

## MEMORANDUM

**To:** Members of the Board of Elementary and Secondary Education and Members of the Board of Higher Education  
**From:** Russell D. Johnston, Acting Commissioner and Noe Ortega, Commissioner  
**Date:** June 18, 2024  
**Subject:** K-12 and Higher Education: Lessons from Our Research

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In early 2020, just prior to the pandemic, both the Board of Elementary and Secondary Education (BESE) and the Board of Higher Education (BHE) voted on near-identical resolutions to “make a broad-based commitment to collect, review, and act on high-quality evidence to inform ongoing and new initiatives” intended to strengthen public education in Massachusetts. [BESE vote January 28, 2020](#); BHE 20-05. Since that time, our agencies have held true to that commitment, collectively engaging in dozens of research projects with independent researchers who have helped us refine our understanding of the students and adults served by our systems, their needs, and the impact of our policies and initiatives.

One of the most consequential and fruitful partnerships has been our U.S. Department of Education IES-funded study with Brown University and Dr. John Papay. Over the past five years, the Department of Elementary and Secondary Education (DESE), Department of Higher Education (DHE), and Brown University’s Annenberg Institute have built a strong research partnership to study various topics related to educational inequality and opportunity in Massachusetts. Throughout this partnership, Dr. Papay and his team have used our cross-agency longitudinal data systems to explore how students move through our educational system, from K-12 to higher education and into the workforce. Their analysis of the data has enabled us to have a more nuanced understanding of student outcomes later in life, and how our policies and programs play a role in those outcomes.

We have invited Dr. Papay to share with us some of the major findings of his work related to K-12 and higher education. Broadly, and in no particular order, they are as follows:

1. There have been substantial demographic changes in the Massachusetts K-12 and higher education systems over the past 20 years, with a doubling of low-income students and tripling of the number of immigrant newcomers in our high schools.
2. MCAS test scores and high school course grades appear to measure complementary but somewhat different skills that predict long-term outcomes.
3. Increases in average MCAS scores and student grades over the past two decades do not appear to reflect increases in students’ underlying skills, raising questions about the signals students receive about their performance.
4. Racial and socio-economic inequality in four-year college completion is quite large, even among students with similar 10th grade MCAS scores.

5. Differences in 10<sup>th</sup> grade MCAS scores and educational attainments largely explain differences in later earnings across racial/ethnic and socioeconomic groups.
6. Some of the Commonwealth's high schools are much more effective than others at improving educational outcomes and earnings for low-income students.
7. College-going declined substantially during the pandemic, with enrollments in Massachusetts community colleges falling especially rapidly. These declines were large even for students with strong high school records and high MCAS scores.
8. Few students who enroll in community college earn an associate degree or transfer to a four-year school within 5 years of entry, although these rates remained stable despite changing demographics.
9. The share of community college students earning associate degrees in STEM specialties has increased, but the share earning healthcare credentials has stayed flat despite strong labor market demand.

The Appendix includes some additional information the researchers have provided about these patterns. The researchers will provide a more detailed memorandum describing these findings before the joint BESE-BHE meeting.

#### **Appendix: Summary of Findings from the Annenberg Institute at Brown Research Team**

Our *Educational Opportunity in Massachusetts* team has been working in partnership with DESE and DHE to study educational outcomes and progress of students in the Commonwealth. We draw here from both new findings and existing reports. Each of the reports referenced in this document can be retrieved from the *Educational Opportunity in Massachusetts* website: <https://annenberg.brown.edu/edopportunity/research>

##### **1. There have been substantial demographic changes in the Massachusetts K-12 and higher education systems over the past 20 years.**

The demographic characteristics of the students that the Massachusetts K-12 and higher education systems serve have changed quite dramatically over the past 20 years, as we [reported](#) in *Lifting All Boats? Accomplishments and Challenges from 20 Years of Education Reform in Massachusetts*. The share of Hispanic students has more than doubled, and in all racial/ethnic groups, the share of students from low-income families has increased substantially.

Our recent [report](#), *Rising Numbers, Unmet Needs*, highlights one particularly vulnerable group – recent immigrants, often with limited or interrupted formal education, who arrive in high school as English learners. The number of newcomers in Massachusetts high schools has tripled since 2008. While only one-third of these newcomers enroll in college (down from half a decade ago), most of those who do enroll in Massachusetts public institutions. However, many newcomers are graduating from high school without the requisite preparation to succeed in college because they have spent limited time learning English, suggesting the need to create pathways to college and aligned supports for these students. The magnitude of this challenge is likely to grow for Massachusetts public educational institutions, given current immigration trends.

##### **2. MCAS test scores and high school course grades appear to reflect complementary but somewhat different skills that predict long-term outcomes.**

Students with higher 10th grade MCAS scores are more likely than those with lower scores to graduate from high school, enroll in college, and graduate from college. They also have higher median annual earnings at the age of 30. This is true even among students with the same demographic profile who earned the same GPA at the same high school. At the same time, students with better high school course grades also do much better. For example, only 33% of students earning a C in their 10th grade math course graduated from a four-year college, compared to 65% earning a B+.

Student grades and MCAS scores are correlated with each other but also predict educational attainments independently of each other. In other words, comparing students with the same MCAS scores, students with higher grades have better outcomes. It is also true that among students with the same grades, those with higher MCAS scores have better outcomes. The bottom line is that we have a “both/and” story. Both MCAS scores and high-school course grades are important predictors of long-run outcomes. While the general story they support is the same, the two measures provide distinct information about student skills.

**3. Increases in average MCAS scores and student grades over the past two decades do not appear to reflect increases in students’ underlying skills, raising questions about the signals students receive about their performance.**

In *Lifting All Boats?*, we noted the substantial increase in high-school MCAS scores over the first 15 years of testing. We [reported](#) on similar patterns when the state introduced science testing for the class of 2010, in that 14% of students failed their first test; by 2019, only 9% did. However, these MCAS improvements could arise from score inflation, where test scores increase without improvements in underlying skills because, for example, of inappropriate teaching to the test.

We compare trends in MCAS scores to the performance over time of Massachusetts students on the National Assessment of Educational Progress (NAEP), a low-stakes test with no known problems with scaling. Our analysis suggests that the increases in average MCAS math and ELA scores until approximately 2008 represented real gains in academic proficiency, as they were mirrored in scores on the NAEP. However, the increases from 2008 through the onset of the pandemic appear to have been almost entirely due to scale drift, score inflation, or a combination of the two. As a result, there are important concerns about whether MCAS scores are conveying the right signal about students’ preparation for college and career. For example, in 2018, the last year of the legacy 10th grade examinations, nearly 80% of students scored Proficient or above in mathematics and 91% in ELA. Meanwhile, proficiency levels on the NAEP were at 50% or below in both subjects.

Scores on the Next-Generation MCAS tests, which were introduced to align with revised statewide curriculum frameworks, might provide more accurate information about skill levels. In 2022, for example, only half of 10th graders scored at Meets Expectations or above in math, reflecting a post-pandemic drop in performance. But this level is still substantially higher than statewide scores on that year’s NAEP; only 35% of students were in the Proficient or Advanced categories on that assessment. This suggests that score inflation continues to be an issue, even with the Next-Generation tests.

For good reason, score inflation is one often-cited issue with high stakes tests. However, during this same period, there also appears to have been substantial inflation of students’ course grades

in the state's public high schools. Over the past decade, in all core academic subjects, the share of students earning an A has increased dramatically. In 2011, the first year of consistent statewide data on course grades, approximately 20 to 25% of students received an A in math and ELA. By 2023, this share had increased to 30% in math and close to 40% in ELA. The increase in grades over the past decade has come while attendance rates have declined precipitously and is not reflected in other measures of student learning, such as test performance on the MCAS or the NAEP. This inflation appears to have accelerated during the pandemic, when grades went up substantially while test scores declined.

Taken together, these patterns raise important questions about the accuracy of the information students and their families are receiving about their preparation for college and careers.

**4. Racial and socio-economic inequality in four-year college completion is quite large, even among students with similar 10<sup>th</sup> grade test scores.**

In *Lifting All Boats?*, we documented educational progress during the 20 years from the full implementation of the Massachusetts Education Reform Act (in the early 2000s) to the start of the pandemic. High school graduation rates increased substantially and income- and race/ethnicity-based gaps in high school graduation rates have narrowed. While college completion also increased for all groups of students, gaps in four-year college graduation rates grew. We also find that the academic preparation (as measured by 10th grade MCAS scores) of students entering Massachusetts community colleges has declined.

There remains substantial inequality in college completion, even among students with the same 10th grade MCAS test scores. Low-income students scoring at the 90th percentile on the MCAS test graduated from a four-year college at the same rate as higher-income students who scored at the 57th percentile. If low-income students graduated from four-year colleges at the same rate as their higher-income peers with the same MCAS scores, more than 3,500 additional low-income students who took the test in 2011 would be four-year college graduates. This has important implications for the state's public education system because 72% of low-income Black and Hispanic students who enroll in college do so in the Massachusetts public system, 41% in community colleges and 31% in four-year institutions (from the class of 2019).

**5. Differences in 10th grade MCAS scores and educational attainments largely explain differences in later earnings across racial/ethnic and socioeconomic groups.**

The substantial gaps in college credentials are particularly important for the Commonwealth given the critical role that educational attainments play in promoting socio-economic mobility and economic opportunity. We see that at all levels of MCAS scores from 2003 to 2005, the substantial earnings gap between students from low- and higher-income families (30% on average) was much smaller among students with the same MCAS score and educational attainment. This shows the critical role that the K-12 and higher education systems can play in reducing inequality.

Students who were English learners in 10th grade earned *more* at age 30 than their non-EL peers with similar test scores and attainments. The likely explanation is that 10th grade MCAS scores for students who were English learners understated their latent academic skills.

**6. Some high schools are much more effective than others at improving educational outcomes and earnings for low-income students.**

The high school that a low-income student attends has substantial implications for their longer-run outcomes. Some high schools promote students' economic mobility much more than others. In a [recent paper](#), we looked at how Massachusetts high schools that served large percentages of low-income students affected the longer-term outcomes (four-year college graduation and labor market earnings) of low-income students. We find substantial differences in their effectiveness. For an average low-income student in the state, attending a school at the 80th percentile of the distribution increases the probability of graduating from a four-year college by about 60% (from just under 9% to 14%) and later earnings by about 9% (\$2,500) compared to attending a school at the 20th percentile.

High schools that are effective in producing strong longer-run student outcomes tend to be schools that improve students' test scores and college aspirations. While most schools that boost test scores also raise longer-run outcomes, some schools raise scores without improving earnings (and vice versa). High schools that improve students' enrollment and success in college seem to be particularly impactful on later earnings.

These findings carry implications for both DESE and DHE. They point to the importance of developing stronger pathways from high schools to specific 2-year and 4-year higher education institutions (many low-income students who go to college enroll at their local community college or state university). Ensuring that Massachusetts high school graduates enroll in a post-secondary institution and thrive is a key determinant of their later earnings.

**7. College-going declined substantially during the pandemic, particularly in Massachusetts community colleges. These declines were large even for students with strong high school records and high MCAS scores.**

Not surprisingly, the pandemic produced substantial declines in college-going across the Commonwealth. We are currently working on a larger report on pandemic impacts, but our [earlier brief](#) highlights this trend. Low-income Black, Hispanic, and Indigenous students have seen the sharpest declines, and they were felt most strongly in community colleges. College-going for low-income Hispanic students fell by 9 percentage points from the high-school graduation class of 2019 to the class of 2021.

Our current work shows that declines have been seen across the board, among students at all MCAS test score levels, despite the fact that high school graduation rates have increased. Even among high-scoring students, the decline in college-going for students in the class of 2022 is more than 10 percentage points. This means that there is a growing share of students who have graduated from high school, have strong preparation for post-secondary education, and are not yet enrolled.

**8. Few students who enroll in community college earn an associate degree or transfer to a four-year school within 5 years of entry, although these rates remained stable despite changing demographics.**

In a 2022 [research brief](#), we focused on students who enrolled in a Massachusetts community college (MACC) associate degree (AD) program soon after graduating from a Massachusetts public high school. In many ways, these students should be the most prepared to succeed in community college. However, of these students who entered college in the fall of 2017, only 26% earned an AD within five years. There are substantial gaps in AD completion by family income and student race/ethnicity. For example, only 15% of Black students and 20% of Hispanic students who first enrolled in a MACC AD program in the fall of 2017 earned an AD within five years.

Transfer rates from two-year to four-year institutions rose substantially between the 2010 and 2015 entry cohorts for higher-income students, but not for low-income students. One hypothesis to explain this pattern is that the DHE investment in developing transfer pathways contributed to the increase in transfer rates for higher-income students but not low-income students. Students from higher-income families with low grade-10 MCAS math scores were more likely to transfer to a 4-year school than low-income students with relatively high MCAS scores.

There is some positive news in the trends of AD completion and transfer rates. Despite the dramatic increase in the proportion of students who came from low-income families and from historically marginalized groups, the proportion of MACC entrants that earned an AD within five years and the proportion that transferred to a four-year institution have remained remarkably stable between the 2007 and 2017 entry cohorts.

Eight percent of Massachusetts public high school graduates who enrolled in a four-year higher education institution in 2016 subsequently transferred to a community college (and 80% of these transferred to a MA community college). This is down from 12% of 2005 college entrants but still represented more than 2,800 students in those years. Only 20% of these students earned an associate degree (AD) within six years after initial college entry, and 17% eventually returned to a four-year college and earned a bachelor's degree. Black and Hispanic students and students from low-income families have been especially likely to transfer back to community colleges (and also to drop out of college altogether).

**9. The share of community college students earning associate degrees in STEM specialties has increased, but the share earning healthcare credentials has stayed flat despite strong labor market demand.**

The percentage of MACC students who earned an AD in a STEM specialty increased by more than 50% between the 2006 and 2016 entry cohorts. Over this same period, there was very little increase in the proportion of MACC students who earned an associate degree in a healthcare specialty, despite high labor market demand. The vast majority of AD recipients in STEM specialties identify as male, whereas the majority of recipients of an AD in a healthcare program identify as female. A variety of supply constraints appear to have contributed to the stagnation in the percentage of students who earned associate degrees in competitive healthcare programs such as nursing (the largest such program). One such constraint is the difficulty of recruiting and retaining clinical faculty. A second is a paucity of placements in hospitals for required practicums.