



## COLLEGE ACCESS AND RETENTION OF CAREER AND TECHNICAL EDUCATION GRADUATES

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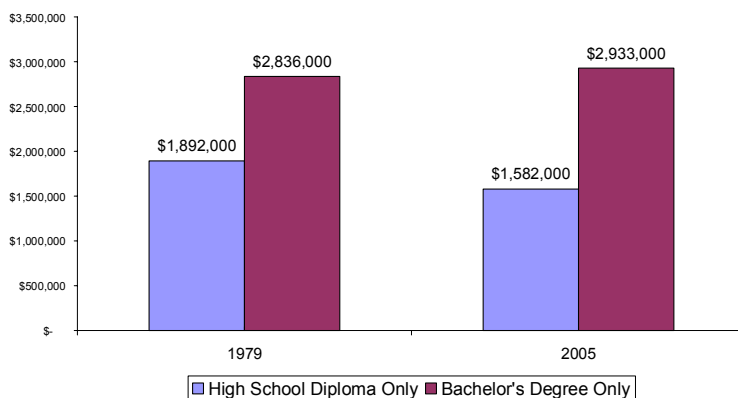
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### Introduction

The types of jobs that exist in Massachusetts' economy have changed radically over the past three decades. Thirty-five years ago, the Commonwealth was one of the top ten industrial states. Indeed, more than one-quarter of all payroll employment in the state at that time was concentrated in the manufacturing sector. Underlying the change in the state's job content has been two trends. First, job creation in the state has been heavily concentrated in professional and financial services, education, and health services, with new and emerging opportunities in biological-pharmaceutical and engineering consulting services. The manufacturing sector, however, has been characterized by job losses. Second, job losses in the state's manufacturing sector have been accompanied by changes in its mix of products, a sharp increase in the technological sophistication of its production processes and consequent changes in its staffing structures. As a result, there are greater economic returns associated with receiving a post secondary education in Massachusetts.

**Figure 1.**

**Trends in the Mean Lifetime Earnings of Male Adults  
Aged 18 to 64 By Educational Attainment (2005  
constant dollars)**



As shown in Figure 1, back in 1979, a young man with a high school diploma, but no post secondary education could expect to earn nearly \$1.9 million over his working life. Those men who earned a four year college degree had expected lifetime earnings at that time of over \$2.8 million, a 50 percent lifetime earnings advantage. By 2005, the lifetime earnings advantage for men earning a college degree in Massachusetts had jumped to 85 percent.<sup>1</sup>

The rising economic gains to educational attainment have placed great emphasis on providing high school students with a variety of pathways into the post secondary education system. Both high schools and colleges have worked to increase the share of graduating high school seniors who enroll in post secondary programs. Programs such as the Federal Trio system provide outreach and support to “low-income, first-generation college students, and students with disabilities to progress through the academic pipeline from middle school to post baccalaureate programs.”<sup>2</sup> At the state level, dual enrollment programs and high school-to-college articulation agreements are also meant to improve the access of high school graduates into the post secondary system.

Nationally, high school graduates with disabilities have sharply increased their enrollment in the nation’s colleges. Between 1987 and 2003, the proportion of high school graduates with a disability who enrolled in a post secondary educational institution doubled, making students with disabilities among the most rapidly growing sources of new students enrolling in the nation’s post secondary system.<sup>3</sup>

Currently, little is known about the actual post secondary enrollment of graduates from Massachusetts public high schools and less is known about the post secondary outcomes of the subset of high school graduates with disabilities. Yet, the labor market environment that these young adults will enter is one characterized by a large and growing lifetime earnings advantage to earning a college degree. Thus, issues of post secondary access and persistence are critical to those interested in creating viable employment and earnings opportunities for high school graduates with disabilities.

This white paper is intended to document the post secondary access and persistence of career and technical education (CTE) graduates. The findings are based on data about nearly 4,600 high school students from the Classes of 2004 through 2006 who graduated from seven vocational-technical high schools in Massachusetts.

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<sup>1</sup> For a complete discussion of the changing returns to education in Massachusetts see: Andrew Sum et al *As Assessment of the Labor Market, Income, Health, Social, Civic and Fiscal Consequences of Dropping Out of High School: Findings for Massachusetts Adults of the 21<sup>st</sup> Century*, Boston Youth Transition Funders Group, January, 2007

<sup>2</sup>For a description of the Trio system see: <http://www.ed.gov/about/offices/list/ope/trio/index.html>

<sup>3</sup> Lynn Newman, “Changes in the Postsecondary Education Participation of Youth with Disabilities,” Chapter 4 in *National Longitudinal Transition Study 2: Changes Over Time in the Early Post School Outcomes of Youth with Disabilities*, Office of Special Education Programs, U.S. Department of Education, Washington, DC, June 2005.

## Organization of the White Paper

This white paper is organized into four sections:

1. **Methods and purpose:** This section describes how the data used for this study were collected; lists the main research questions; and describes the analytic techniques that were used to answer the research questions.
2. **Characteristics of the sample:** This section describes the characteristics of the CTE graduates included in the study.
3. **Findings:** This section contains two sub-sections. Part 1 describes the findings related to college enrollment and Part 2 describes the findings related to one-year college retention rates.
4. **Potential next steps:** This section offers considerations for school and district leaders, and policymakers.

### Methods and Purpose

The analysis in this white paper is based upon nearly 4,600 high school students from the Classes of 2004 through 2006 who graduated from seven vocational-technical high schools in Massachusetts. Everyone included in the sample graduated with a competency determination and passed the MCAS (Massachusetts Comprehensive Assessment System) test.

Data for the study were obtained from a group of local CTE school districts. Each school district provided a student-level data file that included information about students' demographic and socioeconomic traits, educational disadvantage status, behavioral traits and the disability diagnosis and treatment. These data files served as the basis to match high school graduates with post secondary enrollment information from the National Student Clearinghouse (NSC). (See Appendix A for additional information.) Combining the NSC post secondary enrollment activities data with the high school graduate characteristics data produced a data file that enabled us to examine the impact of a variety of student traits including disability status and severity of the disability, on the post secondary enrollment of graduates from a sample of CTE school districts in the state.

Two main questions lie at the foundation of this research:

1. To what extent do college enrollment rates vary across the range of student characteristics?
2. To what extent do one year college retention rates vary across the range of student characteristics?

The student characteristics we examined are:

- Gender
- Race
- Family income status – measured by whether the student received free or reduced price lunch in high school
- Disability status – students with and without disabilities; students with disabilities were further divided into those who attended full inclusion classes (received less than 21 percent of their special education services outside the general education classroom) and those who attended partial inclusion classes (received 21 to 60 percent of their special education services outside the general education classroom)
- Educational disadvantage – defined as students who scored below grade level on a standardized test, failed a grade, or were enrolled in a remedial reading or math class while in high school
- High school behavior – including senior year attendance and suspensions
- Vocational technical education program in high school

Multivariate regression analyses were conducted on college enrollment and college retention to disentangle, to the extent possible, the independent effects of these characteristics. More specifically, a series of logistic regression models were used to examine the probability of attending college and the probability of retention after one-year while statistically accounting for student characteristics. Statistically significant differences are reported at the .01 level.

### **Characteristics of the sample**

Secondary CTE programs in Massachusetts are designed to provide their graduates with the opportunity to find career related employment after graduation as well as to prepare students for higher education. CTE schools annually conduct both 6 to 9 month and 15 to 18 month follow-up of their graduates via mail and phone surveys to develop a set of performance outcome measures required under federal regulations.<sup>4</sup> Findings from the school based follow-up conducted each year by CTE staff reveal that a considerable fraction of CTE graduates begin work immediately after completing high school, most often in a field of study related to their high school career area of specialization. However, about 45 percent of graduates enroll in college. Few CTE graduates are found to be disengaged from one of the three key life activities of youth: college, work, or military service, or some combination of these, after finishing high school.

Unlike comprehensive schools, the majority of CTE graduates included in the sample were male (61 percent). Just under one-fifth of these students are members of a race-ethnic minority group and about 11 percent are non-native English speakers. About one-quarter of the graduates in the sample were eligible for school lunch subsidies.

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<sup>4</sup> A recent review of secondary vocational technical education in Massachusetts can be found in Fraser, Alison L. (October 2008). *Vocational Technical Education in Massachusetts*. Pioneer Institute, No 42.

**Table 1:  
Demographic Characteristics of High School Graduates from Seven Vocational  
Technical High Schools, Classes of 2004, 2005, & 2006**

Characteristics of Graduates	Number	Percent of Total
Total number of graduates	4,597	100%
Male	2,798	60.9%
Female	1,799	39.1%
White, non-Hispanic	3,789	82.4%
Hispanic	481	10.5%
Black, non-Hispanic	137	3.0%
Other, non-Hispanic	190	4.1%
Native English speaker	4,078	88.7%
Speak Non-English language at home	519	11.3%
Not eligible for school lunch subsidy	3,502	76.2%
Eligible for free school lunch	834	18.1%
Eligible for subsidized school lunch	261	5.7%

Source: CTE District administrative records, tabulations by authors.

The share of graduates who were diagnosed with a disability while in high school was quite high among the CTE institutions included in our analysis. About one in four graduates, or 1,138 students in our study, were classified by their high school as having one or more disabilities. The majority of students with a disability were enrolled in a full inclusion program of service. Full inclusion students primarily receive services in a regular classroom, although they can be provided a limited amount of services outside of the regular classroom setting. Usually, full inclusion students spend at least 80 percent of their school time in regular classes. Within our sample of graduates, about 60 percent of those with a disability were enrolled in a full inclusion program. Students assigned to partial inclusion services spend more time outside of general education classes (compared to full inclusion students) to receive special education services. Generally students in the partial inclusion category spend less than 80 percent of their school time in regular classes. About 40 percent of students with disabilities included in our sample were assigned to a partial inclusion special education program.

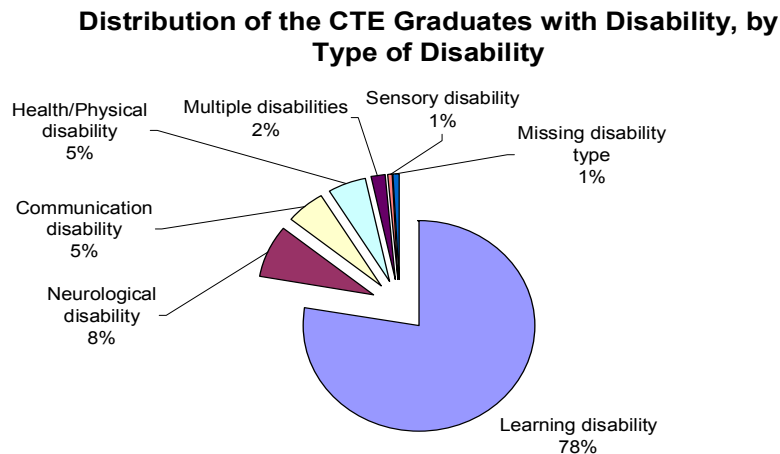
**Table 2:  
Special Education Status of High School Graduates from 7 Vocational Technical High  
Schools, Classes of 2004, 2005, & 2006**

Special Education Status	Number	Percent of Total
Total graduates	4,597	100.0%
No special education	3,459	75.2%
Special education graduates	1,138	24.8%
Full inclusion (special education services outside general education less than 21% of the time)	678	14.7%
Partial inclusion (SPED services outside general education 21% to 60% of the time)	460	10.0%

Source: CTE District administrative records, tabulations by authors.

Students with disabilities were classified into numerous disability categories, but the overwhelming majority were determined to have a learning disability. Indeed 78 percent of all graduates with a disability were categorized by their schools as learning disabled. The remaining special education graduates were distributed across different types of disabilities in the following proportions—neurological disabilities (8 percent), communication and health disabilities (5 percent each), multiple disabilities (2 percent), and sensory disabilities (1 percent). The neurological disability category includes students who were identified with emotional or intellectual disabilities or with autism or other neurological disabilities. Contrary to widely held perceptions about the prevalence of emotional disabilities among high school students, in our sample of CTE graduates, emotional disabilities represented a very small share of all special education graduates.

**Figure 2.**



Source: CTE District administrative records, tabulations by authors

## Findings

This section summarizes findings from descriptive and multivariate regression analyses related to college enrollment and one-year college retention rates.

### Part 1: College Enrollment Findings

#### *Descriptive Findings*

We found that about 45 percent of CTE graduates in our sample enrolled in a post secondary educational program based on NSC tracking. However, the college enrollment rates varied considerably across a range of student demographic characteristics, courses of study in high school, and disability status. For example, our analysis of the data found that:

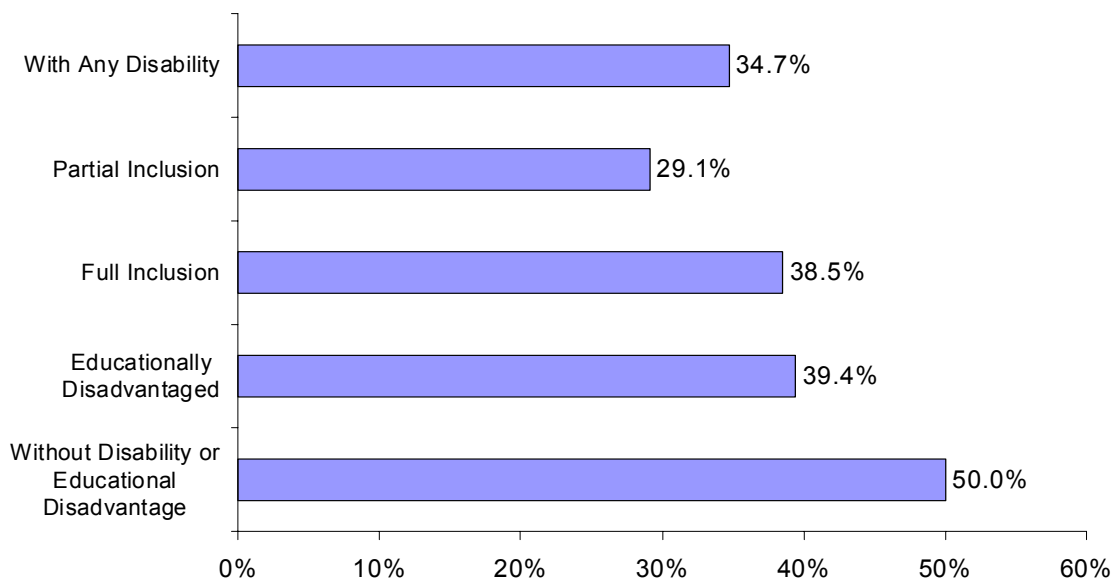
- The college enrollment rate for females was much higher than that of male high school graduates.

- College enrollment rates varied widely among graduates from different technical/career programs of study. About two-thirds of those who specialized in health and related clinical fields enrolled in college while only about one-quarter of graduates from construction and precision production specialties enrolled in college.
- Graduates from lower income households had lower post secondary enrollment rates. Students eligible for free or subsidized lunch had lower enrollment rates than those who were not eligible for participation in this program.
- The college enrollment rates of CTE graduates who were Black or Hispanic were higher than the enrollment rates of White graduates.
- Little difference was found in the college enrollment rates between native English speakers and non-native English speakers.

The college enrollment rate of CTE graduates from our sample of high schools varied systematically by disability status of the graduate, as well as by educational disadvantage status of the graduate. Educationally disadvantaged graduates include students without a disability who scored below their grade level on a standardized test, failed a grade, or were enrolled in a remedial reading or math class while in high school. Our analysis of the data files revealed that about 39 percent of CTE graduates with an educational disadvantage and 35 percent of CTE graduates with a disability had enrolled in college after completing high school. In contrast, one-half of the students in our study who were not diagnosed with a disability or classified as educationally disadvantaged had enrolled in college after graduation. Among those graduates with a disability, only 29 percent of the students assigned to a partial inclusion course of study in high school had enrolled in college, while 38 percent of full inclusion students had enrolled in college after completing high school.

**Table 3.**

### College Enrollment Rate by Disability and Educational Disadvantage Status





### **Results from Regression Analysis**

Findings from our analysis of post secondary enrollment thus far raise as many questions as they answer. We found that the college enrollment rates of students vary widely by a variety of key student characteristics, which include their high school program of study.

This section reports on the estimates of the independent impacts of these characteristics on the likelihood that a graduate will enroll in college. For example, we found that the college enrollment rate was much higher for females than for males. We also found that graduates of health related high school programs (which are largely populated by female students) have high enrollment rates, while precision production programs (which are largely populated by male students) have comparatively low college enrollment rates. A key task is to disentangle to the extent possible the independent effects of gender and program of study on the rate of college enrollment of students.

We developed a set of three logistic regression models designed to assess the independent impact of some of the key background traits of students and their programs of study on the probability that a CTE graduate will enroll in college. We found large and statistically significant effects for a number of key factors on the likelihood of the high school graduate attending college. Our analysis revealed that:<sup>5</sup>

- Females were more likely to enroll in college than their male counterparts, but the size of the effect, although still considerable (+8 percentage points), was much smaller after statistically controlling for other factors.
- The independent effects of race/ethnic minority status were positive and very large. Black students were 29 percentage points and Hispanic students 10 percentage points more likely to enroll than their White counterparts.<sup>6</sup>
- Some programs of study had very large impacts on the probability of enrolling in college. Completing a program in construction or mechanics and repairers program of study reduced the likelihood of enrolling in college by nearly 33 percentage points compared to many other CTE fields of study including health professions and computer and information services.
- Holding other factors constant, graduates eligible to participate in free and subsidized lunch program were about 11 percentage point less likely to enroll in college.
- School attendance exerted a strong influence on the probability of enrolling in college. Compared to the average attendance rate, a one percentage point deficit in a student's annual rate of attendance is estimated to reduce the probability of college attendance by one percentage point. Thus even a few days of absence in school reduces the likelihood of enrolling in college.
- After adjusting for a variety of other traits, our regression models showed that graduates with disabilities were about 10 to 12 percentage points less likely to enroll in college, compared to graduates without disabilities. The impact on college enrollment rates was

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<sup>5</sup> Findings are discussed only if significant at the .01 level.

<sup>6</sup> The finding of increased probabilities of enrollment for Black, non-Hispanic and Hispanic students is not unique to this study. A recent multi-variate analysis of college enrollment conducted by the U.S. Bureau of Labor Statistics yielded similar results. See Alison Aughinbaugh, "Who Goes to College? Evidence from the NLSY97," *Monthly Labor Review*, Washington DC, August, 2008



much smaller for students who participated in a full inclusion special education program than those who were assigned to a partial inclusion program. Compared to graduates without a disability, students with disabilities who had participated in a full inclusion special education program were about seven percentage points less likely to enroll in college whereas their partial inclusion counterparts were 15 percentage points less likely to enroll in college.

## Part 2: One-Year College Retention Findings

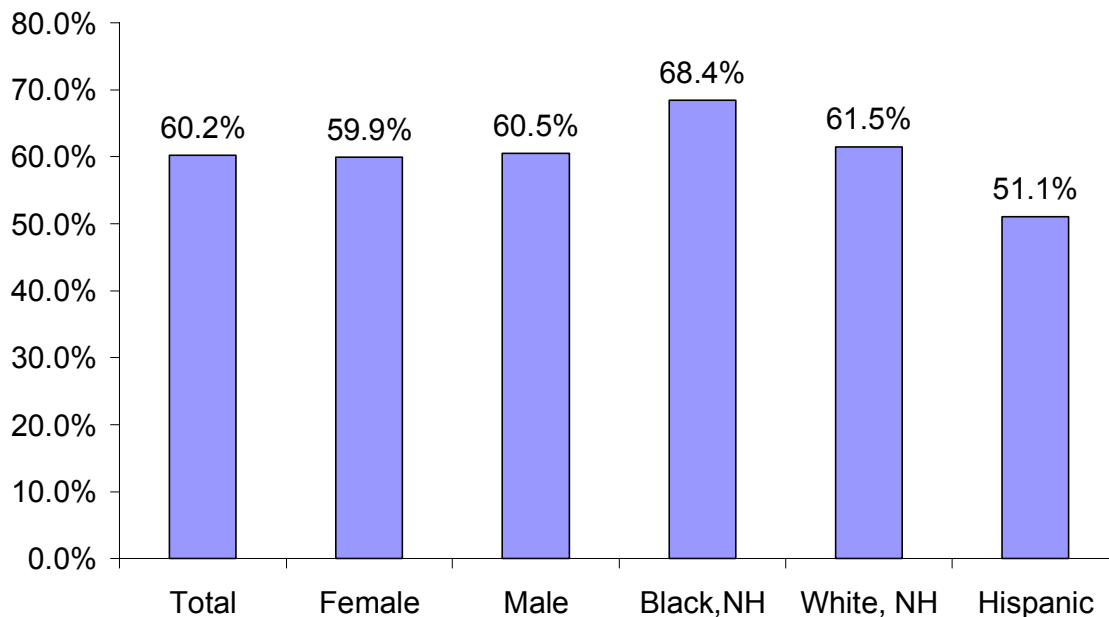
Just as the findings in the previous section suggest that student characteristics impact the likelihood that a student will enroll in college, student characteristics also impact the likelihood that a student will be retained for the first year at the college level.

### *Descriptive Findings*

Our analysis found that out of the 2,060 seniors who graduated from a participating CTE program and enrolled in college, 1,240 continued in college for at least one year after their initial enrollment. This yields an overall one year retention rate of 60.2 percent for our sample of college-bound high school graduates.

**Table 4.**

One Year College Retention Among College Enrolled CTE Graduates, by Gender and Race/Ethnicity



As shown in Table 4, a comparison of the one-year retention rates of male and female college enrolled high school graduates reveals that both groups had about the same probability of persisting through their first year in college. Although male high school graduates from these vocational high schools were considerably less likely to enroll in college, once enrolled in college, they were as likely as females to remain enrolled at the end of the first year. Nearly 60 percent of female students returned to college during the second year, compared to 60.5 percent of male college students.

The one-year retention rate did vary by race/ethnicity. Black students had the highest one-year retention rate of the four racial/ethnic subgroups of students. With a one-year retention rate of 68 percent, Black students were six percentage points more likely than White students and 16 percentage points more likely than Hispanic students to return to college one year after their initial college enrollment. Black high school graduates from these seven schools not only enrolled in college at much higher rates than other race groups, but they also had higher one-year retention rates than the other three racial/ethnic groups of students.

Black students who graduated from these CTE high schools appear to be better prepared to not only enter college, but to also persist at higher rates. Further study of the trajectories of these students through high school and through the first year of college and beyond is warranted to identify potentially successful pathways to a college education among Black high school youth. Hispanic students were less likely than White students to remain enrolled after the first year in college. The one-year college retention rate of Hispanic students was 51 percent, a rate that was 10 percentage points lower than the 61 percent one-year retention rate among White students. Students who spoke a language other than English at home (non-Native English speakers) had somewhat lower rates of college persistence than native-English speakers (56 percent versus 61 percent).

Reliable information on family incomes for high school students is rarely available. Most studies of high school students use some measure of student subsidized/free lunch eligibility as a proxy for more specific measures of family income. The family income level is closely associated with the educational and labor market outcomes of youth in general.

### Calculating One-Year Retention Rate

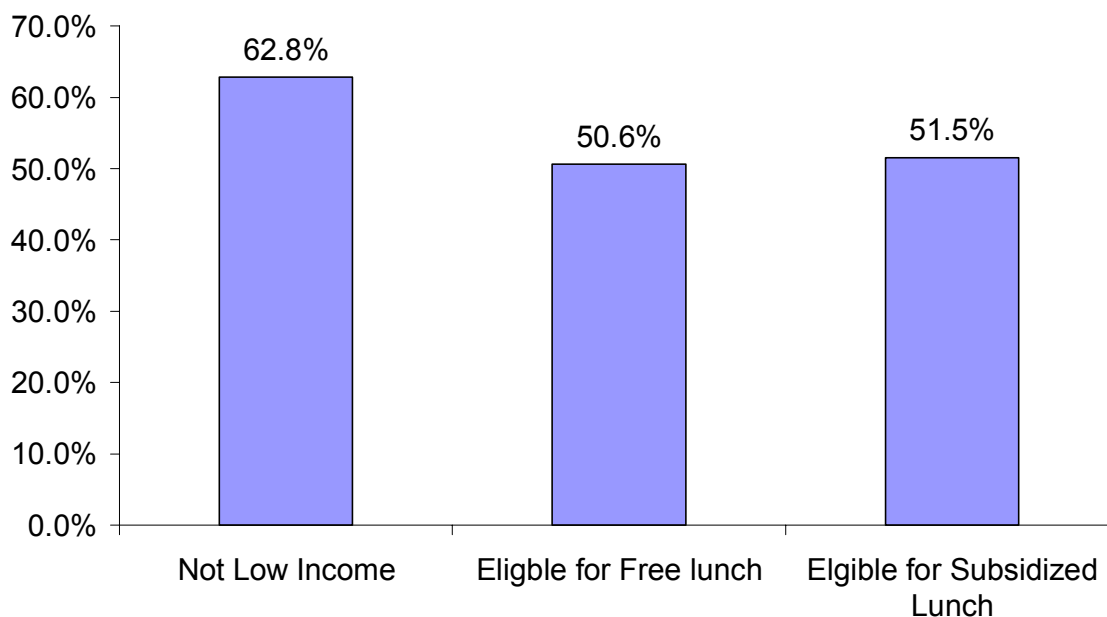
The one-year college retention rate of high school graduates is commonly measured by estimating the number of students in a given entering fall freshman cohort (usually full-time, first time students) and tracking them into the fall of following year. Those who are enrolled in their second fall term are included as retained for one year—regardless of the number of earned credit hours. The measure of retention we use in this study is somewhat different. Our estimate of one year retention rates are not based on developing a single cohort group. Instead we identify the initial enrollment of the three cohorts of graduating seniors (from the classes of 2004, 2005, and 2006) regardless of when they entered the post secondary system and regardless of their full-time/part-time status at entry. We then track these students over a 12 month period from their initial enrollment to measure their one-year retention. For example, a student who delays entry into college until the Spring term after completing high school would be included in our retention measure if they were enrolled in college in the Spring term in the year following their initial enrollment.

Family income is a measure that represents many of the determinants of educational and labor market success among youth, such as the quality of preschool, elementary and secondary schools, the quality of neighborhoods and peers, family structure, educational attainment of parents, access to resources to enhance cognitive development, access to better healthcare, and many more. Research studies in the youth arena have consistently shown a strong and negative relationship between family income and youth education and labor market outcomes.

Our analysis of the data found that students from lower income families were not only less likely to enroll in college, but among those who were enrolled, low-income students were less likely to stay enrolled in the second year of college. Among the college-bound CTE high school graduates, those who were eligible for lunch subsidies in high school (free or subsidized school lunch) were about 12 percentage points less likely to remain enrolled in college one year after their initial college enrollment. A little over one-half of college enrolled graduates who were eligible for lunch subsidies in high school (compared to 63 percent of their school lunch ineligible counterparts) returned to college during the first semester of their second year in college. Thus, income is a correlate of not only access to college, but also of success in college.

**Table 5.**

One Year Retention Among College Enrolled CTE Graduates by Low Income Status



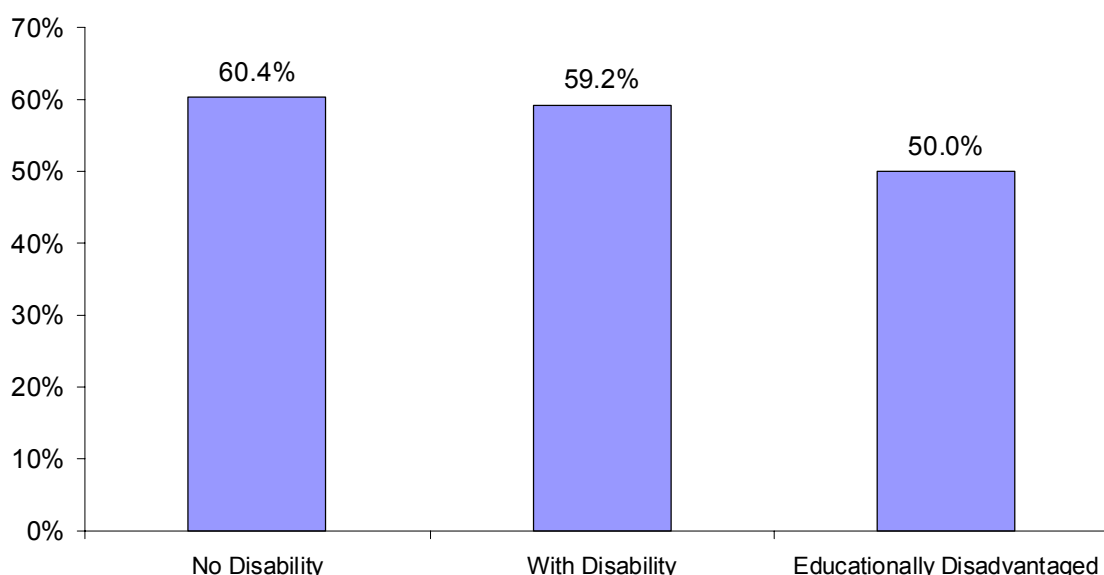
Disability is often considered to be a major limiting factor in determining college success. Students who participate in special education programs generally perform more poorly on standardized tests, are much less likely to enroll in a bachelor's degree granting institution, and are less academically prepared than other students who do not have a disability. A second group of students, those who are educationally disadvantaged

(students without a disability who were behind in grade or scoring below standardized test norms) are also thought to be less college ready.

Our analysis of the persistence of CTE students with disabilities produced a surprising result: One-year college persistence rates of CTE high school graduates with disabilities were essentially identical to those of their counterparts who had no disability. Both groups of entering college students had one-year retention rates of 60 percent. Although students with disabilities are less likely to enroll in college than students without disabilities, once they are enrolled, the two groups of students have about the same rate of one-year retention in college. However, we did find that the persistence of students who were educationally disadvantaged was lower than that of other graduates. Students judged to be educationally disadvantaged who had enrolled in college had a one-year retention rate of 50 percent, compared to an overall one-year retention rate of 60 percent for all college-enrolled CTE graduates.

**Table 6.**

**One Year Retention Rates Among college Enrolled CTE Graduates, by Disability and Educational Disadvantage Status**



These descriptive findings suggest that student characteristics exert an important influence on the likelihood that a student will be retained for one year at the college level. In order to estimate the independent impact of these and other factors on the likelihood of a CTE graduate remaining in college for one year after initially enrolling, we have developed and estimated three logistic regression models. These models are designed to determine the independent influence on one-year college retention of the demographic traits, low-income status, disability status, educational disadvantage status, in-school behavior of CTE high school graduates, as well as the type and level of college in which these graduates had initially enrolled.

### **Results from the Regression Analysis**

Our regression analysis yielded a number of important insights into the determinants of one-year retention in the post secondary system for CTE graduates. Contrary to our expectations, we found that, CTE students with a disability were as likely to be retained in college as their non-disabled counterparts. Holding factors such as gender, race, free lunch eligibility, English language proficiency, high school behavioral traits and the level and type of post secondary enrollment, our first regression equation found no statistically significant difference in the likelihood that a student with a disability was retained compared to their counterparts without a disability.

In order to explore this finding in greater detail, we ran a second model that distinguished between students with disabilities who participated in a full inclusion special education program while in high school and those who were enrolled in a partial inclusion program. Holding other factors constant, we found that students who participated in a full inclusion special education program were about eight percentage points **more likely** than students without a disability to be retained in college during the first year.<sup>7</sup> In a subsequent meeting with CTE officials, including a number of special education directors, this result was thought to be connected with a set of behavioral skills developed as part of the full inclusion special education curriculum, especially those related to self-advocacy and organizational skills.

Other key findings include the following:

- After controlling for other factors, no statistically significant differences were found in the probability of one-year retention between male and female CTE graduates.
- Black graduates of CTE programs were much more likely to be retained in college relative to White graduates. All three models estimated an 11-percentage point one-year retention advantage for Black CTE graduates relative to White graduates.
- Low-income CTE students were significantly less likely to be retained in college. Students who had been eligible for free or subsidized lunches while in high school were expected to persist in college through the first year at a rate that was 10 to 11 percentage points below that of students who were not eligible to participate in the free or subsidized lunch program.
- Surprisingly, non-native English speakers had a better chance of being retained in college than their native English speaking counterparts. The one-year retention rate for non-native English speakers was 10 percentage points higher than that of native English speaking students.
- High school behavioral traits exerted a strong influence on the likelihood of retention in the post secondary system for the first year. Senior year attendance rates were positively associated with post secondary retention. A one percentage point difference in the senior attendance rate is expected to change the retention by 1.3 percentage points. This implies that missing even a few more days of school than the average college bound senior can sharply reduced the chances of retention. Missing 10 more days of school than the average college bound senior is

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<sup>7</sup> All results are significant at the .05 percent level.

expected to reduce a student's likelihood of one-year college retention by about 8.5 percentage points.

- Student suspension while in high school also significantly reduced a student's likelihood of retention during the first year in college. One or more incidents of out-of-school suspension were expected to reduce the likelihood of staying in college during the first year by 9.5 percentage points.
- Enrolling in a community college sharply reduced the chances of retention of students for one year, after holding other factors constant including family income status, disability status, educational disadvantage status, English language skills and key behavioral traits. We found that students who enrolled at two year public institutions were about 23 percentage points less likely to be retained in college during their first year than their counterparts who enrolled in other parts of the nation's higher education system (including two-year private, four-year public, and four-year private institutions). No statistically significant differences were estimated in one-year retention rates among students who had enrolled at either public or private four-year colleges or at private two-year institutions.

## Potential Next Steps for School Leaders and Policymakers

### For school and district leaders

- **Address the behavior issues that lead to poor attendance and suspension.** Student behavior while in high school exerts a powerful predictive influence on the college retention of CTE graduates. Missing school and getting suspended in high school significantly reduce a student's likelihood of retention during the first year in college.
- **Examine how full inclusion programs operate in CTE programs.** Full inclusion special education graduates were much more likely to remain in college after enrollment. Secondary school leaders need to understand the specifics of how full inclusion programs operated in a CTE context to produce these advantages.

### For higher education leaders

- **Devise innovative strategies to strengthen overall retention and increase graduation rates.** The study found poor retention outcomes for CTE graduates who enrolled in community colleges. This combined with above average rates of enrollment in community college among graduates from the CTE high schools, suggests that community colleges should make concerted efforts to devise innovative strategies to strengthen overall retention and increase graduation rates, particularly among students with disabilities.
- **Use information about students' high school experiences when making decisions about post secondary placements.** This study reveals that among CTE graduates, high school behavior exerts an important influence over the chances of success in college. Given the relatively poor retention rates of the state's public community college system, consideration should be given to community college faculty

and staff using readily available information on students' high school experiences in making program/course placement decisions.

### **For policymakers**

This paper is, to our knowledge, the first empirical study of the actual transition experiences of high school graduates with disabilities and participating in a special education program. We are now preparing a second set of studies that examine the transition experiences of graduates with disabilities from comprehensive high schools across the state. Much has been learned from our initial research foray, but much more needs to be learned. For example, at the state level, we need to track students not only into college, but also into the labor market. We also need to measure student outcomes over an extended period of time after high school. And perhaps most importantly, we need to connect the experiences of students in college with their high school experiences to better assess the strengths and weaknesses of the educational pipeline in Massachusetts, especially for special education students.

In order to facilitate the types of analysis described above, state policymakers should consider:

1. **Allowing objective and qualified researchers access to data now collected by a variety of state agencies.** A wide variety of information about students, including students with disabilities, are collected by a number of state agencies. Researchers from outside these government agencies should have access to these data (with appropriate confidentiality restrictions) so that a fair and impartial appraisal and analysis that can produce replicable results can be provided to policymakers. Too many barriers to these data currently exist.
2. **Establishing a pre-k to college student identification number for each child/adult enrolled in the publicly funded education system in the state.** Such an identification number would prove quite useful in conducting longitudinal studies that examine the impacts of various elements of the educational pipeline.
3. **Collecting social security numbers for every student.** It is essential to have a social security number for each student in order to examine a variety of issues related to the labor market activities of students and to assess their post school employment and earnings experiences. However, the social security number should not be used as the student identification number to protect against identity theft.

In addition to establishing policies to support the collection and analysis of better student data, policymakers may also consider supporting new research projects such as the one described below.

**Examine the impact CTE programs have on Black students.** Given the promising finding that Black graduates of CTE programs were much more likely to enroll in college and to persist in post secondary education after finishing high school, state and federal policymakers may consider analyzing the sources of this advantage for these students. With the strikingly high rates of high school dropouts among Black students – especially boys – this finding holds real promise. A more systematic appraisal of the role that CTE programs play is needed in determining why Black graduates of these programs are more likely than their White peers to enroll and remain in college.



## Appendix A

### Current method for measuring post secondary access

Although the Massachusetts Department of Education collects information from school districts through its Student Information Management System (SIMS) about the post graduation plans of their new graduates, these data do not represent the actual post secondary outcomes of recent graduates. Rather they serve as a measure of the near term future plans of new graduates about work, enlisting in military service and post secondary enrollment.

Some school districts do conduct follow-up studies of their graduates to determine the actual post graduation activities of their graduates. However, such follow up activity is the exception rather than the rule. The state's secondary career and technical education (CTE) schools annually conduct both 6 to 9 month and 15 to 18 month follow-up of their graduates via mail and phone surveys to develop a set of performance outcome measures required under federal regulations.<sup>8</sup> Additionally, the Boston Public School district has conducted a short-term follow up of its graduates for nearly two decades.<sup>9</sup> Neither the CTE nor Boston follow up studies are designed to track recent high school graduates who were diagnosed with a disability of some type while in high school and participated in a special education or related rehabilitation program at the secondary level. About 19 percent of entering 9<sup>th</sup> graders in public schools in Massachusetts are special education students. The share of special education students who graduate on-time from high school is somewhat lower than the share of public school student population with disabilities primarily because of above average dropout rates and greater likelihood of remaining in school beyond the normal time to graduation.<sup>10</sup> Thus, not only do we know little about the actual post secondary outcomes of high school graduates in the state, but we have virtually no evidence about college access of our high school graduates with disabilities.

### New method for tracking post secondary access

Working with a group of local CTE school districts, we have developed a new method of tracking public high school graduates with disabilities into the higher education system.<sup>11</sup> We obtained a unit record data file from each school district that included information about students' demographic and socioeconomic traits, educational disadvantage status, behavioral traits, and the disability diagnosis and treatment of their graduates from the classes of 2003 through 2007. The collection of these data enabled us to attain three objectives: First, it allowed us to gain insights into the characteristics of graduates from each of the seven participating CTE school districts. Second, elements of these data files served as the basis to match high school graduates with post secondary enrollment information from the National

<sup>8</sup> A recent review of secondary vocational technical education in Massachusetts can be found in Alison L. Fraser, *Vocational Technical Education in Massachusetts*, Pioneer Institute, No 42, October, 2008

<sup>9</sup> An example of the analysis of this follow-up can be found in Ishwar Khatiwada and Andrew Sum, *The College Enrollment Behavior of the Class of 2005 Boston Public High School Graduates Including a Multivariate Statistical Analysis of Findings of the Winter/Spring 2006 Follow-up*, Center for Labor Market Studies, Northeastern University. September, 2007

<sup>10</sup> Overall about 17 percent of the state's public school student population aged 3 to 21 is served in a special education program. See: U.S. Department of Education, *Digest of Education Statistics, 2007*, Washington DC. Table 49. The data on the special education share of the class of 2006 cohort in Massachusetts are available at <http://www.doe.mass.edu/infoservices/reports/gradrates/06state.html>

<sup>11</sup> Our study has subsequently expanded to include a new panel of local comprehensive school districts.

Student Clearinghouse (more on this in the following paragraph). Third, together these data allow us to disentangle the role of disability status from the role of demographic, socioeconomic, academic, and school behavioral traits on the probability of post secondary enrollment of recent high school graduates.

The National Student Clearinghouse was established in 1993 as a low cost method of verifying enrollment status of college student loan recipients. It is an up-to-date repository of information derived from college and university registrars on undergraduate enrollments for each academic term. The NSC serves as a central and comprehensive source of information on college enrollment and degree awards covering about 91 percent of college enrollment in the nation. These data are used for a wide range of purposes in addition to loan verification. Among these is its use as a research tool to track the post secondary enrollment and completion status of high school graduates. We were able to track in the NSC the post secondary enrollment activities of all five cohorts of CTE graduates from our initial panel of participating school districts. Combining the NSC postsecondary enrollment activities data with the high school graduate characteristics data, we produced a data file that enabled us to examine the impact of a variety of student traits including disability status and severity of the disability, on the post secondary enrollment of graduates from a sample of CTE school districts in the state.