MassINC

NEW DATA SHOWS EARLY COLLEGE IS DELIVERING AS PROMISED FOR MASSACHUSETTS

Maintaining strong outcomes as the initiative grows will require second-generation evaluation strategies

Since 2013, MassINC has vigorously supported efforts to dramatically expand access to Early College.[1] Our conviction that this initiative can close gaping holes in the state's postsecondary pipeline is rooted in the impressive performance of high-quality Early College programs in other states. However, we duly recognize that replicating evidence-based educational interventions and bringing them to scale is exceptionally difficult. This makes it critical to carefully monitor the commonwealth's Early College programs to ensure that they deliver as promised. Equally important, we must probe for unintended consequences, as Early College reshapes high schools and public higher education across the state.

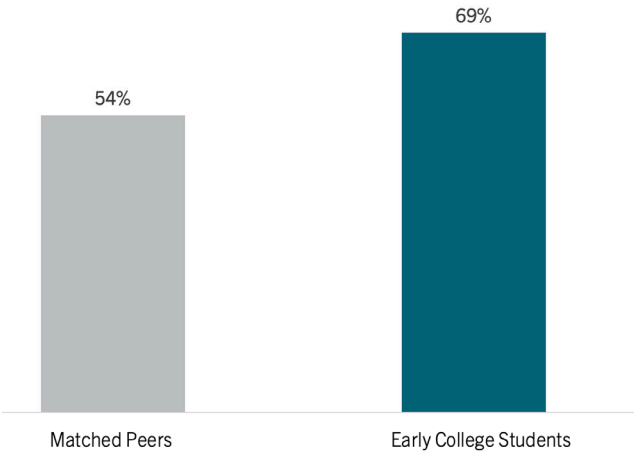
Fortunately, leaders in Massachusetts had the foresight to establish strong evaluation protocols when they launched the state's Early College Initiative in 2017. The first-generation evaluation framework included cross-agency data sharing agreements, which allow us to follow Early College students year after year as they move from high school through postsecondary studies.

In this policy brief, we highlight impressive patterns from the Department of Elementary and Secondary Education (DESE)'s most recent analysis of this longitudinal data. We then draw attention to the need to augment current evaluation techniques as the initiative expands to reach tens of thousands of students each year. The brief concludes with recommendations for next-generation data and evaluation protocols to execute this more intensive research agenda.

THE MOST RECENT (AND MOST RIGOROUS) EARLY COLLEGE DATA SHOWS STUNNINGLY LARGE GAINS

MassINC's 2021 report, Early College as a Force for Equity in the Post-Pandemic Era, presented DESE performance data on postsecondary enrollment and persistence for the first group of students graduating from state-designated Early College high schools. This 2019 cohort was relatively small, which made it difficult to include prior academic achievement in statistical models to reduce selection bias (i.e., the tendency for students who are more likely to succeed in higher education to seek out Early College programs). DESE's latest analysis pools Early College students graduating from high

Figure 1: Share of Students Enrolling in College Immediately After High School



Source: MA Department of Elementary and Secondary Education

school in 2019, 2020, and 2021 into one sample. This gives researchers the ability to utilize additional control variables, including prior academic achievement (see sidebar on p. 5 for more on methodology).

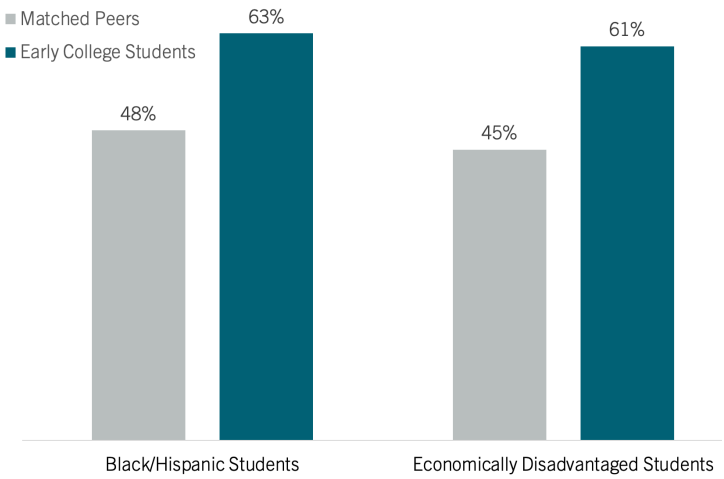
Even with this far more robust model, Early College students continue to outperform matched peers in the statistical comparison group by wide margins. The deeper we probe these figures, the more impressive the results appear. Most notably:

EARLY COLLEGE IS SENDING MANY MORE STUDENTS ON TO COLLEGE WITHOUT INTERRUPTION

Maintaining "momentum" by continuing to college after high school without interruption is one of the best predictors that a student will eventually earn a postsecondary degree.[2] The new performance data shows large gains in the share of students who enroll in a two- or four-year college immediately after high school: 69 percent of Early College students went on to postsecondary studies without interruption, compared to 54 percent of their matched peers, a 15 percentage point difference (**Figure 1**). While this is smaller than the 20 percentage point gain detected for the 2019 cohort, as noted by DESE in its presentation of the results, a 15 percentage point increase is well above the average effect size for evidence-based postsecondary completion interventions.[3]

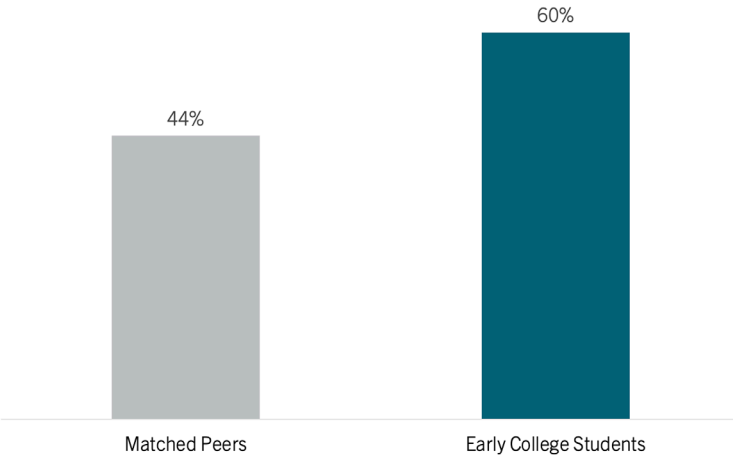
More importantly, the new estimates disproportionately include students participating in Early College programs launched during or just prior to the pandemic. (The 2019 cohort had 361 12th graders, whereas the 2021 group was roughly five times larger with approximately 1,500 12th graders). It is very likely that incorporating students in programs getting off the ground amidst the pandemic disruption reduced the estimated impact of the overall initiative.

Figure 2: Share of Students Enrolling Immediately in College by Subgroup



Source: MA Department of Elementary and Secondary Education

Figure 3: Share of Students Enrolling in College Immediately Persisting to a Second Year



Source: MA Department of Elementary and Secondary Education

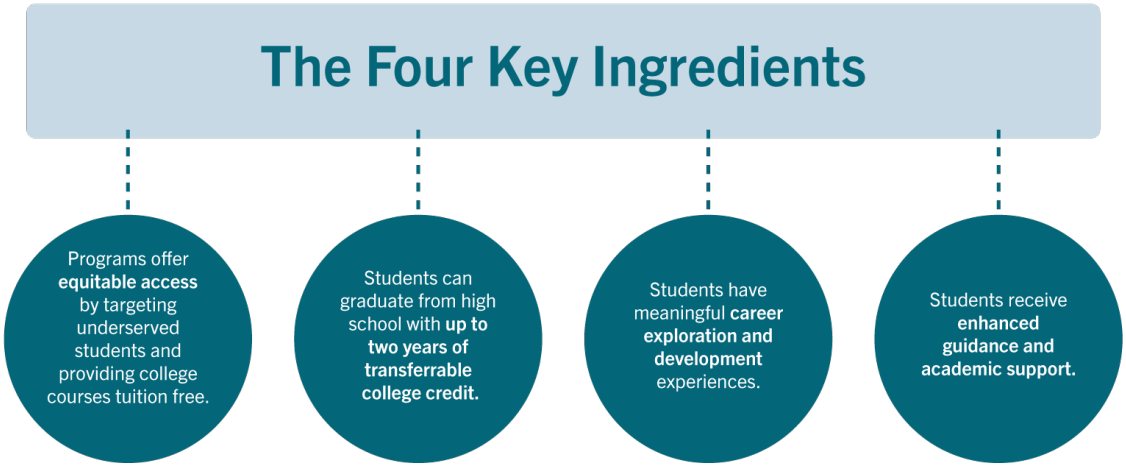
THE GAINS IN COLLEGE-GOING ARE LARGER FOR LOW-INCOME STUDENTS AND STUDENTS OF COLOR

The percentage point gains in immediate postsecondary matriculation for low-income students and students of color were roughly the same size as the full sample (**Figure 2**). However, these increases are from a lower base, so the percent increases for low-income students and students of color in Early College over their matched peers are slightly larger: 30 percent for low-income students and 27 percent for Black and Hispanic students (combined) versus 24 percent for the full sample.[4]

While this finding is consistent with results from other Early College studies, it is rather unusual for an educational intervention. Successful college completion efforts often lead to wider socioeconomic disparities because more advantaged students are generally both better positioned to participate and to gain benefits from their participation.[5]

WHAT DOES HIGH-QUALITY EARLY COLLEGE LOOK LIKE?

While research must continue to distill all of the attributes of high-performing Early Colleges, existing studies point to a carefully structured approach with four key ingredients, connections to postsecondary beginning in middle school and intensifying throughout high school, and instructional models that eventually allow high school students to learn alongside students in regular college courses.

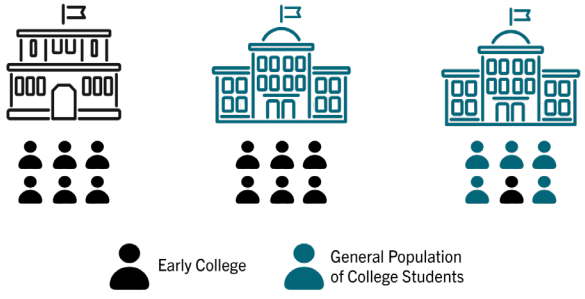


BREAKING DOWN THE EARLY COLLEGE EXPERIENCE YEAR BY YEAR

7th and 8th grades	9th grade	10th grade	11th grade	12th grade
College and Career Exploration			Career Development	
Outreach and Family Engagement	Comprehensive system of supports for college and career planning and to develop academic skills and behavior needed for success			
	Rigorous high school coursework	Introduction to college-level coursework	Students take up to 60 credits aligned to a college major	

INTRODUCING HIGH SCHOOL STUDENTS TO THE COLLEGE CAMPUS

Programs often prepare students by starting with college-level coursework at the high school, and then students proceed to courses on college campuses in sections offered just for high school students. The best Early College experience ends by taking classes on campus in courses with regular college students.



Early College students graduate from high school with significant college credits (reducing the cost of and time to degree completion) and with the confidence, habits, and skills to be successful in college and career.

EARLY COLLEGE IS SIGNIFICANTLY INCREASING SUCCESS IN COLLEGE

Among students who went on to college immediately after high school graduation, 60 percent of Early College students persisted to a second year of postsecondary studies, compared to 44 percent of matched peers, a 16 percentage point gain **(Figure 3)**. This finding is particularly important because many interventions increase college-going among students who lack preparation, which makes persistence beyond the first year difficult. Inducing those without sufficient preparation to enroll in higher education is an inefficient use of limited public resources and is often costly for students and their families.[6]

Massachusetts' Early College initiative is leading many students to pursue postsecondary studies who would not otherwise have continued without interruption, but it is also preparing them to succeed in college. Data reported verbally by DESE indicates that Early College students with lower eighth grade MCAS scores post larger gains in college enrollment and persistence than those with higher levels of academic achievement prior to entry.[7] This finding, coupled with figures showing an increase in Early College students completing the more rigorous MassCore college preparatory curriculum, suggests the intervention contributes to postsecondary success by increasing academic effort and rigor throughout high school.

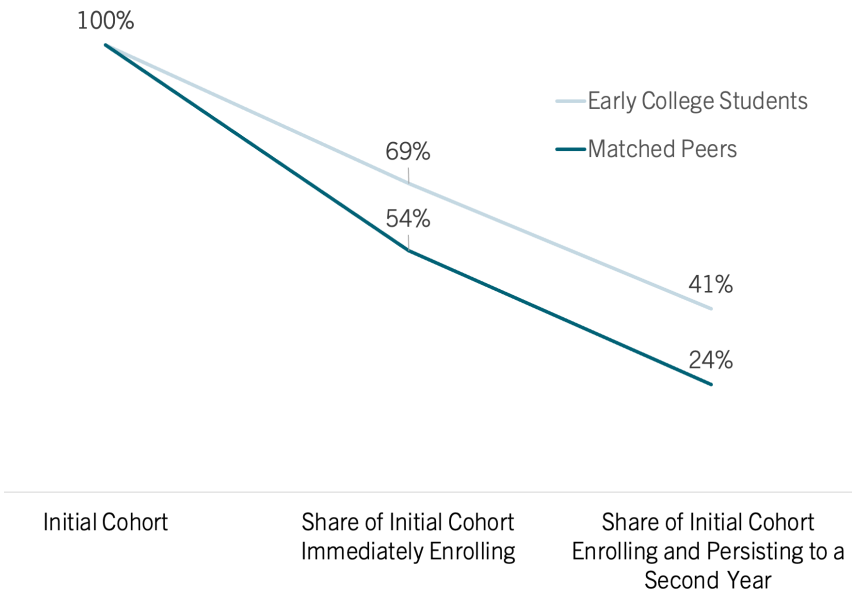
EARLY COLLEGE DOUBLES THE LIKELIHOOD THAT STUDENTS IN THE TARGET POPULATION ENROLL AND PERSIST IN POSTSECONDARY STUDIES

As reflected in the data reported above, Early College increases the number of students who pursue postsecondary studies and increases the number of students who have success in higher education.

Combining these enrollment and persistence effects, the share of students entering and remaining in the college pipeline jumps from 24 percent to 41 percent. Thinking about this as simply a gain of 17 percentage points **(Figure 4)** understates the impact.

From the student's perspective, Early College more than doubles the odds of immediately enrolling and then persisting to a second year of college.[8] Employers will likely want to gauge the impact in terms of the potential for additional college-educated workers in the labor force. Among those in the DESE sample, 1,068 Early College students remain in the college pipeline compared to 613 of their matched peers. This is a 74 percent increase in immediate postsecondary enrollment and persistence for students in the targeted population. While longitudinal data following Early College participants long enough to observe postsecondary degree attainment is needed to ensure that these gains hold, DESE figures show that Massachusetts students who persist to the second year of college are seven times more likely to complete it than those with an interruption in postsecondary enrollment.[9]

Figure 4: Postsecondary Progression, Early College Students vs. Matched Peers



Source: Authors' analysis of data from the MA Department of Elementary and Secondary Education

QUASI-EXPERIMENTAL EVIDENCE THAT EARLY COLLEGE IS WORKING

The Massachusetts Early College Initiative is a model for implementing a strategic initiative with an eye toward rigorous evaluation. For the past four years, Pierre Lucien has overseen data collection and developed methods to chart the performance of the state's designated Early College programs. With grant funding from the Smith Family Foundation, Lucien was placed at DESE by Harvard's Center for Education Policy Research (CEPR) to serve as a Strategic Data Project Fellow. Currently a doctoral student at Oxford University, he's been advised and supported by CEPR, as well as by two leading academic researchers with experience analyzing college and career outcomes using DESE data (John Papay at Brown University and Shaun Dougherty at Boston College).

To rigorously compare the postsecondary trajectories of students enrolled in Early College to those who did not participate, Lucien combined participants from the classes of 2019, 2020, and 2021. This provides a sample large enough to match Early College students to non–Early College students with similar demographic and socioeconomic attributes, English language skills, disabilities, and eighth grade MCAS scores. These "matched peers" also attended high schools with similar characteristics, which is an especially important variable given evidence that the college-going culture within a secondary school community has a significant influence on the likelihood that students pursue higher education and complete postsecondary degrees.[10]

While these statistical controls reduce selection bias, they cannot eliminate it to the same degree as a randomized control trial. Still, they are considered strong evidence of effectiveness when researchers have sufficient data to achieve close matches and the differences between the two

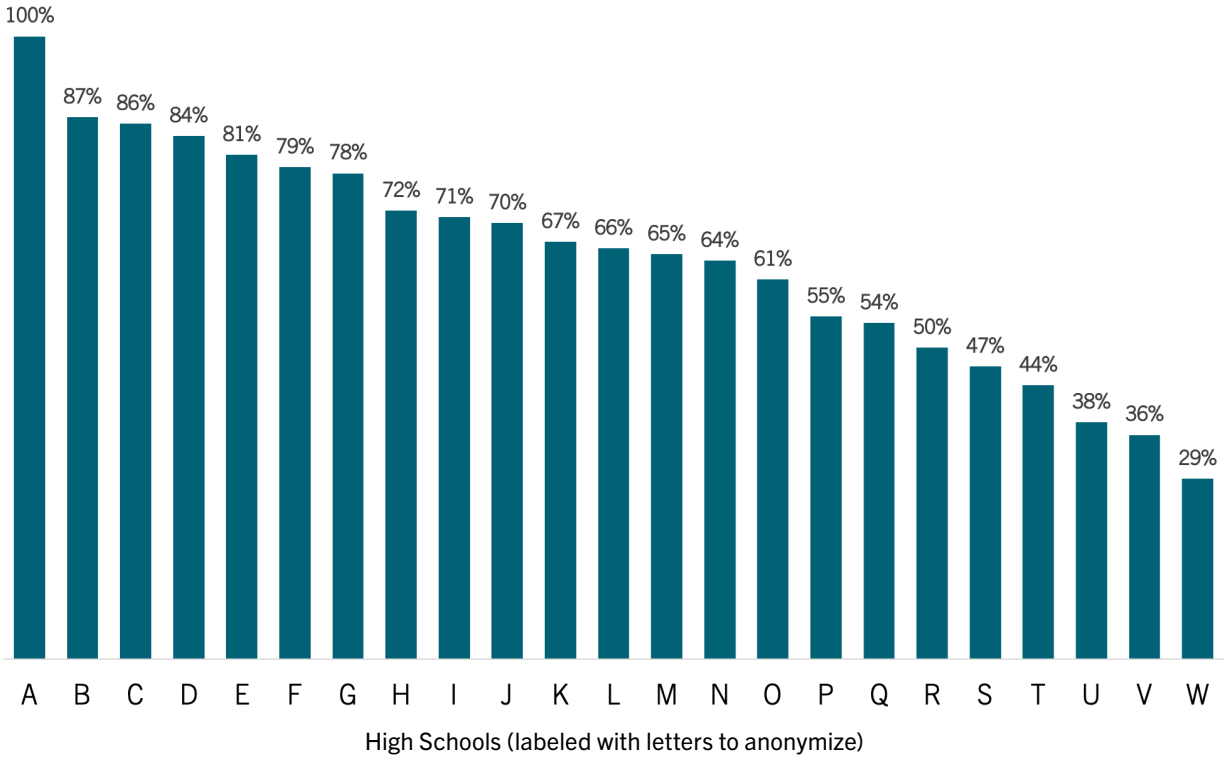
TEASING OUT DIFFERENCES ACROSS PROGRAMS AND ENSURING STRONG OUTCOMES AS EARLY COLLEGES GROW WILL REQUIRE A MIXED-METHODS APPROACH TO EVALUATION

Approximately 5,400 students are participating in Early College today; the initiative must reach another 40,000 to deliver fully on its potential.[12] Maintaining strong outcomes as programs serve far more students will present formidable challenges. Identifying these challenges and finding timely strategies to address them will require new and more intensive approaches to evaluation.

This need is evident in the wide variation in performance across programs at present. In the most recent data release, DESE reported immediate enrollment for 23 Early College high schools with a sufficient number of participants matriculating to postsecondary studies to calculate reliable estimates. As presented in Figure 5, DESE anonymized the results due to the relatively small sample size at the program level. However, the data is still revealing. One program sent 100 percent of Early College students to postsecondary studies immediately after high school. At the other end of the distribution, the lowest had just 29 percent of its participants continue without interruption.

This variation may be due to significant differences in the student populations served and other contextual variables. It could also result from important differences in how each program operates. Developing a better understanding of what's behind this variation is critical for both educators looking to improve the performance of their own programs and policymakers responsible for deploying resources to expand access to Early College and enhance program quality. To pinpoint answers, we must surface targeted research questions and explore them using a mix of quantitative and qualitative methods.

Figure 5: Share of Early College Students Enrolling Immediately in College by High School



Source: Authors' analysis of data from the MA Department of Elementary and Secondary Education

Examples of key issues that may merit intensive investigation include:

- English language learners. How well do Early College programs serve English language learners? What design features lead to more success with this subpopulation of students?
- Family engagement practices. How do programs introduce the Early College opportunity to parents, when does this outreach begin, and how do families engage in the experience throughout the journey? Does Early College make parents more informed consumers of higher education? Does it change parental mindsets about college and the way they view their student's likelihood of succeeding in higher education?
- Credit accumulation and transferability. What factors influence how many college credits students complete prior to high school graduation? How successful are students in transferring these credits to meet postsecondary degree requirements? Are there threshold levels of credit accumulation that significantly increase the likelihood of postsecondary completion?
- Advising and academic support practices. What level of advising and academic support do programs provide to students? Is there variation by gender and/or race/ethnicity in the likelihood that students take up these services?
- Peer effects. Do Early College students influence how their peers, siblings, and/or parents think about higher education? Do peer effects differ by gender and/or race/ethnicity? Is it possible to intentionally structure Early Programs to promote positive peer effects?
- STEM learning and mindsets. Can Early College courses or career exploration experiences change student self-perceptions about their ability to succeed in math and science? Are Early College students more likely to pursue and succeed in STEM fields?
- Labor market impacts. How does Early College influence labor market participation and earnings while students are enrolled in high school and postsecondary studies? Does Early College alter long-term earnings trajectories by leading to faster and/or higher levels of postsecondary attainment, a shift to high-return majors, and/or enrollment in selective colleges?

As Early College grows, there will be temptation to use quantitative methods alone to gauge the performance of individual programs. More students generally mean a larger sample size and additional precision to produce reliable estimates of program performance, so there is no longer a need to anonymize results. However, from a statistical standpoint, it actually becomes more difficult to employ the matched peer method when large numbers of students in the target population are receiving the intervention.

The unusually large scale this initiative seeks to achieve will even make it difficult to produce estimates of the statewide impact using the current approach. Many will simply want to see population level impacts (i.e., an absolute increase in the share of graduates from Massachusetts high schools completing postsecondary degrees) when Early College is serving tens of thousands of students annually. However, even when Early College reaches this scale, we will not be able to associate changes in statewide postsecondary attainment rates with this singular initiative because many factors contribute to college degree attainment. If important drivers of postsecondary success move in a contrary direction, college completion rates may not rise even when Early College performance is strong. To provide policymakers with a clearer understanding of Early College's contribution, evaluators will need to build statistical models that control for as many of these exogenous variables as possible.

AS EARLY COLLEGE ENTERS THE NEXT PHASE OF EXPANSION, MASSACHUSETTS MUST DEVISE NEW STRUCTURES TO OVERSEE AND EXECUTE A VIGOROUS RESEARCH AGENDA

Moving forward, Massachusetts needs structures that can generate objective research on a host of critical questions and make the results available to educators, policymakers, and the general public. As a new administration takes the reins, it must work to develop these structures with four key principles in mind:

- **Timeliness.** Research and evaluation activity must produce results that enable rapid improvement cycles. Too often, evidence is stale by the time it reaches educators and policymakers. Given the visibility and contentious nature of education policy, a tendency has developed to hold information until it is thoroughly vetted and verified. This simply will not do, with dozens of programs across the state working feverishly to build programs. The perfect must not become the enemy of the good. There will always be opportunities to update and revise, but the field needs the best available information at its disposal as promptly as we can generate it.
- **Independence.** Given how susceptible data can be to subtle manipulation and how high-profile Early College has become, it is imperative to insulate those with responsibility for administering the initiative from making final decisions about what gets studied, how data are produced, and whether findings are shared with the public.
- **Strategic.** To improve practice, it is critical to home in on narrowly tailored research questions. Developing research priorities is also essential given resource limitations, both from a financial standpoint and in terms of the capacity of staff at the state and local level to engage with outside research partners.
- **Comprehensive.** Early College will have broader ramifications for the high schools and colleges operating these programs, and it will also be important to capture these effects. For example, Early College could benefit students who are not participating, by reducing the instructional load on high school faculty or through peer effects, if these nonparticipants are more likely to pursue postsecondary studies after witnessing the success of friends in Early College. Alternatively, the intervention could harm them, if Early College students receive preferential access to advising and other academic support. While researchers need to provide educators with a detailed understanding of how specific components of Early College are operating, they must balance this with developing an understanding of whether the initiative is having more systemic impacts, positive or negative.

To deliver on these principles and lay the groundwork for the next phase of Early College expansion, we offer two recommendations:

1. Establish a formal research advisory council as a subcommittee of the Early College Joint Committee. A research advisory council would have the expertise and independence necessary to develop robust evaluation protocols with sensitivity to how methodologies will need to change as programs scale and enroll more students. The body could also develop a strategic research agenda and make objective decisions about how to release research in a responsible and timely manner, particularly program level data, where small sample size will always result in less precise estimates.

At present, data and evaluation decisions generally fall to the Early College Joint Committee (ECJC), which includes members from the Board of Elementary and Secondary Education and the Board of Higher Education. While the ECJC provides a healthy degree of independent governance, and members clearly value and prioritize data, the body could benefit from experts to help them consider methodological challenges and strategies to overcome them. The ECJC can ensure that this expertise is on hand by creating an advisory council that includes a combination of ECJC members and academic researchers.

2. Develop a research–practice partnership devoted to Early College. As data has improved over the past two decades, research–practice partnerships (RPPs) have become increasingly common throughout the country. These long-term collaborations aim to make educators more aware of research and of how they can develop interventions in ways that provide sufficient data to evaluate their impact. At the same time, RPPs give academics exposure to practitioners and position them to produce studies with relevant and actionable findings. Evidence suggests RPPs can improve outcomes in education, as well as in health and public safety.[13]

Located at a university (or a group of universities), an Early College RPP could help carry out the research agenda developed by the advisory council. The RPP's long-term structure would position it to expedite projects and carry out multiple efforts simultaneously. Its focus on practice, rather than publication in peer-reviewed academic journals, would also accelerate the pace of learning and knowledge dissemination. Equally important, the approach can build a culture of collaboration around research, helping to overcome fears that often paralyze efforts to utilize data to improve practice.

This brief has focused narrowly on research and evaluation issues for the Early College initiative as a whole. Building governance and accountability structures to ensure that all students receive the highest-quality experiences possible is also critical. Primary research on the pointed questions outlined above will provide a strong foundation for this undertaking. As we learn more, those responsible for reviewing individual programs will have a larger evidence-base to inform their analysis with respect to performance and improvement strategies.

NOTES

1. See: "The Gateway Cities Vision for Dynamic Community-Wide Learning Systems." (Boston, MA: MassINC, 2013); Ben Forman. "Investing in Early College: Our Most Promising Pathway." (Boston, MA: MassINC, 2019).
2. Paul Attewell and others. "What is Academic Momentum? And Does it Matter?" *Educational Evaluation and Policy Analysis* 34.1 (2012); William Doyle. "Effect of Increased Academic Momentum on Transfer Rates: An Application of the Generalized Propensity Score." *Economics of Education Review* 30.1 (2011); and Xueli Wang. "Toward a Holistic Theoretical Model of Momentum for Community College Student Success." *Higher Education: Handbook of Theory and Research*. (Springer, Cham, 2017).
3. Unless noted otherwise, all of the data and DESE characterizations of the analysis come from Pierre Lucien's presentation to the Early College Joint Committee Meeting on June 15, 2022.
4. Among the students in the Early College sample, 58 percent are Black or Hispanic and 44 percent are economically disadvantaged.
5. The analysis of MassTransfer initiatives recently published by MassINC is an example of this pattern. The state's efforts to facilitate transfer from community colleges to four-year institutions have had much greater impact for non-low-income students. See: Richard Murnane and others. "Building Stronger Community College Transfer Pathways: Evidence from Massachusetts." (Boston, MA: MassINC, 2022).
6. For more on the cost-effectiveness of postsecondary completion initiatives, see: Ben Forman and Simone Ngongi-Lukula. "Investing in Success Findings From a Cost–Benefit Analysis of Massachusetts Community Colleges." (Boston, MA: MassINC, 2022).
7. Per discussion at Early College Joint Committee Meeting, July 11, 2022.
8. The odds ratio between Early College students and their matched peers is 2.27 (authors' calculation from DESE data).
9. Figures contained in slides presented at the Early College Joint Committee Meeting, February 18, 2021.
10. For the latest evidence on the impact of Massachusetts high schools, see: "Massachusetts High Schools and Students' Longer-Run Outcomes." (Providence, RI: Brown University, August 2022).
11. "Identifying and Implementing Educational Practices Supported by Rigorous Evidence: A User Friendly Guide." (Washington, DC: Institute for Education Sciences, 2003); Makoto Hanita and others. "Matched-Comparison Group Design: An Evaluation Brief for Educational Stakeholders." (Waltham, MA: Education Development Center, 2017).
12. MassINC developed this goal by assuming that Early College could serve 25 percent of low-income students in the state, with low-income participants making up no more than two-thirds of enrolled students. See: Forman and Ngongi-Lukula (2021).
13. Cynthia Coburn and William Penuel. "Research–Practice Partnerships in Education: Outcomes, Dynamics, and Open Questions." *Educational Researcher* 45.1 (2016).