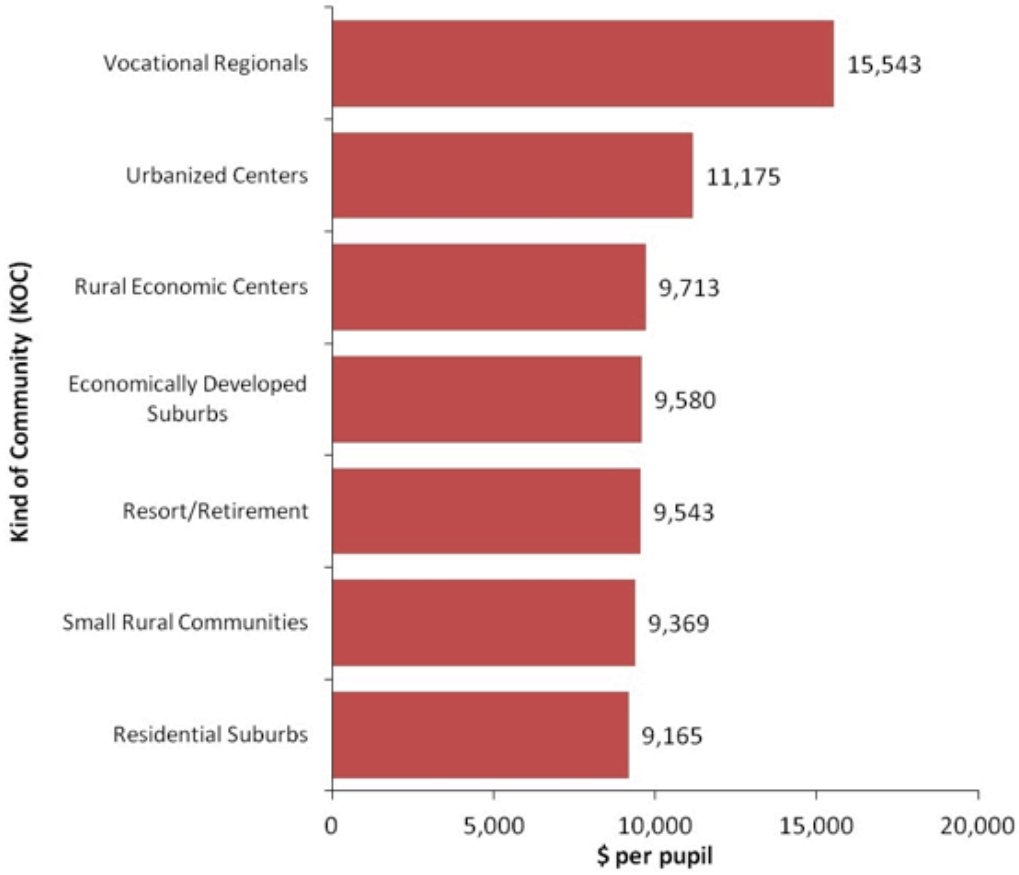
of the Foundation Budget, which measures the minimum required spending level in each district. The formula adjusts the Foundation Budget upwards by roughly $4,700 in vocational schools.[13] There are many other factors in the formula, such as the number of low-income students or English language learners, so that the foundation budget varies across vocational schools. However, the general pattern is that vocational schools are expected to spend substantially more than other schools.

Chapter 70 not only calculates the minimum spending necessary in each district, but it also determines how much state aid districts receive. Because the Chapter 70 formula is very complex, the results vary for each district and for each town that is a member of a regional district. However, the higher foundation budget in vocational schools and districts means that, all else being equal, the state will often contribute more aid toward the cost of career vocational technical high schools.

For FY16, regional vocational schools were required to spend an average of $16,000 per pupil, just above the foundation budget.[14] To reach this total, the state provided an average of $8,100 and local municipalities were required to contribute $7,900. For the entire state, the comparable figures are required net school spending of $11,100, state aid of $4,800, and local contributions of $6,300. In other words, state aid covers two-thirds of the additional $5,100 in required spending.[15]

The levels of required local spending and state aid show much more variation than the foundation budget or required net school spending; i.e. most districts are required to spend broadly similar amounts, but the source of the spending varies tremendously across districts. The highly progressive state aid formula generally targets more aid to areas with lower income or lower property values. State aid to regional vocational schools therefore varies from $3,200 per pupil to

**Figure 1. FY15 Foundation Budget by Type of School**




Source: DESE "How the Foundation Budget is Calculated" at http://www.doe.mass.edu/finance/chapter70/

**Table 11. Required Net School Spending and State Aid, FY16**

| | Required Net School Spending | Chapter 70 Aid | Required Local Contribution |
|---|---|---|---|
| Regional Vocational Schools | $16,000 | $8,100 | $7,900 |
| All Other Districts | $11,000 | $4,700 | $6,300 |
| Difference | $5,100 | $3,400 | $1,700 |

Cape Cod Regional Vocational Technical School to $14,400 to Greater Lawrence.

The vast differences in state aid reflect and also influence large differences in the required local contributions, which range from a low of $3,000 at Greater Lawrence to almost $14,000 at Minuteman. The differences across regional schools get wider when the regional members are examined individually – the required local contribution for separate municipal members of a regional district often vary significantly.

The figures for expenditures per pupil and required spending suggest that the extra cost of vocational education is somewhere around $4,000 per student. This additional cost means that significant expansion of vocational education would require additional funding, but the expense would represent less than one half of one percent (0.5 %) of the Commonwealth's annual education budget. Adding space for 5,000 students – enough to roughly eliminate the known waiting lists – could cost $20 million per year before considering capital costs, which are discussed below. The precise number depends on many factors, including which vocational programs are expanded and where the expansion takes place.

The location of expansion also has a large impact on who would pay for the additional spaces. The large differences in state aid and required contribution across districts and member communities means that the burden depends on where the new students come from. To simplify, expansion in high-income or property rich areas would impose higher costs on local communities, while if new students came from less affluent areas, the state would cover a greater share of the costs.

### Capital Costs

In addition to annual operating costs, vocational schools also face substantial costs for facilities and capital equipment. Any large expansion of vocational schools would require new construction or significant renovation of existing facilities.

As with traditional schools, vocational schools are eligible for funding through the Massachusetts School Building Authority. When a project is approved, MSBA provides a reimbursement rate that covers a portion of eligible costs, and the rate depends on community income, poverty, and property wealth, as well as incentive points based on construction choices.[16]

Vocational schools' requirements for larger work spaces and equipment mean that capital costs are higher than in traditional schools. According to the most recent Needs Survey from the MSBA, in 2010 the average vocational school was almost twice as large as a traditional high school.[17] The survey also noted that "Vocational Technical High Schools may require more thoughtful design of acoustical elements and building systems, particularly electrical, plumbing and ventilation, in order to support the vocational program and ensure a safe and healthy physical environment" (page 52).

In the past, the state provided more generous reimbursement to regional districts (as well as additional aid to cover transportation costs).[18] When this regional aid was phased out in the 1990s, it reduced the incentive for

regional members to agree to renovation or new construction. In recent years, the legislature has considered proposals to increase the MSBA reimbursement rate by 10 percent for regional schools and 20 percent for regional vocational schools, but these proposals have not passed.[19]

The majority of the regional vocational schools were built in the late 1960s and early 1970s, while Bristol and Norfolk County schools are 100 years old. In 2010, the MSBA rated the building conditions in vocational schools as marginally worse than other schools. While several have had renovations or been rebuilt since then, many vocational buildings require significant work.

The MSBA application process requires support from local communities. Regional vocational schools must therefore gather support from many member communities, which may be more difficult than for a vocational school within a municipal district that serves just one community. The process becomes even more problematic for regional schools that enroll a large number of students from non-member cities and towns. The non-member municipalities do not contribute towards capital costs, meaning that member towns must shoulder all expenses not reimbursed by MSBA.

Regardless of the reimbursement process, recent projects such as Essex North Shore and Putnam Voc-Tech allow a rough estimate of the potential expense to expand vocational education. The $100 million and higher price tags on these projects suggest that construction costs for vocational education can be in the neighborhood of $100,000 per student.

While this figure appears daunting, there are several reasons to believe it might not be as much of an obstacle as it first appears. One is that new construction might not be necessary – as of 2010, MSBA estimated that Massachusetts has more than one million square feet of unused classroom space, and that more than one out of every five schools was larger than its enrollment or education program requirements. Although the MSBA estimates are now five years out of date, the excess space is likely to grow in the future as enrollment declines. Better management of existing facilities and renovation of unused space could provide room to expand some vocational programs at a lower cost, particularly those without need for specialized equipment or large shop space.

Another reason that the $100,000 per student figure overstates the cost is that expanding vocational schools could lead to less need for new space (and lower construction costs) in traditional schools. The savings from avoided construction would reduce the net cost of expanding vocational education.

Just as with operating expenses, the burden of expanding vocational education will shift depending on where the expansion takes place. The minimum reimbursement rate under MSBA is 31 percent, but most districts receive at least 40 percent. In poorer communities the reimbursement rate could be as high as 80 percent, shifting most of the cost to the state.

## Conclusion – Opportunities and Challenges

Recommendations:

- Targeted expansion of career vocational-technical education modeled on successful independent regional programs
- Focus on geographical areas not currently served by existing CVTE schools and areas where applications greatly exceed available student spots
- Provide Massachusetts School Building Authority incentives for projects that reduce waiting lists and projects that repurpose existing space

The success of vocational education in Massachusetts provides an opportunity. Expanded access to vocational education could benefit thousands of students, particularly students who are not well served in traditional schools. Vocational programs provide excellent

career training, as well as the traditional academic education required to attend college. Of course, not all vocational education programs are created equal, and any expansion should focus on the features of the regional programs that have proven most successful.

While expanding career vocational technical education comes with a potentially significant price tag, it also carries great value for its graduates: both a high school diploma with a competency determination and a certificate of proficiency in their career technical program (along with third-party certifications, such as from OSHA, SolidWorks, or EPA Certification) The primary factor driving expenses up is the higher cost of running vocational schools - they spend roughly $4,000 more per student than comparable high schools. At the same time, vocational schools also require more space than traditional high schools to accommodate equipment, machine tools, and other necessities, as well as more frequent renovation and new equipment.

The total cost of expansion depends on many details, including which vocational programs are expanded and the extent of new construction that is necessary. Under the existing funding formulas the burden of additional spending would be shared roughly equally between the state and local communities. However, the true impact depends where expansion takes place, with the state taking on a larger share of the cost in lower income communities.

Given the lack of progress renovating existing vocational education facilities and the lack of urgency to reduce waitlists, it will take a strong push to expand vocational education. However, it is important to note that students attending successful vocational schools appear far less likely to drop out and therefore more likely to contribute to Massachusetts' economy, be prepared to fill anticipated job openings, earn higher wages, require fewer public benefits, and pay more in taxes. The success of many career vocational technical education programs suggest that expanding opportunities to students struggling with traditional high schools would be a worthwhile investment.

## About the Authors

**Ken Ardon** received a Ph.D. in economics from the University of California at Santa Barbara in 1999, where he co-authored a book on school spending and student achievement. He taught economics at Pomona College before moving to Massachusetts, and from 2000 to 2004, Dr. Ardon worked for the Commonwealth of Massachusetts in the Executive Office of Administration and Finance. Since 2004, he has been an assistant and then associate professor of economics at Salem State University, where he now serves as chair of the economics department. Dr. Ardon is a member of Pioneer Institute's Center for School Reform Advisory Board.

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## Endnotes

1. For a description of the history, see: Fraser, Alison L. "Vocational Technical Education in Massachusetts." Pioneer Institute, White Paper no 42, October 2008
2. Fraser, Alison L., and Donovan, William. "Hands On Achievement: Why Massachusetts Vocational Technical Schools Have Low Dropout Rates." Pioneer Institute, White Paper no 93, January 2013.
3. Massachusetts Department of Elementary and Secondary Education, "Charter School Fact Sheet, Directory, and Application History." Accessed at http://www.doe.mass.edu/charter/about.html on August 28, 2015.
4. DESE data on CVTE enrollment accessed at http://www.doe.mass.edu/infoservices/reports/enroll/default.html?yr=cvte1415# on September 1, 2015.
5. "Manufacturing Success: Improved Access to Vocational Education in Massachusetts." Northeastern University School of Law, March 2014.
6. Fraser (2008) and Fraser and Donovan (2013).
7. Total enrollment based on foundation enrollment figures by city/town. Enrollment by county in grades 9-12 is estimated based on enrollment in municipal districts as well as enrollment in regional schools. Where possible, enrollment in regional schools was assigned to each student's home municipality.
8. "Chapter 74 Vocational Technical Education Program Directory." DESE, November 2014.
9. Ardon, Ken. "Enrollment Trends in Massachusetts." Pioneer Institute. September, 2008. Ardon, Ken. "Enrollment Trends in Massachusetts: An Update." Pioneer Institute. October, 2012. Since the updated report was published, enrollment has remained relatively flat.
10. Essex North Shore Agricultural and Technical replaced Essex Agricultural Technical School and North Shore Regional Vocational.
11. Spending data from DESE per pupil expenditure report, available at http://www.doe.mass.edu/finance/statistics/ppx14.xlsm. The spending figures do not include acquisition of fixed assets or debt service costs.
12. http://profiles.doe.mass.edu/state_report/teachersalaries.aspx
13. Adjustment for vocational schools based on author's calculations using data from http://www.doe.mass.edu/finance/chapter70/chapter_15.html
14. This is significantly lower than the $19,800 figure in Table 1 for several reasons. One is that total expenditures include spending from grants, donations, and revolving accounts, while net school spending only includes the local municipal contribution and state aid. Also, many districts choose to spend more than the minimum; for example in FY15, regional vocational districts budgeted net school spending 8 percent above the required minimum.
15. As stated previously, comparing regional vocational technical schools to all other schools overstates the additional spending on vocational education because other schools include elementary schools.
16. http://www.massschoolbuildings.org/building/funding/reimbursements
17. "2010 Needs Survey Report." Massachusetts School Building Authority, 2011. Available at http://www.massschoolbuildings.org/programs/needs_survey
18. For a history of regionalization, see "School District Consolidation in Massachusetts" at http://www.doe.mass.edu/finance/regional/
19. For example Senate Bill 288 in 2013.

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