



College, Career and Life Readiness: A Look at High School Indicators of Post-Secondary Outcomes in Boston

Robert Balfanz and Vaughan Byrnes

About the Boston Opportunity Agenda

The Boston Opportunity Agenda is a public/private partnership comprising the City of Boston, the Boston Public Schools and Boston's Catholic and charter schools, the city's leading public charities and many local foundations to ensure that all Boston residents have access to the education necessary for upward economic mobility, civic engagement and lifelong learning for themselves and their families.

About the Everyone Graduates Center

The mission of the Everyone Graduates Center is to develop and disseminate the know-how required to enable all students to graduate from high school prepared for college, career, and civic life. Through a systematic and comprehensive approach, EGC combines analysis of the causes, location, and consequences of the nation's dropout crisis with the development of tools and models designed to keep all students on the path to high school graduation, and capacity building efforts to enable states, communities, school districts, and schools to provide all their students with the supports they need to succeed. The Everyone Graduates Center seeks to identify the barriers that stand in the way of all students graduating from high school prepared for adult success, to develop strategic solutions to overcome the barriers, and to build local capacity to implement and sustain them.

About the Center for Social Organization of Schools

Founded more than 50 years ago at Johns Hopkins University, the Center for Social Organization of Schools (CSOS), now part of the Hopkins' School of Education, concentrates its considerable research and development resources on improving low-performing schools and the education they offer their students. The Center maintains a staff of full-time sociologists, psychologists, social psychologists, and educators who conduct programmatic research to improve the education system, as well as full-time support staff engaged in developing curricula and providing technical assistance to help schools use the center's research.

Acknowledgement

This report would not have been possible without the support and partnership of the Boston Public Schools Office of Data and Accountability, particularly Monica Hogan and Elena Lanin.

Design: Canfield Design

Cover Photo: Prostock-Studio | shutterstock.com

© 2019 by the Boston Foundation. All rights reserved.

College, Career and Life Readiness:

A Look at High School Indicators of Post-Secondary Outcomes in Boston

Robert Balfanz and Vaughan Byrnes

Edited by Sandy Kendall, The Boston Foundation

March 2019



EVERYONE
GRADUATES CENTER

 **JOHNS HOPKINS**
SCHOOL of EDUCATION

FOREWORD

The Boston Opportunity Agenda has, since its inception, been focused on building a strong and seamless pipeline for students into Boston's highly competitive economy and active civic life. Over the past 10 years, it has become clear that in order to achieve our ambitious goals for high school graduation and college completion, we need to rethink how we engage students and prepare them for life and work in the 21st century. As a result, in 2017, the Boston Opportunity Agenda worked with leaders from across the K–12, higher education and workforce development fields to create a shared definition of College, Career and Life Readiness for students graduating from all schools in Boston—Boston Public Schools (BPS) as well as Boston's Catholic and charter schools.

In order to define readiness, of course, we had to get clear what we are getting our kids ready for. The group recognized that the future is increasingly characterized by its dynamism and that any singular vision narrows how we expect our graduates will live. So the group focused on the broad forces that are shaping trajectories for career, college and life and that influence the capabilities and mindset students will need to succeed in this fast-shifting environment.

With the goal of having every student graduate with the skills, competencies and experience needed to select a post-secondary path—be it college, career, social enterprise—and to experience success, the definition goes beyond traditional graduation requirements like MCAS achievement and course accumulation. Simply put, on a pathway to success graduates must be able to individually **SET A VISION** for themselves, **CHART A COURSE** to that vision, **CHANGE COURSE** as necessary, **BUILD COMPETENCE** and **WORK WITH OTHERS**. The citywide definition was published in October of 2017 and aligned with a set of initial metrics recommended by American Institutes for Research (AIR) based on a literature review.

Since that literature was primarily national in scope, the Boston Opportunity Agenda was interested to see whether the metrics would hold true for Boston students, and undertook this study to assess real outcomes against the predictive indicators. The BPS, Catholic and charter schools will all use these metrics to track student success, but only BPS has accumulated a large enough data set to validate the metrics we selected. Therefore the data used for the study is limited to the experiences of a cohort of BPS students.

Despite that data limitation, this report gives the city of Boston great insight into the strengths and weaknesses of the metrics we have selected as indicators of post-secondary success. These insights will inform changes that area high schools make to ensure students have access to the experiences—both in and out of school—that they need in order to flourish.

The Boston Opportunity Agenda fervently believes that by combining our resources, expertise and influence around a single focus, we will have a greater impact on Boston's cradle-to-career educational pipeline. That focus includes cultivating in our young people the power to find goals worth seeking, to figure out how to reach them and to navigate new situations and develop skills to surmount any barriers they encounter.

Mike Durkin
Chair, Boston Opportunity Agenda

Laura Perille
Interim Superintendent, Boston Public Schools

TABLE OF CONTENTS

- 5 PURPOSE
- 6 SUMMARY OF KEY FINDINGS
- 7 BACKGROUND RESEARCH ON PREDICTIVE INDICATORS OF SCHOOL SUCCESS
- 8 SAMPLE AND DATA
- 9 HIGH SCHOOL INDICATORS OF POST-SECONDARY ENROLLMENT AND ATTAINMENT
 - Validating a Core Set of High School Predictive Indicators of Post-Secondary Success*
 - Examining the Strength of the Indicators*
 - Distribution of On-Track to Post-Secondary Success Indicators among BPS HS Graduates*
 - Using the Predictive Indicators to Establish Strategic Points of Intervention*
 - Students Who Completed Post-Secondary without Any HS Indicators*
 - Anytime/Anywhere Learning Indicator and Senior Exit Survey Data*
 - High School Indicators for Two-Year Programs*
- 20 SUMMARY
- 23 REFERENCES
- 24 APPENDIX 1
- 28 APPENDIX 2

PURPOSE

The Boston Opportunity Agenda is a partnership among the City of Boston, Boston Public Schools, the University of Massachusetts Boston, and the city's leading public charities along with many other local foundations and philanthropists. The partnership's goal is to use its members' varied resources and expertise in a unified manner to improve the post-secondary, career, and life outcomes for all of Boston's children. With this larger goal in mind, the Boston Opportunity Agenda undertook a project in 2016 to identify and develop a set of college and career readiness indicators, for use by stakeholders in Boston's K–12 institutions to guide future policy and practice.

This project is driven by the necessity of having a post-secondary degree to achieve career success and life-long opportunities in today's knowledge economy. In Boston specifically, half of all job vacancies required at least an associate's degree, at the time of this project's undertaking. In addition, a typical bachelor's degree holder will earn \$1 million more than a high-school dropout over the course of a lifetime. With only 36.5 percent of all Boston Public Schools graduates obtaining a post-secondary credential within six years of graduating high school, there is a stark need in Boston to ensure that more of its youth achieve a post-secondary degree and the life-long opportunities that come with it. Further, of those high school graduates who do enroll in post-secondary schooling, 36 percent require at least one remedial class and only 51.3 percent obtain a credential within six years of graduating high school. These statistics suggest that even when students earn a high school diploma, many are still doing so without the skills, knowledge, and attributes necessary to achieve post-secondary success. By identifying a valid set of indicators for post-secondary success, local practitioners can determine which specific criteria their students must meet prior to completing high school in order to be prepared for post-secondary success and use those indicators to recognize which of their students are currently off-track to achieving those goals.

As the first part of this project, the American Institutes for Research (AIR) completed a literature review in 2017, identifying those metrics that prior research had determined to be the strongest indicators of post-secondary success. Based upon the results of their review, and following discussion with stakeholders at the local level, the Boston Opportunity Agenda along with Boston Public Schools were able to put forth four measures that are both strong indicators of post-secondary achievement and specific to the local context of the Boston school district and its student population. The measures include:

- maintaining an attendance rate of 94 percent or higher;
- achieving a cumulative GPA of 2.7 or higher;
- completion of an internship, job shadowing, or community service, as reported by the Boston Private Industry Council and self-reported on the Senior Exit Survey; and
- completing the Massachusetts Recommended Core Curriculum while also enrolling in at least one AP, IB, dual-enrollment or career and technical education (CTE) course.

The purpose of this current analytics project, the results of which are reported below, was to empirically validate those identified early indicators of post-secondary outcomes, based upon longitudinal data for Boston Public Schools students.

SUMMARY OF KEY FINDINGS

Key results emerging from the report's analyses include:

- The empirical data observed from BPS Class of 2010 affirm that the core indicators selected by the local stakeholders—attendance of 94 percent or higher, GPA of 2.7 or higher, and completion of the MassCore curriculum and enrollment in an AP course—are an efficient and effective set of on-track indicators for college readiness and degree attainment.
- Nearly nine of ten students to earn a post-secondary degree had at least one of the indicators, and two-thirds had two or more of the indicators. Conversely, only 15 percent of students to earn a post-secondary degree managed to do so without realizing a single one of the predictive high school indicators.
- The data shows that high school course work, both in terms of grade point average and completion of the MassCore curriculum, are key to post-secondary success. Even where students exhibit lower attendance rates, they are still able to enroll and complete post-secondary programs at above-average rates if they have at least one of the course-related indicators.
- One major caveat is that the strength of these metrics as an indicator of post-secondary success is almost entirely related to success in four-year B.A. programs, and not related to accomplishments obtained at two-year degree granting institutions. For two-year programs, a GPA of at least 2.0 and attendance of at least 90 percent might serve as the bottom line entry point for possible success in obtaining a post-secondary degree of any kind.
- While they show strong efficiency in identifying students who succeeded in post-secondary schooling, the PSAT and SAT scores for this cohort of students are less practical than other identified metrics as on-track to post-secondary success indicators. Not all students took the exams, how the exams are constructed has changed over time, and 90 percent of the students who did well on the SAT had one or more of the other on-track to post-secondary success indicators, making the information provided by the SAT largely duplicative.
- Should the “Anytime/Anywhere Learning” measure be used as an indicator, a distinction should be made between the different types of extra-curricular engagement. Students who reported engaging in volunteering or internships enrolled in and completed four-year post-secondary programs at higher rates than those who did not. However, students who reported participation in job shadowing enrolled in and completed post-secondary schooling at lower rates than the cohort average (though enrolled in two-year programs at slightly higher rates). It could be that job shadowing as extra-curricular activity is chosen by students typically preparing to enter the work force rather than continue their education, and thus makes a poor indicator of post-secondary successes.
- The distribution of the identified post-secondary success indicators among BPS graduates in the classes of 2010 and 2012 indicates several areas where effective interventions could substantially increase the percent of graduates with strong odds of post-secondary success. First, 40 percent of the high school graduates in the Class of 2010 had none of the post-secondary success indicators. Moving future graduates who are on course to graduate without any on-track to post-secondary success indicators to graduating with one or two indicators should have a substantial impact on improving post-secondary success rates. Second, there is ample room to increase the number of graduates who complete the MassCore curriculum and take one or more AP classes. This combination produces the greatest odds of completing a four-year degree but, at least among the cohorts studied, was not achieved by the majority of graduates. Finally, though not as clear cut, the evidence suggests that success in two-year institutions would likely increase as more graduates obtain at least a 2.0 GPA and attend high school at least 90 percent of the time.

BACKGROUND RESEARCH ON PREDICTIVE INDICATORS OF SCHOOL SUCCESS

Predictive indicator work is theory-driven. It seeks to find which school behaviors and experiences at one level of schooling, i.e., middle grade or high school, are predictive of later success in school, such as high school graduation or post-secondary enrollment and completion. While school success rates vary considerably by demographic groups, research has shown that demographics do not efficiently predict school success (Gleason and Dynarski, 2002). A more promising focus for developing indicators of school success relies on the theoretical construct of student engagement and experiences in school (e.g., Fredricks, Blumenfeld, & Paris, 2004).

Predictive indicators of student success are powerful tools at the K–12 level because they can potentially alert educators to students or groups of students who need some level of intervention or more robust school experience to stay on track to high school graduation or post-secondary successes. Identifying the relevant indicators is just a first step, and the step that is arguably the easiest. Indicators do no good if they are not followed up by action and further assessment to see whether the actions taken have helped to keep students on track to long-term goals. However, appropriate action depends in part on a robust set of predictive indicators that provide sufficient time to intervene. A strong indicator set has several characteristics:

1. Indicators are empirically created.

Powerful indicators are identified based on analysis of longitudinal data that tracks individual student progress over time. In essence, indicators use the experience of previous cohorts to establish that current students have high odds of being on track to a desired outcome, and to intervene when students show behaviors or patterns of experiences associated with non-desired outcomes in prior cohorts.

2. Indicators are simple and easily collected.

Predictive indicators with the greatest utility use readily available data that are typically maintained by schools—variables such as grades, attendance, and course enrollments. They do not necessarily require complex statistical modeling techniques or access to data from surveys or interviews.

3. The set of indicators has been refined to include a few key variables.

In indicator systems, a few key indicators are easier for schools to monitor than a large set of predictors. K–12 analyses have demonstrated that although the underlying issues that produced good or poor grades or strong or weak attendance may be complex and may vary from student to student, there are a small number of flags that can alert educators to a student being on track or potentially falling off-track. By extension, a good indicator system also identifies variables that are not the strongest predictors of positive and/or less than desired school success.

4. Indicators capture the majority of students who achieve desired outcomes as well as those who eventually fail to achieve them.

A good indicator system avoids the “1% problem,” or indicators that are highly predictive but only identify a small percentage of on- or off-track students.

SAMPLE AND DATA

The following analyses are based on a sample of 2,691 high school graduates from the Boston Public Schools. These students were all part of the cohort that began 8th grade in the 2005–06 school year and whose expected time of graduation would have been 2009–10. In 2005–06, 4,587 students began with the cohort as 8th graders. By January 2015, 2,691 of these students had earned a high school diploma. Thus, our sample does not include students who transferred into BPS after 8th grade and excludes students who transferred out between 8th grade and 12th grade. This was done to be able to conduct apples-to-apples comparisons of the high school experience for students who were enrolled in BPS for their entire high school education. Constructing the sample in this way is what enables us to calculate comparable GPAs, attendance rates, and course-taking patterns, among other key variables.

It is this group of high school graduates on whom our analyses focus. Knowing that the earning of a high school diploma is not enough to guarantee future success, we compare the post-secondary outcomes of these high school graduates, based on their achievement levels at the time of high school completion, to determine which criteria in terms of participation, knowledge, and curriculum are most necessary to ensure future post-secondary success.

Our outcomes focus on both post-secondary enrollment and degree completion and are further broken out between outcomes for two- and four-year degree granting institutions. Data on post-secondary outcomes came from the National Student Clearinghouse and followed students through to the end of 2017, more than seven years past their expected time of graduation. This enables us to examine the outcomes of students who both took more than four years to graduate from high school and those who did not enroll in post-secondary institutions right after high school graduation. Data on students' high school experiences were obtained from the Boston Public Schools' student information systems. Possible indicators taken from students' high school achievements include: their

attendance; grade-point average (GPA); achievement levels on the Massachusetts Comprehensive Assessment System (MCAS); completion of the Massachusetts Recommended Core Curriculum (MassCore); enrollment in AP courses and the taking of AP exams; and scores from the PSAT and SAT standardized examinations for post-secondary enrollment. While our analyses examined all of these indicators, including at varying levels of achievement, the results below focus on those specific metrics identified through the literature review conducted as the first part of this project. (Results for the additional measures can be found in Appendix 1). BPS also provided data on students' background and demographic characteristics, such as gender, ethnicity, free/reduced lunch program status, English-language-learner status, and special education status.

Supplemental data was also received from BPS for an additional 3,344 12th grade students who graduated from high school in the spring of 2012. This additional data enabled us to look at data from the BPS Senior Exit Survey administered to graduates in the Class of 2012 but not those of 2010, our earlier cohort. In particular, we were able to examine students' self-reported engagement in extra-curricular learning activities, such as internships, job shadowing, and volunteer work, and compare post-secondary outcomes for students who participated in such activities.

HIGH SCHOOL INDICATORS OF POST-SECONDARY ENROLLMENT AND ATTAINMENT

In testing sets of predictive indicators, our first step is to create descriptive tables with those metrics showing the percentage of students with each characteristic who eventually realized the given outcomes (enrolled in post-secondary or attained a post-secondary degree). We also calculate the percentage of all students with a given outcome who had that characteristic. This allows us to see which indicators are, first, associated with a high probability of realizing the chosen outcome, and second, are shared by a substantial share of students who did achieve the outcome.

By 2018, 77 percent of the high school graduates in the Class of 2010 had enrolled in a post-secondary institution, with 57 percent having enrolled in a four-year institution and 40 percent having enrolled in a two-year institution (some of the students who first enrolled in two-year institutions also later enrolled in four-year institutions). These numbers are close to national averages for the graduating Class of 2010, as reported by the National Student Clearinghouse¹, for which 74 percent of students enrolled in a post-secondary program, with 44 percent enrolling in a four-year program and 30 percent enrolling in a two-year program. The national numbers are based on enrollment within the first two years after high school graduation, as compared to the seven years for our study sample, and thus would likely be a bit higher than they are with an equal time period of observation. In terms of post-secondary completion, 39 percent of the students in our sample of BPS data for the Class of 2010 managed to earn a post-secondary degree, with 35 percent earning a degree from a four-year institution but only 6 percent earning a degree from a two-year program. These numbers are also comparable to national averages, for which 41 percent of high school graduates in the Class of 2010 completed a post-secondary degree, 33 percent from a four-year degree granting institution and only 8 percent from a two-year institution. For post-secondary completion, the national rates are based upon six years after the expected time of high school graduation.

Validating a Core Set of High School Predictive Indicators of Post-Secondary Success

Table I categorizes students by the on-track to post-secondary success indicators selected by the Boston Opportunity Agenda and Boston Public Schools, showing the percentage of each group who had enrolled in a post-secondary institution, as well as the percentage to earn a degree. For each of the selected indicators, students who accomplished them also enrolled in and completed post-secondary schooling at higher rates than the cohort average. In general, 90 percent of students with these indicators enrolled in post-secondary schooling, and roughly 50–60 percent earned a degree. Conversely, the indicators were also shared by the majority of those students who did attain a post-secondary degree. This suggests that, not only are students with those indicators more likely to succeed in post-secondary schooling, but that in most cases students did not succeed without them, and that they are therefore closely tied to possessing the skills and knowledge necessary for post-secondary success. The exceptions to this are completion of the MassCore curriculum and achieving a score of three or higher on an Advanced Placement exam. Most students in the cohort did not accomplish these academic bars, and thus they are not characteristics shared by most of those graduates who went on to succeed in post-secondary schooling. However, 79 percent of students who did complete the MassCore and take an AP course completed post-secondary and this was the highest overall completion rate for any indicator. This suggests that this is an area where there is both room for improvement and where there are strong odds that improvements would lead to higher rates of post-secondary completion. Moreover, since simply taking an AP course or an AP exam is nearly as strong at predicting post-secondary success as is achieving a “qualifying” score on an AP exam, and given that far more students in the cohort had taken AP courses or an AP exam, the specific score of a student’s AP exam is not as effective an indicator as AP course taking. Thus, it seems that a good goal

1. <https://nscresearchcenter.org/ourreports/>

in seeking to increase post-secondary attainment would be to increase the number of students taking the MassCore and enrolling in AP courses.

The literature review on early indicators of college and career readiness previously completed by AIR also highlighted PSAT and SAT exam taking as potential indicators. These measures are examined in the supplemental analyses presented in **Appendix I**. While they show strong efficiency in identifying students who

succeeded in post-secondary schooling, the PSAT and SAT data for this cohort of students are based on prior versions of the exams, which have since been modified. Future analysis with more current SAT and PSAT data should re-evaluate them. However, the empirical data taken from BPS students reaffirm that the core indicators selected by the local stakeholders—attendance of 94 percent or higher, GPA of 2.7 or higher, and completion of the MassCore and enrollment in an AP course—are an efficient and effective set of indicators.

Table 1: Post-Secondary Enrollment and Completion Rates by Predictive Indicator

Characteristic	Numbers of Students with Characteristic	% Who Enrolled in PS	% of Total Students to Enroll in PS	% Who Completed PS	% of Total Students to Complete PS
ALL POST-SECONDARY INSTITUTIONS					
Attendance \geq 94%	1,238	87%	53%	58%	68%
GPA \geq 2.7	1,163	88%	50%	65%	72%
MassCore	716	90%	32%	66%	45%
AP Course	1,208	90%	52%	62%	71%
AP Exam	1,148	91%	51%	65%	70%
AP Exam Score \geq 3	512	94%	23%	78%	38%
MassCore + AP	463	92%	21%	79%	35%
Entire Cohort	2,691	77%	100%	39%	100%
TWO-YEAR DEGREE GRANTING INSTITUTIONS					
Attendance \geq 94%	1,238	33%	38%	7%	48%
GPA \geq 2.7	1,163	26%	29%	5%	37%
MassCore	716	26%	18%	4%	18%
AP Course	1,208	30%	33%	6%	40%
AP Exam	1,148	28%	31%	6%	39%
AP Exam Score \geq 3	512	14%	7%	2%	6%
MassCore + AP	463	15%	7%	3%	8%
Entire Cohort	2,691	40%	100%	6%	100%
FOUR-YEAR DEGREE GRANTING INSTITUTIONS					
Attendance \geq 94%	1,238	75%	61%	53%	71%
GPA \geq 2.7	1,163	81%	63%	61%	77%
MassCore	716	82%	39%	63%	49%
AP Course	1,208	81%	64%	58%	75%
AP Exam	1,148	84%	63%	60%	74%
AP Exam Score \geq 3	512	92%	31%	77%	43%
MassCore + AP	463	90%	28%	77%	39%
Entire Cohort	2,691	57%	100%	35%	100%

One major caveat is that the strength of these metrics as an indicator of post-secondary success is almost entirely related to success in four-year degree granting institutions, and not related to accomplishments obtained at two-year degree granting institutions. When breaking out the results by institution type, we see that for students with the on-track indicators, enrollment and attainment rates in two-year programs were actually lower than the average of all students from their graduating class put together. In addition, the majority of students who enrolled in and completed two-year programs did so without having reached these levels of academic achievement in high school.

Examining the Strength of the Indicators

Next, the selected academic indicators, along with student demographics, are used in logistic regression models to determine the power of each measure in determining a student's *odds of realizing the given outcome*. The demographic measures are included as control measures, to see how predictive the academic measures are regardless of student demographic characteristics. **Table 2**, below, presents the results of three separate series of logistic regression models. In the first set, the selected indicators were used each on their own, without

demographic controls, to predict students' post-secondary outcomes and determine the raw power of each indicator. In the second set of models, each indicator was modeled separately, but along with the demographic controls, to see their power when controlling for other background factors. The third and last set of models included all three indicators at the same time, along with the demographic controls to see their combined power as a set.

In the table, for each effect, the odds-ratio presented can be interpreted as the odds of enrolling/attaining for a student with that characteristic, as compared to odds of 1.0 for students without that characteristic. Odds above 1.0 represent greater likelihood of the event occurring, and odds below 1.0 mean it is less likely. Taking the first result from the table, students whose high school attendance rates were 94 percent or higher roughly were three times more likely to enroll in post-secondary schooling than were students with attendance rates under 94 percent (3.2 vs. 1.0), without controlling for any other factors. Or put another way, students with attendance rates of 94 percent or higher were 220 percent more likely to enroll in post-secondary schooling ($3.2 - 1.0 * 100$).

Without controlling for students' backgrounds, students with high attendance were roughly three times more likely to enroll in post-secondary and four times more likely to earn a degree.

Table 2: Logistic Regression Results

	Enrolled PS	Completed PS	Enrolled 2-Year	Completed 2-Year	Enrolled 4-Year	Completed 4-year
INDEPENDENT EFFECTS WITH NO CONTROLS						
Attendance >= 94%	3.2***	4.3***	0.6***	1.1	4.1***	4.9***
GPA >= 2.7	3.4***	7.4***	0.3***	0.7*	7.1***	9.0***
MassCore + AP	4.0***	8.1***	0.2***	0.4***	9.4***	9.7***
INDEPENDENT EFFECTS CONTROLLING FOR STUDENT DEMOGRAPHICS						
Attendance >= 94%	2.8***	3.6***	0.7***	1.3	3.5***	3.9***
GPA >= 2.7	2.7***	5.4***	0.4***	0.8	5.7***	6.7***
MassCore + AP	2.6***	4.3***	0.3***	0.5*	5.0***	4.8***
COMBINED EFFECTS CONTROLLING FOR STUDENT DEMOGRAPHICS						
Attendance >= 94%	2.0***	2.1***	1.1	1.6*	1.9***	2.1***
GPA >= 2.7	1.8***	3.6***	0.4***	0.7	3.8***	4.3***
MassCore + AP	1.7*	2.4***	0.4***	0.5	2.6***	2.6***

Students' demographics include gender, ethnicity, English language learner status, special education status, and free/reduced lunch program status; * significant at $p < .05$ level; ** $p < .01$; *** $p < .001$

Students with high GPAs were also three times more likely to enroll in post-secondary than were students with low GPAs, and they were seven times more likely to complete a degree. Students who completed the MassCore curriculum as well as an AP course were four times more likely to enroll, and eight times more likely to finish. When controlling for students' demographic characteristics, the effects of the three indicators were more equivalent, with each making a student roughly three times more likely to enroll in a post-secondary program and four to five times more likely to attain a degree. While the addition of the demographic characteristics lowered the strength of the relationships somewhat, each of the three indicators was still a strong and statistically significant predictor of future post-secondary outcomes, even after having controlled for students' particular backgrounds.

The combination of the three indicators together in the last series of models served to weaken them further individually, but this is to be expected given that the three metrics (attendance, GPA, course completion) are highly correlated to each other and therefore overlap in their relationships to student outcomes. Overall, the model including both demographics and the selected indicators explains only 10–15 percent of the variation in post-secondary enrollment between students, but correctly predicts the outcome for 78.2 percent of students in our sample. For post-secondary attainment, the full model explains only 28–38 percent of the variation between students, and correctly predicts the outcome for 76.4 percent of students.

When breaking out the model results by institution type, we again see a drastic difference in the relationship between the indicators to post-secondary outcomes for four-year degree granting institutions versus those for two-year institutions. While the indicators were positive and statistically significant predictors of outcomes for four-year programs, they have either no relationship to outcomes for two-year programs or, in some cases, have significantly negative relationships. Thus, while attendance of 94 percent or higher, GPAs of 2.7 or higher, and completion of the MassCore and an AP course are strongly related to enrolling in and completing a four-year post-secondary program, they were not fundamentals for students to pursue or complete two-year degrees.

Distribution of On-Track to Post-Secondary Success Indicators among BPS HS Graduates

That there is utility in using these academic indicators to measure whether students are on track to post-secondary goals can be seen in **Table 3**. For each of the three selected indicators, the table shows the share of all students in the cohort with that indicator, along with the share of post-secondary enrollees and graduates with those indicators. The table also presents the percentages of all students, post-secondary enrollees, and post-secondary graduates with different numbers of the combined indicators.

While roughly half the students in the entire cohort had attendance rates of 94 percent or higher and GPAs of 2.7 or higher, about two-thirds to three-quarters of students who completed a post-secondary degree had these indicators. Completion of the MassCore curriculum and at least one AP course was about twice as common among students with a post-secondary degree as it was among the cohort as a whole. Taken as a set, two-thirds of students who enrolled in post-secondary schooling had achieved at least one of the three indicators.

Nearly nine of ten students to earn a post-secondary degree had at least one or more of the indicators, and two-thirds had two or more of the indicators. Conversely, only 15 percent of students to earn a post-secondary degree managed to do so without realizing a single one of the high school indicators.

Table 4 shows the post-secondary enrollment and attainment rates for students with different numbers of indicators. More than half of students with at least one of the identified indicators succeeded in earning a post-secondary degree. **For students with two or more of the indicators, 91 percent enrolled in post-secondary schooling and more than two-thirds attained a degree. However, for students with none of the indicators, only 15 percent managed to complete post-secondary schooling.**

Using the Predictive Indicators to Establish Strategic Points of Intervention

From the practical perspective of using the above indicators to establish an early warning system—with the ability to identify those students least on-track to complete post-secondary schooling of some kind, absent effective intervention—targeting students who exhibit none of the selected indicators seems

Table 3: Distribution of Students with On-Track to Post-Secondary Indicators

	% of All Students (N=2,691) with...	% of PS Enrolled (N=2,071)	% of PS Completed (N=1,059)	% of 2-Year Enrolled (N=1,066)	% of 2-Year Completed (N=171)	% of 4-Year Enrolled (N=1,516)	% of 4-Year Completed (N=929)
DATA ON EACH INDICATOR							
Attendance >= 94%	47%	53%	68%	39%	48%	61%	71%
GPA >= 2.7	44%	50%	72%	29%	37%	63%	77%
MassCore + AP	18%	44%	35%	7%	8%	28%	39%
NUMBER OF INDICATORS							
0 Indicators	40%	33%	15%	50%	42%	22%	12%
1 Indicators	25%	26%	22%	29%	27%	26%	21%
2 Indicators	23%	26%	37%	17%	30%	32%	38%
3 Indicators	12%	15%	26%	3%	2%	20%	29%
1 or more	60%	67%	85%	50%	58%	78%	88%
2 or more	35%	41%	63%	20%	32%	52%	67%

Table 4: Outcomes, by Number of Indicators

	% PS Enroll	% PS Complete	% 2-Year Enroll	% 2-Year Complete	% 4-Year Enroll	% 4-Year Complete
0 Indicators	63%	15%	49%	7%	31%	10%
1 Indicator	80%	34%	46%	7%	58%	29%
2 Indicators	89%	64%	31%	8%	81%	58%
3 Indicators	93%	84%	10%	1%	93%	84%
1 or more	86%	56%	33%	6%	74%	51%
2 or more	91%	71%	23%	6%	85%	67%

feasible and practical. Of the 2,691 students in the cohort of graduates, 1,083 displayed none of the indicators and just 15 percent of these students successfully completed a post-secondary degree. Considering that nearly two-thirds of them did enroll in a post-secondary program, it shows that there remains a lot of room for improvement as they are enrolling in post-secondary schooling but just not succeeding. In addition, this group represents just over a third of the entire cohort (40%), while capturing over half (56%) of all the students who failed to earn a post-secondary degree. Taken in combination, these two

points mean that any programs targeting such students would have caught the correct students in at least four of five cases, while at the same time addressing the majority of students in the cohort who failed to achieve post-secondary success, thus wasting relatively little of any implemented resources/personnel and making a substantial impact on the overall problem. The analysis also reveals a somewhat larger set of students needing moderate interventions—those with a single indicator.

Table 5: Outcomes, by Combinations of Indicators

	% PS Enroll	% PS Complete	% 2-Year Enroll	% 2-Year Complete	% 4-Year Enroll	% 4-Year Complete
High Attendance High GPA MassCore/AP (N=324)	93%	84%	10%	1%	93%	84%
High Attendance High GPA No MassCore/AP (N=472)	88%	63%	31%	8%	79%	56%
High Attendance Low GPA MassCore/AP (N=44)	91%	66%	32%	16%	86%	59%
High Attendance Low GPA No MassCore/AP (N=332)	79%	27%	56%	8%	49%	21%
Low Attendance High GPA MassCore/AP (N=69)	90%	75%	22%	3%	87%	72%
Low Attendance High GPA No MassCore/AP (N=265)	81%	43%	36%	5%	69%	38%
Low Attendance Low GPA MassCore/AP (N=25)	88%	40%	44%	4%	72%	36%
Low Attendance Low GPA No MassCore/AP (N=996)	65%	16%	51%	7%	32%	11%
Cohort Average (N=2,691)	77%	39%	40%	6%	57%	35%

Table 5, above, displays post-secondary enrollment and attainment outcomes for students with varying combinations of the high school academic indicators. In a sense, the table presents the trade-offs in values of realizing one indicator versus another. The table shows that course work, both in terms of grade point average and completion of the MassCore curriculum, is key to post-secondary success. Even where students exhibit

lower attendance rates, they are still able to enroll in and complete post-secondary programs at above average rates if they have at least one of the course-related indicators. It is only in those cases where students are missing both the course-related indicators that they experience post-secondary outcomes at rates lower than the cohort average.

Students Who Completed Post-Secondary without Any HS Indicators

Table 6, below, looks more closely at those students who managed to earn a post-secondary degree despite exhibiting none of the three predictive indicators in high school. The table compares descriptive statistics for students with none of the indicators who earned a degree, and those with no indicators who failed to earn a degree, in order to contrast the two groups and highlight any possible differences. The table further compares to two additional groups—those students with all three of the high school indicators, and the cohort as a whole.

While the data available for analysis are limited, there do seem to be some general differences between those students with

none of the indicators who earn a post-secondary degree and those who do not, as well as those with predictive indicators who obtained degrees. Of the 164 high school graduates from the Class of 2010 who earned a post-secondary degree without having a high school predictive indicator of post-secondary success, 71 (or nearly half) earned a two-year associate's degree.

Thus, the first thing that stands out about this group is that in contrast to students with one or more of the predictive indicators they had a much higher rate of obtaining two-year degrees. Even so, the majority of students who earned a post-secondary degree without having high school attendance of 94 percent or higher, a GPA of 2.7 or greater, or taking the MassCore and one AP class obtained a four-year B.A. degree. When compared with students who did not earn post-secondary

Table 6: Descriptive Statistics for HS Graduates with None of the Post-Secondary Indicators

	No Indicators but Earned a PS Degree (N=164)	No Indicators and No PS Degree (N=919)	Students with all PS Indicators (N=324)	Total Cohort (N=2,691)
% Female	60%	48%	59%	53%
% FRL	68%	76%	42%	66%
% Spec. Ed.	8%	23%	1%	14%
% ELL	6%	7%	0%	6%
% Asian	5%	3%	39%	12%
% Black	41%	55%	15%	43%
% Hispanic	40%	33%	8%	29%
% Other	0%	<1%	2%	1%
% White	13%	9%	37%	16%
Average GPA	2.0	1.6	3.8	2.6
Average Attendance Rate	88%	85%	97%	91%
% Proficient 10th Grade MCAS ELA	70%	44%	97%	66%
% Proficient 10th Grade MCAS Math	65%	45%	98%	68%
% with AP Course	31%	14%	100%	45%
% with AP Exam	21%	10%	17%	22%
% taking PSAT	88%	81%	98%	89%
% taking SAT	68%	46%	98%	71%
% with MassCore	8%	7%	100%	28%
% with MassCore + AP	0%	0%	100%	18%

degrees though, students who succeed in post-secondary without any predictive indicators had modestly higher GPAs and rates of attendance and were much more likely to score proficient on 10th grade MCAS tests. Therefore, while those who did not earn a degree struggle in almost every academic aspect, those students who beat the odds and earned a degree more closely resemble the cohort average both academically and demographically. A better understanding of how such students manage to complete post-secondary schooling despite only modest success in high school likely requires a more detailed and qualitative analysis of such students, taking a closer look at their backgrounds and socio-emotional characteristics.

Anytime/Anywhere Learning Indicator and Senior Exit Survey Data

Using the supplemental data for 2012 high school graduates, we were able to look at the possibility of establishing an additional

post-secondary success indicator by looking at post-secondary outcomes for students who completed an internship, job shadowing, or community service, as self-reported on the BPS Senior Exit Survey. These are the variables local stakeholders concurred might be able to capture the value of Anytime/Anywhere Learning for post-secondary success. **Table 7** shows the post-secondary enrollment and completion rates for the Class of 2012 broken out by their responses on the survey to a question regarding extra-curricular learning. Overall, the post-secondary enrollment and completion rates for the Class of 2012 are almost identical to those for the Class of 2010 (given a few percentage points lower, corresponding to the two fewer years the cohort has had to achieve the outcomes).

Students who were engaged in Anytime/Anywhere Learning did enroll in and complete post-secondary programs at higher rates than the cohort average. Of students who reported being engaged in job shadowing, an internship, or volunteering,

Table 7: Outcomes, by Anytime/Anywhere Learning

Characteristic	Numbers of Students with Characteristic	% Who Enrolled in PS	% of Total Students to Enroll in PS	% Who Completed PS	% of Total Students to Complete PS
ALL POST-SECONDARY INSTITUTIONS					
Job Shadowing	322	72%	9%	24%	7%
Internship	595	86%	20%	41%	21%
Volunteer	1,538	84%	51%	46%	62%
Any of the Three	2,455	83%	79%	42%	90%
Class of 2012	3,344	77%	100%	34%	100%
TWO-YEAR DEGREE GRANTING INSTITUTIONS					
Job Shadowing	322	48%	12%	6%	13%
Internship	595	37%	18%	4%	14%
Volunteer	1,538	33%	41%	5%	49%
Any of the Three	2,455	36%	71%	5%	76%
Class of 2012	3,344	38%	100%	4%	100%
FOUR-YEAR DEGREE GRANTING INSTITUTIONS					
Job Shadowing	322	45%	8%	19%	6%
Internship	595	66%	21%	38%	22%
Volunteer	1,538	68%	57%	42%	64%
Any of the Three	2,455	65%	86%	38%	92%
Class of 2012	3,344	55%	100%	30%	100%

83 percent enrolled in post-secondary schooling and 42 percent of the total completed a degree. However, the distinction is not as strong as for students with the other high school indicators. In comparison, students with attendance of 94 percent or higher, GPAs of 2.7 or higher, and students who completed the MassCore curriculum as well as an AP course typically enrolled at rates of 90 percent and two-thirds managed to earn a degree.

Should the Anytime/Anywhere Learning measure be used as an indicator by BPS, a distinction might be made between the different types of extra-curricular engagement. When breaking out student responses for the three different types of activities, we see that students who reported participating in job shadowing actually enrolled in and completed post-secondary schooling at lower rates than the cohort average (but enrolled in two-year programs at slightly higher rates). It could be that job shadowing as an extra-curricular activity is engaged in typically by students preparing to enter the work force as opposed to planning to continue their education, and thus is a poor indicator of post-secondary successes. Students who reported involvement in either internships or volunteering experienced similar post-secondary enrollment and completion rates, though many more students in the cohort were engaged in volunteering than internships. A future Anytime/Anywhere Learning indicator may best rely only on engagement in these two activities. Moreover, there is also an unresolved issue. It cannot be determined from the data available whether the experience of volunteering and interning develops skills not captured by the other predictive indicators but valuable in succeeding in post-secondary institutions, or whether the students who participate in these activities are those enrolling in competitive colleges, which both seek out such participation and tend to have higher completion rates.

In examining the other items on the Senior Exit Survey, the only significant differences between students who attended post-secondary schooling and those who did not, in terms of their high school experiences, was their participation and involvement in extra-curricular activities. Otherwise, students reported remarkably similar experiences as to how they perceived the quality of their high school instruction, regardless of their post-secondary outcomes. Similarly, in terms of school climate, graduates reported highly similar opinions of their schools and its value in their lives, regardless of whether they attended no post-secondary schooling, enrolled in a two-year program, or enrolled in a four-year program. That students had such similar responses

on almost all survey items, no matter their post-high school destination, also suggests that the Senior Exit Survey items would not be very predictive of post-secondary outcomes.

High School Indicators for Two-Year Programs

Since the on-track to post-secondary success indicators that worked very well for four-year degrees did not work for two-year degrees, we attempted to see whether a separate set of indicators could be found that would be predictive of earning two-year degrees. With the data on hand, seen in **Table 8**, we were not very successful. Perhaps a GPA of at least 2.0 and attendance of at least 90 percent could serve as the bottom line entry point for possible success in obtaining a post-secondary degree. This is the threshold that was also almost achieved by those students who did not have any on-track indicators to a four-year degree but did manage to receive a post-secondary degree.

One reason why it is difficult to establish predictive indicators of post-secondary success in two-year degree programs is that, overall, the success rate of BPS students from the Class of 2010 who enrolled in these programs was very low. This is an important finding, itself. Forty percent of the high school graduates in the cohort enrolled in a two-year program, but only 6 percent of the cohort earned a two-year diploma. This means that just 15 percent of the BPS high school graduates who enrolled in a two-year degree program attained a diploma from a two-year institution. One possible explanation was that such students only enrolled in two-year institution in order to build up their marks before then transferring to a four-year program. However, the data from our sample does not support this hypothesis. Of those students who first enrolled in a two-year program, later enrollment in a four-year program was higher for students who completed the two-year program (63%) than for those who failed to earn the two-year degree (46%). Of those students who did enroll in a two-year college, only 16 percent of them completed a post-secondary degree of any kind (two-year or four-year). Given that the national rates of enrollment and completion for two-year programs were similar (30% and 8%, respectively) for the same cohort, this question is a larger one, beyond Boston Public Schools alone, and one that would require further and more specific exploration to answer.

Table 8: Two-Year College Outcomes, by GPA and Attendance Categories

GPA Categories	Enrolled in 2-Year Program	Completed 2-Year Program	Attendance Categories	Enrolled in 2-Year Program	Completed 2-Year Program
0.0 – 0.99	47%	2%	<80%	47%	4%
1.0 – 1.49	48%	5%	80 – 84.9%	43%	7%
1.5 – 1.99	53%	5%	85 – 89.9%	46%	7%
2.0 – 2.49	53%	11%	90 – 93.9%	46%	6%
2.5 – 2.99	40%	8%	94 – 96.9%	34%	6%
3.0 – 3.49	30%	6%	97 – 100%	31%	8%
3.5 – 3.99	23%	5%			
4.0 – 5.00	15%	3%			
Cohort Average	40%	6%	Cohort Average	40%	6%

Table 9 might provide some direction for this analysis. It shows the descriptive statistics for those 171 BPS high school graduates in the Class of 2010 who enrolled in and completed a degree at a two-year college. A few outcomes stand out. First, two-year degree completers are more female than male by a ratio of 2 to 1. Second, they are much more likely than four-year degree completers to be Black or Hispanic. Three fourths of the two-year degree graduates attended high school at least 90 percent of the time but a quarter of the two-year graduates were chronically absent during high school. Two thirds of them scored proficient on 10th grade MCAS, with 40 percent enrolling in an AP course. What varied greatly was their GPAs. Roughly a quarter had high GPAs of 3.0 or greater, but an almost equal number had low GPAs of less than 2.0 (with 50 percent having GPAs between 2.0 and 2.9). This indicates that most attended school often enough, and had at least one measure of some academic strength—be it GPA, or 10th grade MCAS, or taking an AP course—even if their overall high school record also indicated areas and periods of struggle.

Table 9: Descriptive Statistics for Students Who Completed a Degree at a Two-Year College

Female	67%
Male	33%
FRL	74%
Not FRL	26%
Spec. Ed.	15%
Not Spec. Ed.	85%
ELL	11%
Not ELL	89%
Asian	6%
Black	44%
Hispanic	41%
Other	1%
White	9%
Att <80%	5%
Att >=80% & <85%	8%
Att >=85% & <90%	15%
Att >=90% & <95%	32%
Att >=95%	41%
GPA < 2.0	23%
GPA >=2.0 & <2.5	29%
GPA >=2.5 & <3.0	21%
GPA >=3.0 & <3.5	14%
GPA >=3.5	13%
Completed MassCore	18%
Did Not Complete MassCore	82%
Completed AP course	40%
Did Not Complete AP course	60%
Completed MassCore + AP Course	8%
Did Not Complete MassCore + AP Course	92%
Proficient on 10th Grade MCAS ELA	62%
Not Proficient on 10th Grade MCAS ELA	38%
Proficient on 10th Grade MCAS Math	62%
Not Proficient on 10th Grade MCAS Math	38%

SUMMARY

To achieve career success in today's job market, most students will require at least some level of post-secondary schooling. A high school diploma alone is no longer enough to open the door to most career and life-long opportunities. In order to support the future success of students coming through Boston Public Schools as well as Boston's Catholic and charter schools, the Boston Opportunity Agenda, a partnership among the key stakeholders in the City of Boston's education system, undertook an effort to identify and develop a set of college and career readiness indicators for use in Boston's K–12 institutions. The expectation is that those indicators can be used to identify students who are not on track to achieve post-secondary success, in order to intervene with them at a time-point in their high school education that is early enough to get them back on track.

This report with its findings about indicators and outcomes is intended to support implementation of the College, Career and Life Readiness framework. Together, they can guide all schools as they adapt and redesign operations, curriculum, and learning opportunities so that higher proportions of Boston students can graduate from high school prepared to enroll in and complete a meaningful post-secondary credential.

Beginning with a literature review of prior research on early warning indicators conducted by the American Institutes for Research (AIR), and following further discussion with stakeholders at the local level, the Boston Opportunity Agenda identified four measures deemed to be both strong indicators of post-secondary achievement and specific to the local Boston context. The measures include:

- maintaining an attendance rate of 94 percent or higher;
- achieving a cumulative GPA of 2.7 or higher;
- completing an internship, job shadowing, or community service, as reported by the Boston Private Industry Council and self-reported on the Senior Exit Survey; and
- completing the Massachusetts Recommended Core Curriculum (MassCore) while also enrolling in at least one AP, IB, dual-enrollment, or career and technical education (CTE) course.

The Everyone Graduates Center at Johns Hopkins University used two longitudinal samples of data for the high school graduates of 2010 and 2012, respectively, to empirically test and validate the strength and reliability of those indicators in terms of predicting students' future post-secondary outcomes.

The data from the BPS Class of 2010 affirmed that three of the core indicators selected by the local stakeholders—attendance of 94 percent or higher, GPA of 2.7 or higher, and completion of the MassCore and enrollment in an AP course—are efficient and effective indicators for college readiness. Nearly nine of ten students to earn a post-secondary degree had at least one or more of the indicators, and two-thirds had two or more of the indicators. Conversely, only 15 percent of students to earn a post-secondary degree managed to do so without realizing a single one of the high school indicators. Analysis showed that of all the indicators, the two course work–based metrics (grade point average and completion of the MassCore curriculum) best

foretell post-secondary success. Even where students exhibit lower attendance rates, they are still able to enroll and complete post-secondary programs at above average rates if they have at least one of the course-related indicators.

The analyses in this report did evaluate other measures as potential indicators (Appendix I); however, none proved to be stronger and more practically useful predictors than those four measures. This is even true for PSAT and SAT scores. Both, in themselves, are predictive of post-secondary success. However, many students did not have one or the other score, and the test itself is only taken at one point in time, limiting its utility in measuring changes in on-track status for students. Finally, the higher the SAT or PSAT score, the more predictive it was, but also the more likely that students had one or more of the other predictive indicators. Ninety percent of students with SAT sub-scores of 500 or higher had one or more of the other selected high school predictive indicators of post-secondary success, making the information provided by the SAT redundant.

Data from the BPS Class of 2012, specifically graduates' responses on the Senior Exit Survey, allowed us to test the fourth selected indicator: students' participation in an internship, job shadowing, or volunteering. Results showed that, overall, the Anytime/Anywhere Learning indicator is a modest predictor of post-secondary outcomes. The results also showed that a distinction should be made between the different types of extra-curricular engagement. Students who reported engaging in volunteering or internships enrolled in and completed four-year post-secondary programs at high rates. However, students who reported participation in job shadowing enrolled in and completed post-secondary schooling at lower rates than the cohort average (but enrolled in two-year programs at slightly higher rates). It could be that job shadowing as an activity is engaged in typically by students who are planning to enter the work force rather than by those preparing to continue their education, and thus makes a poor indicator of post-secondary success. It also remains unknown whether it is the benefits of participating in volunteering and internships that result in higher post-secondary outcomes or whether the relationship is driven by other characteristics of students who seek out these opportunities, or the post-secondary institutions that value them.

In examining the other items on the Senior Exit Survey, graduates reported remarkably similar experiences as to how they perceived the quality of their high school instruction

and school climate, regardless of whether they attended no post-secondary schooling, enrolled in a two-year program, or enrolled in a four-year program. That students had such similar responses on almost all survey items, no matter their post-secondary outcomes, suggests that the remaining Senior Exit Survey items would be of limited value in predicting post-secondary outcomes.

The distinction between results for two-year programs and those for four-year programs prompts a caveat applicable across all of the report's findings. In general, the strength of these metrics as an indicator of post-secondary success is almost entirely related to success in four-year programs, and not related to accomplishments obtained at two-year degree granting institutions. The four selected indicators, as well as other sets of indicators, were ineffective at predicting post-secondary outcomes for two-year programs. As a starting point, a GPA of at least 2.0 or success on a measure of academic skill and attendance of at least 90 percent might serve as the bottom line entry point for possible success in obtaining a post-secondary degree of any kind. However, further research into two-year programs—both what drives students toward them and what enables success therein—remains an area for future research. Of specific interest is that while 40 percent of high school graduates in the cohort enrolled in a two-year program, only 6 percent of the BPS high school graduates from the Class of 2010 earned a two-year diploma. Given that the national rates of enrollment and completion for two-year programs were similar (30% and 8%, respectively) for the same cohort, this question is a larger one, beyond Boston Public Schools alone, that would require further and more specific exploration to answer.

Another question that remains unanswered, and that could merit further and more specific examination, is how some students manage to complete post-secondary schooling despite struggling through high school. That some students manage to succeed in post-secondary without any of the selected high school indicators shows it is possible to beat the odds. An understanding of how this occurs, however, requires a more detailed and qualitative analysis of such students, including taking a closer look at their backgrounds and socio-emotional characteristics.

Finally, the validation of a succinct set of on-track indicators to college readiness and attainment, and measurement of their frequency among BPS high school graduates, points to some

places where interventions are likely to increase the number of high school graduates with strong odds of success in four-year degree granting post-secondary institutions. They include:

- a.** Helping students who are on course to graduate with no predictive indicator of post-secondary success to gain one or two, as well as helping those with one to gain a second.
- b.** Increasing the number of students who complete the MassCore and take at least one AP class.

Though not quite as clear-cut, the available evidence also indicates that success in two-year institutions could be increased if students achieve at least a 90 percent attendance rate, and a GPA of 2.0 or above.

In Boston, half of all job vacancies required at least an associate's

degree at the time of this project's undertaking. Yet only 36.5 percent of all Boston Public Schools graduates are obtaining a post-secondary credential within six years of graduating from high school. The gap between current outcomes and known needs, combined with the importance of having a post-secondary degree to achieve career success in today's knowledge economy, is what drives the Boston Opportunity Agenda. This report helps identify where strategic opportunities exist to close the post-secondary preparation gap in Boston, and where more learning is needed. Both are urgently warranted by the stark need in Boston to ensure that more of its youth achieve a post-secondary degree and the life-long opportunities and benefits that come with it.

REFERENCES

- Allensworth, E. & Easton, J. (2007). *What matters for staying on-track and graduating in Chicago public high schools*. Chicago: Consortium on Chicago School Research.
- Balfanz, R. & Legters, N. (2004). *Locating the dropout crisis*. CRESPAR Report #70. Baltimore, MD, and Washington, DC: Center for Research on the Education of Students Placed at Risk.
- Bryk, A.S. & Raudenbush, S.W. (1992). *Hierarchical Linear Models*. Newbury Park, CA: Sage Publications, Inc.
- Finn, J.D. (1989). Withdrawing from school. *Review of Educational Research*, 59, 117–142.
- Fredricks, J.A., Blumenfeld, P.C. & Paris, A.H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74, 59–109.
- Gleason, P. & Dynarski, M. (2002). Do we know whom to serve? Issues in using risk factors to identify dropouts. *Journal of Education for Students Placed at Risk*, 7, 25–41.
- Lan, W. & Lanthier, R. (2003). Changes in students' academic performance and perceptions of school and self before dropping out of schools. *Journal of Education for Students Placed at Risk*, 8(3), 309–332.
- Lee, V.E. & Burkam, D.T. (2003). Dropping out of high school: The role of school organization and structure. *American Journal of Education*, 100, 420–453.
- Mac Iver, M.A., Balfanz, R. & Byrnes, V. (2009). *Advancing the "Colorado Graduates" agenda: Understanding the dropout problem and mobilizing to meet the graduation challenge*. Denver, CO: Colorado Children's Campaign.
- Neild, R.C. & Balfanz, R. (2006a). An extreme degree of difficulty: The educational demographics of urban neighborhood high schools. *Journal of Education for Students Placed at Risk*, 11, 131–141.
- Neild, R.C. & Balfanz, R. (2006b). *Unfulfilled promise: The dimensions and characteristics of Philadelphia's dropout crisis, 2000–2005*. Philadelphia, PA: Philadelphia Youth Transitions Collaborative.
- Neild, R.C. (2009). Falling off track during the transition to high school: What we know and what can be done. *The Future of Children* 19, 53–76.
- Roderick, M. & Camburn, E. (1999). Risk and recovery from course failure in the early years of high school. *American Educational Research Journal*, 36, 303–344.
- Rumberger, R. & Lim, S. (2008). *Why students drop out of school: A review of 25 years of research*. California Dropout Research Project Report #15. Santa Barbara, CA: California Dropout Research Project.
- Schargel, F. & Smink, J. (2001). *Strategies to Help Solve Our School Dropout Problem*. Larchmont, NY: Eye on Education.
- Snijders, T.A.B. & Bosker, R.J. (1999). *Multilevel Analysis*. Thousand Oaks, CA: Sage Publications, Inc.
- Wehlage, G., Rutter, R., Smith, G., Lesko, N. & Fernandez, R. (1989). *Reducing the Risk: Schools as Communities of Support*. New York: Falmer Press.
- Welch, M.J., Aseel, A. & Therriault, S.B. (2017). *Initial Recommendations for Student, School, and System Indicators: Tracking College and Career Readiness in Boston*. Washington, DC: American Institutes for Research.

ADDITIONAL PREDICTIVE INDICATORS EXAMINED

The tables below present results similar to those from Table I in the above report, for other indicator measures that were tested, based upon all student level data that was available for analysis. Some of these measures, such as GPA and attendance, are similar to those measures examined more closely in the report, but with different cut-off levels that were not as powerful in identifying those students who experienced success in post-secondary schooling. Other measures are based entirely upon different types of student data, primarily test scores.

While students' PSAT and SAT scores both appear to be efficient at predicting post-secondary outcomes, a practical problem is that both tests have undergone substantial scoring changes between now and the time in which our cohort of graduates took the tests (primarily in 2007 to 2010). At the time of our observed data, the PSAT included three sections, but has since been reduced to two as writing and reading have been combined, and the scales of the test scores have also undergone a change. In the table below, we use the National Merit Scholarship Corporation (NMSC) selection index scores from the PSAT. While the scales for the NMSC scores have also undergone a shift, they remain on a somewhat similar range and so are the best comparable scores for old PSAT scores to current. The scores from the SAT remain on the same scale now as when our student sample took the test, but the SAT has also been reduced from three to two sections. Thus, for both tests, while students' scores were efficient predictors of their post-secondary success (not surprising given their link to post-secondary admissions) the changes in the tests' structures and scoring ranges mean that the results below are not directly translatable to current cohorts of BPS students. They can, however, provide preliminary evidence, and further analysis of more recent PSAT and SAT scores could be conducted to establish more current cut-off levels and on-track indicators.

It is worth noting that of those students with scale scores of 400 or more on any of the SAT subtests (Math, Critical Reading, Writing), more than 80 percent had at least one of the other BPS selected indicators (GPA \geq 2.7, attendance \geq 94 percent, or completion of the MassCore curriculum plus at least one AP

course). Of those with SAT sub-scores of 500 or higher, more than 90 percent had at least one of the other selected high school indicators. Thus, most students with high SAT scores are already captured among the larger group of students with the selected indicators.

A further problem with using SAT scores, as well as most test scores, such as the 8th grade MCAS, is that many students did not take the tests and thus have missing data for those indicators. This further limits their practical utility. In cases where test scores prove to be excellent on-track indicators, they might be considered secondary or supplementary indicators to the primary set confirmed in the above report, which include measures for which all BPS high school students have data.

Characteristic	Numbers of Students with Characteristic	% Who Enrolled in PS	% of Total Students to Enroll in PS	% Who Completed PS	% of Total Students to Complete PS
ALL POST-SECONDARY INSTITUTIONS					
Attendance $\geq 90\%$	1,889	83%	76%	49%	87%
GPA ≥ 2.5	1,336	87%	57%	62%	79%
GPA ≥ 3.0	917	91%	41%	71%	62%
GPA ≥ 3.5	547	93%	25%	79%	41%
8th Grade MCAS ELA	1,647	85%	70%	51%	82%
8th Grade MCAS Math	802	92%	37%	66%	52%
8th Grade MCAS Science	280	91%	13%	68%	18%
10th Grade MCAS ELA	1,711	86%	73%	53%	87%
10th Grade MCAS Math	1,747	85%	75%	52%	87%
PSAT National Merit Selection Index ≥ 100	1,558	86%	65%	55%	81%
PSAT National Merit Selection Index ≥ 125	819	92%	36%	69%	54%
PSAT National Merit Selection Index ≥ 150	368	92%	16%	76%	27%
Took the SAT	1,901	85%	78%	49%	88%
SAT Critical Reading ≥ 300	1,747	87%	73%	52%	87%
SAT Critical Reading ≥ 400	1,173	90%	51%	62%	69%
SAT Critical Reading ≥ 500	624	92%	28%	73%	43%
SAT Mathematics ≥ 300	1,777	86%	74%	52%	87%
SAT Mathematics ≥ 400	1,372	88%	58%	59%	76%
SAT Mathematics ≥ 500	789	92%	35%	70%	52%
SAT Writing ≥ 300	1,757	87%	73%	52%	87%
SAT Writing ≥ 400	1,142	91%	50%	64%	69%
SAT Writing ≥ 500	598	93%	27%	76%	43%
Entire Cohort	2,691	77%	100%	39%	100%

Characteristic	Numbers of Students with Characteristic	% Who Enrolled in PS	% of Total Students to Enroll in PS	% Who Completed PS	% of Total Students to Complete PS
2-YEAR DEGREE GRANTING INSTITUTIONS					
Attendance \geq 90%	1,889	37%	67%	7%	73%
GPA \geq 2.5	1,336	29%	36%	6%	48%
GPA \geq 3.0	917	23%	20%	5%	27%
GPA \geq 3.5	547	19%	10%	4%	13%
8th Grade MCAS ELA	1,647	35%	56%	5%	55%
8th Grade MCAS Math	802	25%	20%	4%	21%
8th Grade MCAS Science	280	19%	5%	4%	6%
10th Grade MCAS ELA	1,711	34%	58%	6%	62%
10th Grade MCAS Math	1,747	35%	60%	6%	62%
PSAT National Merit Selection Index \geq 100	1,558	33%	48%	6%	51%
PSAT National Merit Selection Index \geq 125	819	22%	17%	4%	18%
PSAT National Merit Selection Index \geq 150	368	14%	5%	1%	3%
Took the SAT	1,901	38%	68%	7%	74%
SAT Critical Reading \geq 300	1,747	36%	59%	7%	68%
SAT Critical Reading \geq 400	1,173	28%	31%	5%	35%
SAT Critical Reading \geq 500	624	19%	11%	3%	12%
SAT Mathematics \geq 300	1,777	36%	61%	7%	68%
SAT Mathematics \geq 400	1,372	31%	39%	6%	46%
SAT Mathematics \geq 500	789	22%	16%	4%	19%
SAT Writing \geq 300	1,757	36%	60%	7%	70%
SAT Writing \geq 400	1,142	28%	30%	5%	36%
SAT Writing \geq 500	598	38%	10%	7%	10%
Entire Cohort	2,691	40%	100%	6%	100%

Characteristic	Numbers of Students with Characteristic	% Who Enrolled in PS	% of Total Students to Enroll in PS	% Who Completed PS	% of Total Students to Complete PS
4-YEAR DEGREE GRANTING INSTITUTIONS					
Attendance \geq 90%	1,889	67%	83%	44%	90%
GPA \geq 2.5	1,336	79%	70%	57%	83%
GPA \geq 3.0	917	86%	52%	67%	67%
GPA \geq 3.5	547	89%	33%	76%	45%
8th Grade MCAS ELA	1,647	72%	80%	47%	86%
8th Grade MCAS Math	802	85%	46%	63%	56%
8th Grade MCAS Science	280	86%	16%	65%	20%
10th Grade MCAS ELA	1,711	73%	84%	48%	90%
10th Grade MCAS Math	1,747	71%	84%	47%	91%
PSAT National Merit Selection Index \geq 100	1,558	74%	75%	51%	85%
PSAT National Merit Selection Index \geq 125	819	87%	46%	67%	59%
PSAT National Merit Selection Index \geq 150	368	90%	22%	75%	30%
Took the SAT	1,901	68%	85%	44%	90%
SAT Critical Reading \geq 300	1,747	72%	83%	47%	89%
SAT Critical Reading \geq 400	1,173	82%	63%	59%	74%
SAT Critical Reading \geq 500	624	89%	36%	70%	47%
SAT Mathematics \geq 300	1,777	71%	83%	47%	89%
SAT Mathematics \geq 400	1,372	77%	69%	54%	80%
SAT Mathematics \geq 500	789	87%	45%	67%	57%
SAT Writing \geq 300	1,757	72%	83%	47%	89%
SAT Writing \geq 400	1,142	82%	62%	60%	74%
SAT Writing \geq 500	598	90%	35%	73%	47%
Entire Cohort	2,691	57%	100%	35%	100%

APPENDIX 2:

DESCRIPTIVE STATISTICS FOR STUDENTS WHO DID NOT ENROLL IN POST-SECONDARY SCHOOLING IMMEDIATELY AFTER GRADUATING FROM HIGH SCHOOL

The table below compared basic statistics for high school graduates who enrolled in post-secondary schooling immediately after high school graduation with those who enrolled in post-secondary schooling at a later date. Here immediate enrollment in post-secondary schooling is defined as enrollment by December 31st of 2010, the year of expected high school graduation.

As seen below, students who failed to immediately enroll in post-secondary schooling face many more challenges in terms of demographic backgrounds (poverty, minority status, ELL, special education) and also struggled significantly more in terms of all academic performance measures (attendance, GPA, course completion, test proficiency).

	Students who graduated HS but did not immediately enroll in PS (N = 400)	Students who graduated HS and immediately enrolled in PS (N=1505)
% Female	60%	56%
% FRL	75%	60%
% Spec. Ed.	17%	8%
% ELL	9%	4%
% Asian	5%	17%
% Black	47%	38%
% Hispanic	39%	24%
% Other	1%	1%
% White	8%	20%
Average GPA	2.2	3.0
% GPA >= 2.7	24%	62%
Average Attendance Rate	90%	94%
% Attendance >= 94%	32%	62%
% Proficient 10th Grade MCAS ELA	57%	80%
% Proficient 10th Grade MCAS Math	54%	82%
% with AP Course	29%	63%
% with AP Exam	27%	61%
% taking SAT	64%	86%
% with MassCore	14%	40%
% with MassCore + AP	7%	27%



75 Arlington Street, Boston, MA 02116 | 617-338-1700 | www.bostonopportunityagenda.org/