

Early College Designs: *Achieving College- and Career-Readiness for All*

By Rennie Center for Education Research & Policy



Introduction

Success in college is about more than just “getting in.” Acceptance does not guarantee students are ready for more advanced coursework or on a pathway that leads to a career and family-sustaining wage. Many high school graduates struggle to transition to college or postsecondary training programs, as shown by rates of enrollment in developmental—otherwise known as remedial—courses at institutions of higher education. Nearly 36 percent of Massachusetts public high school graduates who enter public colleges or universities in the Commonwealth test into developmental education.^A The rate rises to upwards of 60 percent at community colleges.¹ These courses are a costly detour on the path to college completion.² Students must pay for college classes but do not earn credit toward a degree or certificate necessary for full participation in our knowledge-based economy.

Further, students may be academically prepared but experience difficulty with other aspects of college life. Success in college requires independence, discipline, and resourcefulness, as well as familiarity with the college-going experience. The transition is often particularly difficult for first-generation college students who rely on extended networks of caring adults for support but often do not receive enough guidance to shape college expectations. Without adequate levels of preparation and support, many students choose to leave when confronted with new challenges. Rising costs are also a problem, particularly when academic or non-academic challenges add to the duration and cost of earning a degree. Together, these factors derail many students’ postsecondary education plans: only 41 percent of the approximately 76,000 Massachusetts high school students in the 2007 graduation cohort had earned a postsecondary degree six years later.^{3 B}

Nothing can prepare students for college as well as an actual college experience.⁴ Early college programming allows students to take college courses while still in high school and earn both high school and college credits simultaneously. These programs offer numerous benefits to participants. First, students are exposed to postsecondary academic requirements and cultural norms. Earlier access to rigorous college work means that potential skill gaps can be identified and remediated before students face tuition bills.⁵ These benefits lead to a smoother transition and higher rates of college persistence; 86 percent of early college graduates who enroll in college stay for a second year, compared to 72 percent of all college students nationally.⁶

The promise of a high-quality education leading to opportunity and shared prosperity for all children is a deeply held value in Massachusetts. Despite a record of prominent successes, however, our Commonwealth has struggled to provide students from all backgrounds the supports necessary for long-term life success. To confront this challenge, the Massachusetts Budget and Policy Center and the Rennie Center for Education Research & Policy are undertaking this shared research project: the *Roadmap for Expanding Opportunity: Evidence on What Works in Education*.

This series of reports builds on progress initiated with the Education Reform Act of 1993, addressing critical areas in which progress has stalled. Ultimately, this project will provide a roadmap for bringing education reform into the 21st century. Reports will examine promising evidence-based strategies for supporting all children in achieving college, career, and life success. In particular, analyses will be grounded in a recognition that learning must extend beyond traditional school structures and offerings.

Reports will offer strategies for adapting a broad evidence base to local contexts, including cost analyses to assess the level of resources required to support district and statewide innovation. Ultimately, these briefs are designed to provide education leaders and practitioners with building blocks for driving future educational reforms across the Commonwealth.

^A More than half of Massachusetts public high school graduates enroll in one of the Commonwealth’s public institutions of higher education (e.g., state colleges and universities, community colleges), making remediation rates a noteworthy concern. See Massachusetts Department of Elementary and Secondary Education (2014a).

^B This includes all students graduating from a Massachusetts public high school as part of the 2007 graduation cohort (i.e., starting high school in 2003 and completing a high school diploma in either 4 or 5 years) and completing any postsecondary degree at any institution of higher education (public or private, in Massachusetts or in another state) within the six years following their high school diploma.

Second, early college can help make a degree more attainable by allowing students to accrue credits while still in high school. By earning college credit, students reduce the time and cost of completing a postsecondary program.⁷ Approximately one in every three early college students earns an Associate’s degree or other workforce credential prior to graduating from high school, accelerating his or her trajectory toward a sustainable career path.⁸

Finally, early college experiences can be especially valuable for students who do not think of themselves as college-bound.⁹ In a randomized study, minority and low-income early college students—who have been traditionally underrepresented in postsecondary education—had more successful postsecondary outcomes as compared to peers who did not participate in early college programming.¹⁰ These findings, combined with national evidence on the efficacy of early college programming, suggest that this model may be especially effective for students who lack support from family and friends in setting college expectations.¹¹ Ultimately, in addition to increasing college readiness and completion rates, early colleges have the potential to increase the size and diversity of the college-going population.

Early College Designs in Massachusetts

In Massachusetts, the demand for a highly knowledgeable and skilled workforce has been well-documented; 69 percent of business leaders report having difficulty finding skilled workers for open positions.¹² Other states, including New York, Pennsylvania, Ohio, and Illinois, have been shown to outperform Massachusetts in producing enough high-skilled college graduates to fill jobs and meet labor market demand.¹³ This evidence points to the need for more graduates of the Commonwealth’s public high schools to seek and complete a postsecondary credential—a two- or four-year degree or an industry-based certificate—in order to improve their chances for success in the state’s economy.

National research indicates that early college—structured opportunities for high school students to engage in and obtain credit for college-level courses—is among the most effective strategies for promoting higher rates of postsecondary access, persistence, and completion. Dual enrollment provisions in Massachusetts law enable early college programming by allowing high school students to enroll in the Commonwealth’s public higher education institutions and take college courses that yield both high school and college credit. Students may enroll in a postsecondary institution either full-time or for individual college courses.¹⁴ The Commonwealth Dual Enrollment Partnership (CDEP) is the only state funding source for dual enrollment and is one component of the Massachusetts Department of Higher Education’s strategic initiatives to improve students’ readiness for, awareness of, and access to public postsecondary education. CDEP funds are awarded to public institutions of higher education to offer credit-bearing (non-remedial) courses to high school students on college campuses, at high schools, or online. The Massachusetts Department of Higher Education is responsible for setting student and course eligibility requirements for CDEP-funded dual enrollment opportunities. CDEP offers substantial cost savings to students and their families, as eligible courses are free or offered at a reduced price.^C However, in recent years, the CDEP has only funded a small proportion of the early college experiences available to Massachusetts students.

Early college designs encompass a diverse array of programs. The Massachusetts Department of Elementary and Secondary Education, Department of Higher Education, and Executive Office of Education, with support from Jobs for the Future, recently released a document on the early college design landscape that articulates a range of program models.^D The list of potential models includes, for example, partnerships that link career, vocational, and technical education in secondary school to postsecondary institutions; intensive, cohort-based models to support at-risk students in earning college credit; and programs that span grades 6-14, including those with a specific focus on a particular academic discipline like STEM.¹⁵ The Early College Design Landscape document also highlighted certain early college program components that can have an impact in bridging secondary to postsecondary transitions and building college- and career-ready skills. Aligning with the research base on effective early college partnerships, the list of components includes district and college partnerships, earned college credit, linked high school and college curriculum, career development education, and student support services.

While a number of robust early college designs can be found across the Commonwealth, integrating early college experiences into traditional high schools and/or districts is just beginning to take hold as a viable strategy to promote college and career readiness. Especially for students historically underserved by postsecondary education, including students of

^C Additional information can be found on the [CDEP website](#).

^D Additional information, including the [Early College Design Landscape document](#), can be found on the Massachusetts Department of Elementary and Secondary Education [College and Career Readiness site](#).

color, English language learners, students with disabilities, and low-income students, access to early college experiences can support the development of the skills and knowledge needed to succeed after high school. The literature and programs featured in this report demonstrate the importance of continued exploration and expansion of early college designs as a means of preparing all students for future success.

Study Methods

In this report, the Rennie Center for Education Policy & Research aims to expand the conversation about preparing all students for success in college and the workforce by examining early college designs. Based on a scan of recent literature, the Rennie Center first identifies effective practices in developing early college designs. Then, the team highlights three early college partnerships in Massachusetts to describe how education institutions have implemented research-based practices. Finally, the team compiles cost estimates for replicating program strategies across the Commonwealth's public school districts, focusing on costs shouldered by both high schools and public institutions of higher education.

Case Study Site Selection

The Massachusetts Departments of Elementary and Secondary Education and Higher Education have identified a broad array of options under the umbrella of “early college designs” (including Advanced Placement and International Baccalaureate coursework); the Rennie Center team used particular parameters to select early college programs to profile in this policy brief. Selected programs must:

- Allow students to access rigorous college coursework, while also providing exposure to other aspects of college life;
- Provide students with dual enrollment options, so that academic coursework can be “counted” toward both a high school diploma and postsecondary requirements (i.e., a college degree or credential);
- Have minimal entrance requirements/course pre-requisites, and a foundation of student support services, in order to make these opportunities available to a broader range of students than traditional academic acceleration programs, including student populations underrepresented in higher education; and
- Operate as a partnership between a public high school and a public institution of higher education.

Within these parameters, the team aimed to capture a broad range of early college designs from across the state, while focusing on programs whose practices align closely with research-based recommendations. Selected models included in this paper are:

- A *dual enrollment partnership between Amesbury High School and Northern Essex Community College* where students have the option to enroll in community college courses, offered at Amesbury High School, for credit during their sophomore, junior, and senior years.
- The *STEM Pathway at Marlborough High School*, a grade 6-12 pathway spanning middle and high schools in Marlborough, MA. Students can currently take writing courses through Framingham State University; additional options to advance students' progress in a specific STEM pathway, including online courses, are being planned with Quinsigamond Community College for the 2015–16 school year.
- A *career-oriented dual enrollment program at Mount Wachusett Community College* for 12th graders at Winchendon's Murdock High School. Students can enroll at the community college for up to one year of credit in technical courses, leading to a postsecondary credential in an applied field such as information technology.

Promising Approaches to Implementing Early College Designs

A review of the research literature revealed several salient program characteristics across early college options. The following research-based practices are described in the literature and also are present in the selected early college sites within Massachusetts.

Students complete and obtain credit for rigorous, college-level coursework.

Many of the positive outcomes for students associated with early college are linked to exposing students to more rigorous, college-level coursework than they might otherwise select. Once in college, only 14 percent of early college participants needed remedial work in their first year of college, compared to 23 percent of students nationally.¹⁵ In addition, exposure to more rigorous coursework during high school does not deter students from successfully completing their high school education: 90 percent of students completing college credit as part of an early college model received a high school diploma versus 78 percent of students nationally.¹⁶ All three of the highlighted Massachusetts programs offer students opportunities to complete college courses for both high school and college credit; all three programs target students whose aspirations may not include college, drawing similarities to the national population of students who have enrolled and succeeded in early college programming. Further, in all three programs, the vast majority of participants complete the program's course sequence and go on to enroll in postsecondary education. In the program at Amesbury High School, which specifically targets students who are "on the fence" about pursuing postsecondary education, approximately 90 percent of students who enter the program complete the full three-year sequence and enter college after graduating high school. At Winchendon's Murdock High School, the program aims to provide increased access to postsecondary education, identifying and recruiting participants who might not otherwise seek out college-level coursework.

Knowledge and skill gaps are addressed prior to high school graduation.

As part of the student identification and recruitment process, many early college programs—including the three highlighted in this report—administer college placement tests, such as the ACCUPLACER, to assess students' eligibility for participation.¹⁷ When students' scores indicate that they would place into developmental courses, the programs build in additional support to address areas of academic need. Students at Marlborough High School who are interested in participating in the dual enrollment program with Framingham State University must take the university's writing placement exam. Their scores determine their eligibility for, and placement in, college credit-bearing courses. Students who earn the highest score, a "3," enter into an expository writing course that yields both high school and college credit. This course satisfies the English composition/writing requirement under the MassTransfer Block, allowing for the transfer of credits for general education requirements among Massachusetts' public institutions of higher education.^E Students who score a "2" enroll in a course called Introduction to College Writing, which familiarizes students with the pace, rigor, and content of freshman-level college writing classes. Students earn both high school and college credit for this course, but it does not meet MassTransfer requirements. Students who receive a score of "1" are not eligible to earn college credit, and their identified needs are addressed through the regular high school program of studies. Similarly, Murdock High School in Winchendon offers a developmental math course to students whose ACCUPLACER scores indicate that they are not ready for college credit-bearing math courses. The developmental course is taught at Murdock High School by a Mount Wachusett Community College professor, and students who successfully complete the course are then eligible to enroll in credit-bearing math courses at the community college.

College credit accumulation builds toward a degree or postsecondary credential.

Research indicates that the more college credit students earn while in high school, the more likely they are to complete a postsecondary degree, whether a two-year or four-year degree or a technical credential.¹⁸ Many early college designs have developed an integrated academic program so that students can complete up to two years of college credit and/or an associate's degree at the same time that they earn a high school diploma. All three of the selected Massachusetts programs allow participating students to earn at least 15 college credits, which generally constitutes a semester's worth of credit. Early college students at Murdock High School spend their senior year enrolled full-time at Mount Wachusett Community College—earning both high school and college credit—and graduate with a high school diploma and an industry certificate.

^E Additional information can be found on the [MassTransfer website](#).

Students at Amesbury High School can take a course sequence that enables them to complete up to a year’s worth of college credit during their sophomore, junior, and senior years of high school, allowing many early college participants to subsequently complete a four-year college degree in just three years. Beginning in the 2015–16 school year, students in the STEM early college pathway at Marlborough High School will be able to combine courses from Framingham State University and Quinsigamond Community College to earn up to 15 credits.

Students are exposed to college campuses and new cultural norms.

According to the literature, taking courses on a college campus contributes to the authenticity of the college experience.¹⁹ Location is seen as critical to setting student expectations; nearly half of the early college programming that is part of the national Early College High School Initiative^F is located on a postsecondary campus. Furthermore, when dual-enrolled high school students are mixed in with the college population, they tend to demonstrate greater maturity and act more like college students.²⁰ All three of the selected programs have opportunities for acclimation, ranging from campus visits and tours to taking an entire courseload on a college campus. Students participating in the dual enrollment partnership at Amesbury High School receive student IDs from Northern Essex Community College and are eligible to partake in all campus services and activities. Northern Essex’s staff arranges for campus visits and tours for participating students at least once per year, and students are encouraged to take courses on campus during senior year (when transportation tends to be a less significant issue than for younger students). Murdock High School students spend their senior year fully immersed in college life, taking all of their classes at the Mount Wachusett Community College campus. Exposure to college can begin before high school as well: middle school students in Marlborough who are members of the STEM Early College cohort tour the Framingham State University campus and participate in workshops with chemistry, math, and computer science faculty.

Setting and Supporting College Expectations

Student services that acclimate high school students to college, and support them in taking rigorous college-level courses, are an important aspect of successful early college partnerships.

At **Amesbury High School**, guidance counselors work with students taking **Northern Essex** courses to set college expectations and provide support. Students complete a college success curriculum that is incorporated into their first college-level course and includes a focus on the skills needed to be successful at the college level. Annual campus tours and visits also help acclimate students to college.

Murdock High School seniors who participate in dual enrollment courses do so by spending their entire senior year on the **Mount Wachusett** campus. Students meet regularly with an advisor, both individually and during weekly lunches with the whole student cohort. Students also receive three hours of tutoring per week—one hour with a professional tutor and two hours with a peer tutor.

Students enrolling in **Framingham State University** writing courses at **Marlborough High School** receive one-on-one advising sessions with the high school’s director of the early college partnership.

Student support services are a hallmark of early college designs.

Student supports and “college knowledge” experiences are effective in setting college expectations for students. At a minimum, these types of experiences help students develop their “ability to manage time effectively, recognize when they need help, and navigate campus resources.”²¹ Some programs, such as the Early College High School Initiative, go a step further by engaging all students in a comprehensive support system that develops academic and social skills as well as the behaviors and conditions necessary for college completion. All three of the highlighted programs offer various supports to students, including tutoring, advising, test preparation, mentors, and other readiness strategies. Mount Wachusett Community College offers a wide variety of supports and services to students in their dual enrollment programs, including advisors, professional and peer tutoring, mental health services, and disability coordinators. The cohort of students from

^F Funded since 2002 by the Bill & Melinda Gates Foundation, the Early College High School Initiative has supported the development of 240 early college high schools nationally. An independent program evaluation has shown that students in these schools are significantly more likely than their peers to earn an Associate’s degree after completing their high school diploma.

Murdock High School meets weekly with each other and with their advisor; there also is frequent communication between high school and college staff about students' progress.

Alignment between high school and college curricula facilitates student transitions.

Fulfilling the requirements for high school graduation is meant to signal to students that they are ready for postsecondary education or training, but often this is not the case. Even when students qualify for admittance to college, there often are gaps between where their high school curriculum left off and where the college curriculum begins. Courses that are designed for early college models are most effective when they align high school and college content while utilizing instructional practices that meet high school students' developmental needs.²² The literature indicates that college faculty who teach first-year students have the best knowledge of likely skill gaps, and that these faculty members should backwards map with high school teachers to find points of integration.²³ Further, high school and college faculty can participate in joint professional development, with particular focus on curricular alignment and college readiness skills.²⁴ They also can co-plan support courses (e.g., summer bridge programs) and curricula and review data together. Faculty at Amesbury High School and Northern Essex Community College who teach courses for the early college program jointly develop the syllabi and attend professional development together once a year. In addition, in the 2015-16 school year, Northern Essex will have a full-time Faculty Liaison, who will be paired with a high school teacher to share assessments and resources in order to ensure that an early college course taught at Amesbury High School is comparably rigorous to a course taught at the community college.

Planning for Partnership

Each of the highlighted partnerships has invested significant resources in planning early college programming that aligns high school and college curricula and addresses students' skill and knowledge gaps.

Quinsigamond Community College and **Marlborough High School** have been in the process of developing courses in STEM fields, such as engineering, that will be implemented during the 2015-16 school year and bear credit at both the community college and the high school. Currently, students can take online courses, for college credit only, that support the computer science pathway. Quinsigamond and Marlborough staff meet monthly to plan the program together.

Having completed a one-year planning effort prior to the launch of their partnership, **Amesbury High School** teachers and **Northern Essex Community College** faculty developed a sequence of interdisciplinary courses integrating high school and college literature/English and history courses for students to take.

Mount Wachusett Community College leaders spent a semester and summer working with **Murdock High School** leaders to plan, develop, and seek funding for the Robinson-Broadhurst career education dual enrollment program. An expansion on the community college's other dual enrollment offerings, this program offers high school students the chance to spend their senior year on the Mount Wachusett campus taking up to 35 credits.

Effective partnerships between high schools and colleges are essential.

In effective partnerships, all parties come together to articulate a vision for the program and hold each other accountable.²⁵ Ideally, partners engage in a formal planning process where they work together to define roles and design and implement program components.²⁶ Marlborough High School and Framingham State University committed to a planning year before implementing their program and met monthly to work collectively on a number of issues: conducting outreach to families; figuring out logistics; developing a schedule that would work for both institutions; and standardizing course requirements and content. To foster effective collaboration, the literature recommends programs have at least one liaison—typically employed by the college—who serves as the primary point of contact between the institution of higher education and the high school. This person is responsible for managing administrative aspects of the program; he or she “acts as a bridge between the school and postsecondary institution and helps to resolve problems, identify resources, and foster communication about early college with the college community.”²⁷ All of the partnerships highlighted in this report have a person at both the high school and college who serve as the primary program contact, although it is more common among colleges to have someone dedicated exclusively to this function (albeit managing multiple high school relationships). For example, in the 2015–16 school year, Northern Essex Community College will have both a Linkages Coordinator and a Faculty Liaison. The Linkages Coordinator works closely with program faculty and high school counselors to monitor

student progress and serves as an academic advisor. The Faculty Liaison is responsible for expanding professional development opportunities offered jointly to Amesbury High School and Northern Essex faculty.

Sustainable funding is a challenge.

Neither school districts nor institutions of higher education typically can cover the cost of robust early college designs using existing resources. The amount of available funding often drives programmatic decisions, including how many courses will be offered, where the courses will take place, and how many students will be able to participate.²⁸ One of the primary cost drivers is staff, including instructors, administrators, and advisors/counselors, who have time dedicated to early college programming. For example, Amesbury High School previously offered a standalone “college success” course that students completed at the beginning of the early college sequence, but the concepts covered in that course were later integrated into the interdisciplinary English and history course offered to 10th graders to reduce the number of staff hours and streamline program costs. In most cases, funding comes from a variety of sources, including student fees, grants, and in-kind contributions;²⁹ the three programs featured in this report have all have taken a different approach to funding early college programming (see text box below). Information about the costs associated with the highlighted early college designs and the funding sources used to cover them is presented in the next section.

Staffing

Staffing college-level courses that enroll high school students and often take place at a high school can be a challenge for early college partnerships. They require resources beyond what school districts and higher education institutions may have available. Here are some ways that the selected programs are addressing staffing and resource challenges:

Murdock High School students enroll in existing **Mount Wachusett Community College** classes taught by on-campus college faculty. Program oversight is provided by the vice president of external affairs, communications & K-12 partnerships and the dean of access & transition. In addition, students retain their connection with their guidance counselor at Murdock High School. Mount Wachusett received funding from the Robinson-Broadhurst Foundation, a local private funder in Winchendon, MA, to support this partnership.

Framingham State University writing courses are taught by college faculty at **Marlborough High School**, while **Quinsigamond Community College** faculty teach online college courses. Starting in the 2015-16 school year, Marlborough High School faculty will teach courses that offer both high school credit and community college credit. The program director at the high school provides program oversight and monitoring for both early college options. Marlborough High School received state grant funds to support planning of the STEM pathway, and the school will use additional federal grant funds secured last year to support the program—including additional course offerings—moving forward.

One high school teacher and two adjunct **Northern Essex Community College** professors teach the courses offered at **Amesbury High School**. Program oversight is provided by the principal, assistant principal, and guidance counselor at the high school, as well as the director of K-12 partnerships, the linkages coordinator, and an administrative assistant at the community college. Distinct from the other two partnerships, all costs from the Amesbury High-Northern Essex partnership are underwritten by the high school partner. Students and their families pay a portion of the cost, and the district covers the remainder.

Program Costs

The three early college partnerships highlighted in this policy brief feature different approaches to offering college-level coursework, despite making use of a similar set of research-based program elements. They vary in terms of the number of credits students can earn, where the courses are taught and by whom, and whether the courses were created expressly for the students in a partnering high school or rely on existing college courses in which students can enroll. They also use various revenue sources to pay for tuition and other programmatic expenses, ranging from student fees to flat fees paid by the high school to private grant funding. These differing approaches have implications for total program costs and per-student costs. Recognizing this variation, the Rennie Center team developed cost estimates for each program to address two key questions for policymakers and district leaders:

- What does it cost to provide programming that allows students to earn college credit while still in high school?
- What accounts for the differences in costs across program models?

A resource cost model approach was used to estimate the program costs associated with each of the selected models; that is, the Rennie Center team identified the major “ingredients,” or resources, used by each of the programs to deliver the following key program components:

1. Student Recruitment/Identification/Placement
2. Academic Instruction
3. Student Support Services
4. Materials and Supplies
5. Program Administration and Oversight
6. Program Planning
7. Tuition and Fees

These seven components provide a common framework for organizing resources across the programs. Within each of the program components, we identified specific activities and their associated costs for both the public high school and for the partnering higher education institution to estimate total program costs.

For example, academic instruction in the Amesbury High School-Northern Essex Community College partnership is provided at the high school with course offerings varying both by grade level and by the type of faculty teaching each course. High school faculty teach the literature course, while history courses are taught by adjunct community college faculty. On the other hand, at the Murdock High School-Mount Wachusett Community College program, seniors are enrolled in existing courses at the community college, selecting from a group of allowable certificate-based programs (e.g., accounting or small business management). Activities like these comprise the “package” of resources provided by each partnership included in the study. A dollar value was assigned to each resource according to its market price or unit price, as appropriate. Resource values were then annualized so that the resulting cost estimates reflect the total annual cost per student for the 2013–14 school year.

Also note that tuition and fees are reported as part of total program costs. These were included as an overall program cost to provide a more accurate estimate for other partnerships looking for guidance on the cost parameters for these types of early college designs. It is important to note that tuition and fees may represent a revenue source for the higher education institution if these offset the costs of other program components.

The activities and associated costs related to program planning are described separately. These costs are not included in the total annual costs, as planning activities are a one-time start-up cost and do not recur on an annual basis. All of the planning activities occurred prior to the 2013–14 school year, in some cases more than a year prior. In addition, cost estimates for course options from Quinsigamond Community College are not included in the analysis of the program at Marlborough High School, since dual enrollment course offerings at that institution will not be available until the 2015–16 school year.

An overview of program components and requisite resources is provided in Table 1; more detailed information on the specific resources included in the cost estimates is provided in Appendix B, Table B.1.

Table 1: Program Components included in resource cost estimates, 2013–14 school year

Program Components	Amesbury High School/Northern Essex Community College		Murdock High School/Mount Wachusett Community College		Marlborough High School/Framingham State University	
	High School	Community College	High School	Community College	High School	State University
Student Recruitment/Eligibility	Guidance counselor identifies and recruits eligible students Annual parent night held for eligible students	Administers ACCUPLACER Hosts registration night on campus and at high school	Administers ACCUPLACER Guidance counselor identifies eligible juniors	Staff partners with high school on recruitment	Annual “College Readiness for Parents” event Program Director conducts outreach with parents and students	Administers writing assessment
Academic Instruction	Courses offered at high school Literature courses taught by high school faculty	History, Arts and Sociology courses taught by adjunct college faculty; English Composition (seniors) taught at community college		Seniors enroll in existing courses at the community college Cost-sharing for first-year experience class	College writing and expository writing courses are held at the high school	College writing and expository writing taught by college faculty
	Annual professional development					
Student Support Services	Regular contact with guidance counselor	On-campus support services (e.g., tutoring) Students transported to campus for events and projects three times per year	Regular contact with guidance counselor	Part-time advisor Weekly lunches Professional & peer tutoring Other on-campus support services (e.g., mental health services, disability coordinator)	Regular contact with guidance counselor	On-campus support services (e.g., tutoring) Students transported to campus for a tour and staff presentations
Materials & Supplies	Materials and textbooks			Foundation covers cost of textbooks	Chromebooks	Textbooks
Program Follow-Up, Administration & Oversight	Bi-monthly meetings between high school and community college staff High school guidance works with college’s linkages coordinator to track students		High school guidance counselor tracks students College’s Dean of Access & Transition works with data coordinator to track students and program outcomes		High school’s Program Director works with college’s Associate Vice President of continuing education	
Tuition & Fees	District/families share costs			Private grant funding (to community college) covers tuition and fees	Flat fee per course for up to 20 students paid by district	

Table 2 provides total annual program costs for comparable components across the three programs. For the 2013-14 academic year, costs ranged from \$4,252 for the Marlborough High School-Framingham State partnership to \$11,319 for the Murdock High School-Mount Wachusett program. The third program, Amesbury High School-Northern Essex Community College, fell closer to the low end of the range, with an annual per-student cost of \$4,910. The total per-student costs for each of the programs reflects the number of credits that could be earned by any one student during the 2013-14 academic year. In the two lower-cost programs, students could earn between 3 and 12 credits over the course of the year. In the highest-cost program (Murdock High School-Mount Wachusett), students earned an average of 35 credits during the year—nearly three times the maximum amount that could be earned in either of the other two programs, and the equivalent of about a year of college credit. The number of students participating in each program also contributes to the difference in costs, particularly given the large number of program participants in the Amesbury High School-Northern Essex program (60 students) compared to the small number in the Murdock High School-Mount Wachusett program (6 students).

Table 2: Per-participant resource cost estimates, 2013–14 school year

	Amesbury High School/Northern Essex Community College	Murdock High School/ Mount Wachusett Community College	Marlborough High School/Framingham State University
Resource Costs			
Total 2013-14 Per-Participant Resource Cost	\$4,910	\$11,319	\$4,252
Number of student participants	60	6	25
Number of credits earned per student per academic year	3-12 ^g	35 ^h	4-8 ⁱ
By Program Components			
Student recruitment	\$106	\$246	\$786
Academic instruction	\$2,233	\$132	\$400
Student support services	\$331	\$3,527	\$598
Materials & supplies	\$541	\$1,000	\$392
Program administration & oversight	\$469	\$1,106	\$1,276
Tuition & fees*	\$1,230	\$5,308	\$800**

*Tuition costs are incurred by public school districts and students/families as students obtain postsecondary course credits. Districts have underwritten these costs from multiple funding sources; please see Table 1 for additional detail. Tuition costs may represent a revenue source for the higher education institution if they offset the costs of other program components.

**Note that the tuition and fees costs per student associated with the Marlborough High School/Framingham State University program would be lower if enrollment was at the full capacity of 40 students.

For the Murdock High School-Mount Wachusett program, the largest share of costs comes from tuition and student support services. The student supports available in this partnership are more extensive than in the other two programs and include weekly opportunities for students to meet with both high school guidance counselors and community college advisors. Thus, the costs for this program component in the Murdock High School-Mount Wachusett program at \$3,527 are more than ten times that of the Amesbury High School-Northern Essex program, where costs are \$331.

^g Students can earn up to 9 credits during sophomore year, up to 12 credits during junior year and up to 3 credits during senior year.

^h Students can earn a full year of college credit during their senior year of high school. On average, during academic year 2013-14, students earned 35 credits.

ⁱ Students can earn 4 credits for each of the 2 courses offered by Framingham State University.

The variation in per-student cost for academic instruction is also notable. In the Murdock High School-Mount Wachusett program, students enroll in existing courses at the community college. Because the number of student participants is low (6 students during 2013-14), it is not difficult to place students into existing classes, an approach that keeps costs low (\$132) by minimizing the need for additional staff and other per-student costs associated with increased academic instruction. In the other two programs, students are primarily enrolled in courses taught only for them at the high school. The exclusive use of adjunct faculty (who are compensated on a flat rate per course taught as compared to salaried high school teachers) keeps these costs low in the Marlborough High School-Framingham State partnership (\$400). In the Amesbury-Northern Essex program, the higher cost for academic services (\$2,233) is driven by the use of both adjuncts and regular high school faculty credentialed for community college teaching, as well as the number of courses offered and the number of hours spent with students during each course. In particular, longer course hours increase the overall time spent on academic instruction in Amesbury. These types of choices—course instructor, course length, number of participants, etc.—are critical factors in how resources are ultimately distributed across the key components of an early college program.

The three programs have a range of costs for recruitment activities, from a low of \$106 in the Amesbury High School-Northern Essex program to a high of \$786 in the Marlborough High School-Framingham State program—more than a seven-fold difference. As reflected in Table 1, the Marlborough High School-Framingham State program engages in a broad set of activities from both partners to attract students into the program. The other two programs primarily rely on high school guidance counselors to identify students who are a good fit for the program. Moreover, with a small high school class and space for only six students to participate, the Murdock High School-Mount Wachusett program requires few resources for recruitment.

Finally, variation in the per-pupil costs of tuition and fees largely reflects differences in the approach that each program has taken to covering the costs of enrolling in postsecondary courses. In the Amesbury High School-Northern Essex program, tuition costs are shared by the district and families, each of whom pay a slightly discounted rate per credit. In the Murdock High School-Mount Wachusett program, the full cost of tuition and fees is covered by a grant from a local foundation. In the Marlborough High School-Framingham State partnership, the high school pays a flat fee that allows up to 20 students to enroll in each of the two courses offered.

As Table 3 (below) indicates, there is also tremendous variation in the cost of program planning, ranging from a low of \$252 in the Amesbury High School-Northern Essex program to a high of \$673 in the Marlborough High School-Framingham State program. These differences reflect not only the activities of each partnership in developing its program, but also program size. Although both Amesbury High School-Northern Essex and Marlborough High School-Framingham State engaged in similar, year-long planning processes to develop their programs, the per-student cost for planning in Amesbury High School-Northern Essex was much lower because enrolling a larger number of students (60 versus 25 students) achieved greater economies of scale. In the Murdock High School-Mount Wachusett program, the \$481 per-participant cost is substantially lower than the Marlborough High School-Framingham State program, in part because Mount Wachusett has a great deal of experience in planning early college programs (including many partnerships with area high schools). Indeed, most of the planning costs for that partnership reflect resources committed by the high school.

Table 3: Per-participant resource cost estimates for planning 2013–14 program activities

	Amesbury High School/Northern Essex Community College	Murdock High School/ Mount Wachusett Community College	Marlborough High School/Framingham State University
Program Planning Activities	<p>Amesbury/Northern Essex team participated in a year-long planning process in regular face-to-face meetings</p> <p>Amesbury team included superintendent, director of curriculum, high school principal, and guidance counselor</p> <p>Northern Essex team included two program administrators</p> <p>Faculty planned syllabi and integrated courses</p>	<p>Program capitalized on existing offerings at the community college; a team including the director of dual enrollment, the VP of academic affairs, the cohort advisor, and the dean for access & transition met to identify appropriate programs</p> <p>Two guidance counselors and two school administrators worked together to plan the program details at the high school</p>	<p>Marlborough/Framingham State team planned program one year prior to implementation in monthly face-to-face meetings</p> <p>High school team included program director, principal, vice principal, and one additional administrator each month</p> <p>College team included Associate VP for Academic Affairs, Dean of Continuing Education, professor, and program coordinator</p> <p>High school program director oversaw preparation, organization, and alignment</p>
Resource Costs	\$252	\$481	\$673
2013–14 Number of Student Participants	60	6	25

Considerations

The findings above, which outline the effective practices and associated costs of three Massachusetts early college partnerships, highlight a number of relevant and timely issues for state policy leaders, districts, and higher education partners to consider.

For State Policymakers

Promote the expansion of early college opportunities for students

Early college designs enable Massachusetts' public institutions of higher education—especially the community colleges—to capture students who are not part of the historical college-going population, as well as students who would not necessarily choose public higher education when faced with the full range of postsecondary options. At a time when postsecondary enrollments are beginning to decline, forging enduring partnerships with high schools through early college offers public colleges and universities the opportunity to continue working at full capacity to fulfill their mission. Through dual enrollment, community colleges are able to “prepare students to earn an associate degree or certificate, transfer to a baccalaureate program, or provide vital training to enter or advance in the regional workforce,”³⁰ *all while students are still in high school*. Recognizing this opportunity, the Department of Higher Education has partnered with public colleges and universities on the Go Public! Campaign, which aims to broaden students' knowledge of public higher education options in the Commonwealth in order to attract and retain Massachusetts students. This campaign recently featured dual enrollment as an opportunity for early exploration of the Massachusetts public higher education system.³¹

Issue guidance on the use of Commonwealth Dual Enrollment Program (CDEP) funds

The Massachusetts Department of Higher Education has begun to use a request for proposals (RFP) process for CDEP funds as a way to signal and solicit action around its priorities related to college access, persistence, and completion. However, the Board of Higher Education has yet to establish formal policies for public institutions of higher education and their partners aimed at aligning early college programs with evidence-based effective practices. One reason for this may be that the minimal funding available for CDEP in recent years has limited DHE's influence over program implementation and oversight. Providing more detailed guidance on early college practices would set parameters around the distribution, use, and monitoring of CDEP funds, which may help promote the development or expansion of early college programs.

Fund planning grants to encourage the development of early college designs

Funding for early college opportunities has been a perpetual challenge. Some programs cobble together funds through various sources, including student fees (which only cover costs associated with obtaining course credits) and public or private grants. However, planning for the design and implementation of an effective early college model can be among the most resource-intensive aspects of the program, and these activities are often the most difficult to fund. For example, Marlborough was one of only six districts in the Commonwealth to receive a competitive Race to the Top grant to plan its STEM Early College High School program. While each program should be tailored to meet the needs of particular constituencies, much of what can be learned through initial planning is transferable and can be applied to the development or expansion of other programs. Therefore, funding for planning activities is not only good practice, it also is likely to yield a return on investment that goes beyond the single program being developed; effective planning efforts may even influence state-level guidance on how to build an early college partnership. As part of this planning process, programs could be required to articulate a sustainability plan, leading to careful consideration of how to maximize limited resources.

Districts and Institutions of Higher Education

Develop innovative solutions to reduce program costs between partners

The costs associated with dual enrollment and the lack of sustainable funding are oft-cited impediments to implementing or expanding early college options. However, budgetary constraints should not end the conversation about early college designs. For example, though not featured in this report, Malden High School and Bunker Hill Community College have formed a partnership that meets critical needs for both institutions: Malden High serves as a satellite campus for the

community college at no charge to the college and, in return, Malden High School students may take college-level courses without paying tuition and fees. Additionally, online courses provide a cost-effective way to offer personalized learning and supports for students (and they may be the only option for high schools that are too far from an institution of higher education to make in-person courses feasible). Currently, Marlborough High School and Quinsigamond Community College are experimenting with online courses. However, if online courses are the only option, especially for the first courses in early college sequences, other supports may be needed to acclimate students to college expectations and cultural norms.

Begin preparing students for college on their first day of school

The importance of college readiness spans the preK-12 continuum. Addressing college readiness deficiencies in the latter high school years—or worse, at the beginning of a student’s postsecondary education—is too late for many students to overcome gaps in their preparation for college and career success. Instead, from the time students enter school, their teachers, counselors, and other support personnel should have the tools necessary to identify and attend to any academic, social, and emotional challenges that students face. Furthermore, getting an early start allows students to accumulate the knowledge and skills necessary to complete a rigorous program of studies in high school. College readiness data can and should be used to inform instructional decisions at all grade levels. The Department of Elementary and Secondary Education offers a remarkable array of data and analytic resources through its School and District Profiles, District Analysis and Review Tools (DARTs), and Edwin Analytics. These resources can be used in combination with locally collected information to form a nuanced picture of where the district is and what it needs to do to ensure postsecondary success for all students.

Prepare students for college-level coursework and address readiness gaps

Early college experiences aim to prepare students for the rigor of college-level courses. The Massachusetts Department of Elementary and Secondary Education recommends that students complete the Massachusetts High School Program of Studies (MassCore), which is designed to ensure that “high school graduates arrive at college or the workplace well prepared and reduce the number of students taking remedial courses in college.”³² MassCore sets the tone for college and career expectations and is aligned with admissions requirements at Massachusetts’ public colleges and universities.¹ Students should be made aware of MassCore requirements and understand the implications of those requirements even before they start high school. In addition, soon after students enter high school, educators should have mechanisms in place to gauge students’ college readiness, including participation in early college opportunities. They can then deploy interventions to address knowledge and skill gaps. For instance, students enrolled in college preparatory English at Amesbury High School have their first opportunity to take the ACCUPLACER in ninth grade. Meanwhile, seniors at Murdock High School have the opportunity to take a developmental math course if they do not meet ACCUPLACER qualifying scores as juniors. When they successfully complete this developmental course, they can enroll directly in college-level math courses at Mount Wachusett, helping them stay on track to a college degree.

Develop a staffing structure that supports both students and course instructors

Effective program models require staff whose time is dedicated to ensuring the success of early college partnerships. Staff at both the high school and postsecondary institution need to have opportunities to engage in collaborative planning and evaluation of the program and to be in regular communication with key program participants and stakeholders. Typically, one person at each institution takes the lead in coordinating communication and program monitoring, bringing in additional faculty and staff as needed. Dedicated program staff also tend to be responsible for coordinating professional development for course instructors in order to align content and pedagogy for early college students. For example, while high school faculty likely have mastered content and instructional practices that meet the developmental needs of high school students, they may need support to meet more rigorous college standards. On the other hand, college faculty may need to cultivate new pedagogical techniques in order to deliver content effectively to a younger student population. Finally, program staff must be available to provide consistent guidance and support to students in order to optimize their early college experience.

¹ Most selective private institutions of higher education require the completion of a high school program of studies equivalent to MassCore.

Conclusion

Early college designs enable students to create and fulfill postsecondary aspirations. From getting students to think differently about their futures to equipping them with college degrees or industry credentials, early college designs have the potential to transform the secondary to postsecondary transition for a large population of Massachusetts' students. Early college designs reduce—and in many cases eliminate—the common barriers to college entrance, persistence, and completion, such as insufficient academic preparation, lack of “college knowledge,” and rising costs. Therefore, students who traditionally have been underrepresented in higher education, as well as those who may be ambivalent about their plans after graduation, have the opportunity to jump-start their postsecondary education within a supportive high school environment. Institutions of higher education benefit from early college designs as well, as these opportunities allow them to expand their enrollments and further their missions. Evidence-based early college designs have been proven to improve access to and success in postsecondary education. As Massachusetts is poised to make choices about how extensively these strategies can be used to expand and diversify the population of well-prepared college-bound high school graduates, it is important to consider the long-term benefits of early college for the state's workforce and economic development.

Appendix A: Program profiles for selected early college designs

Amesbury High School Early College Program with Northern Essex Community College

District Context. Amesbury Public Schools serves 2,280 students, with approximately 620 enrolled at Amesbury High School. Demographic characteristics at Amesbury High School reflect the district-wide student population: approximately 92% of students are white, while roughly 4% of students identify as Hispanic. Less than 1% of the student population identifies as African American or Asian. The racial/ethnic composition of the student population varies from the statewide average student population, which is approximately 65% white, 9% African American, 17% Hispanic, and 6% Asian. Similar to the district as a whole, 25% of students at the high school come from low-income households (compared to 38% statewide), and nearly 34% of students are determined to have high learning needs under the state definition, which includes low-income students, and current/former English language learners (compared with nearly 50% statewide).

Program Model. The Early College partnership with Northern Essex Community College (NECC) enables Amesbury High School students to take college courses during their sophomore, junior, and senior years. Courses for sophomores and juniors are taught by both high school and college faculty at Amesbury High School, while seniors may take courses on NECC's campus. All courses yield both high school and college credit.

Program Characteristics

Goals: The program aims to develop students' analytical, writing, and communication skills by providing them with opportunities to take high school and college courses in an integrated learning community.

Students served: In the 2013-2014 school year, 60 students participated in the program (20 per grade). All students enrolled in College Prep English in 9th grade take the ACCUPLACER, and those with qualifying scores are eligible to participate in the Early College program beginning in 10th grade. According to the school's program of study, the program "is designed for students who may not have considered themselves a candidate for college, but have the desire and motivation to attend college."^A

Course sequence: During their sophomore year, students take an interdisciplinary course that integrates high school and college literature/English and history courses as well as a College Success curriculum. In the junior year, high school English 11 and U.S. History II are integrated with college-level American Literature, U.S. History II, Exploring the Arts (ART 106), and Introduction to Sociology (SOC 101). Juniors may also take a dual enrollment course of their choice. Seniors take a course that integrates Senior English with English Composition I.

Staffing: One high school teacher and two adjunct college professors teach the courses offered at Amesbury High School. Program oversight is provided by the principal, assistant principal, and guidance counselor at the high school and the Director of K-12 Partnerships at NECC. In addition, the Linkages Coordinator and an Administrative Assistant at NECC provide critical program support.

Credit accumulation: The program offers students the opportunity to earn up to 24 college credits: nine in 10th grade, twelve in 11th grade, and three in 12th grade. Students are encouraged to complete the full sequence.

Student supports: Northern Essex's Linkages Coordinator works closely with high school faculty and counselors to monitor student progress and serves as an academic advisor to the program, meeting with students periodically (including to select courses). Participating Amesbury High School students have access to on-campus services and supports, including tutoring, counseling, and career services.

Marlborough High School STEM Early College Pathway

District Context. Marlborough Public Schools serves just over 4,500 students, with approximately 1,000 enrolled at Marlborough High School. Demographic characteristics at Marlborough High School are consistent with the district-wide student population: approximately 60% of students are white, while just under 30% of students identify as Hispanic. Approximately 4% of the student population identifies as African American and roughly 3% as Asian. Just over 40% of students at the high school, and the district, come from low-income households, and more than 50% of students have high learning needs under the state definition, which includes low-income students and current/former English language learners. The characteristics of the student population at Marlborough High School also closely resemble the state averages, with two exceptions: the school's Hispanic population is considerably larger than the state average of 17%, and the African American population is about half the state average (8.7%).

Program Model. Through partnerships with Framingham State University (FSU) and Quinsigamond Community College (QCC), Marlborough High School offers students a variety of early college options. The partnership with Framingham State University (FSU) enables students to take up to two college writing courses during their junior and/or senior year. Marlborough also offers a STEM early college pathway that culminates in opportunities to take QCC courses either at Marlborough High School (beginning in the 2015-16 school year) or online.

Program Characteristics

Goals: The goal of the partnership with FSU is to increase college readiness by exposing students to the rigor and content of college-level writing courses. The STEM partnership with QCC intends to embed industry pathways in the high school program and immerse students in a college experience.

Students served: Students who are interested in taking the FSU writing courses must receive a qualifying score on FSU's writing placement exam. In the 2013-14 school year, 18 students enrolled in Introduction to College Writing, and 7 students enrolled in Expository Writing. Also in the 2014-15 school year, 11 students participating in the STEM pathway program took online QCC courses.

Course sequence: Currently, students can take QCC courses that support the computer science pathway, but QCC and Marlborough High School have been in the process of developing courses in STEM fields, such as engineering, where students can earn high school and college credit. These will be implemented during the 2015-16 school year. FSU offers two English courses: Introduction to College Writing and Expository Writing. Each course offers both high school and college credit, but only the Expository Writing course, which requires a higher placement test score for enrollment, qualifies for the MassTransfer Block.

Staffing: FSU courses are taught by college faculty, as are the online QCC courses. Marlborough High School faculty will teach QCC courses in STEM fields that bear both high school and college credit. Program oversight and monitoring for both early college options is provided at the high school level by a program director, and the program director is supported, as needed, by a data coordinator. The Associate VP for Academic Affairs/Dean of Continuing Education oversees the FSU program at the college level, and the Manager for Educational Partnerships oversees the QCC program.

Credit accumulation: Each of the FSU courses yields four credits. Through a combination of AP, online, and in-person courses, students participating in the STEM pathway typically earn an average of 15 to 18 college credits, or approximately one semester's worth. Between the two early college options, students can earn up to a full year's worth of college credit.

Murdock High School

Robinson-Broadhurst Foundation Career Tech Scholarship Program at Mount Wachusett Community College

District Context. Winchendon Public Schools serves 1,360 students, with approximately 325 enrolled at Winchendon’s Murdock High School. Demographic characteristics at Murdock High School compare closely with district-wide student population: approximately 90% of students are white, while roughly 4% of students identify as Hispanic. Nearly 2% of the student population identifies as African American, and less than 1% identifies as Asian. Additionally, similar to the district profile, 45% of students at the high school come from low-income households, and more than 50% of students have high learning needs under the state definition, which includes low-income students and current/former English language learners. While the student population includes a smaller proportion of students of color than the state average, the district does have slightly higher percentages of low-income students and students with disabilities than the state as a whole.

Program Model. The Robinson-Broadhurst Foundation Career Tech Scholarship program is a one-year, full-time dual enrollment program in which students complete the requirements for their high school diploma while simultaneously learning a trade and earning college credits toward a certificate. Participating students take all of their courses at Mount Wachusett Community College during their senior year.

Program Characteristics

Goals: By enabling students to complete their high school diploma while earning a trade certificate, the program intends to provide increased postsecondary options for students, including college enrollment and/or entrance into the workforce.

Students served: In the 2013-2014 school year, six high school seniors participated in the program. Students are recruited in their junior year, and they must obtain a qualifying score on the ACCUPLACER in order to join the program.

Course sequence: During their senior year, students enroll in college courses to meet their high school graduation requirements while also selecting courses from an allowable certificate-based program, including auto tech, allied health, IT support, cyber security, accounting, bookkeeping, analytical laboratory and quality systems, and small business management.

Staffing: Students enroll in existing community college courses, so there are no college faculty who work specifically with this program. However, program oversight is provided by the Vice President of K-12 Partnerships and Dean of Access & Transition. In addition, a half-time data coordinator tracks students and responds to requests for program information. Students maintain their connection to their high school guidance counselor.

Credit accumulation: The program offers students the opportunity to earn a full year’s worth of college credit, which can then be applied to an Associate’s or Bachelor’s degree should students pursue additional postsecondary education.

Student supports: Since participating students spend their entire senior year at “the Mount,” most of the supports are provided on campus by college personnel. Program participants meet regularly with an advisor, both individually and during weekly lunches with the whole student cohort. Students also receive three hours of tutoring per week—one hour with a professional tutor and two hours with a peer tutor. In addition, students are eligible to utilize any of the services available on campus to the broader student community.

Appendix B: An Overview of Study Methods

The Rennie Center team initiated this research by identifying a broad range of early college designs offering dual enrollment options across the state. The team then used four criteria to select programs to profile, while ensuring that selected programs' practices align closely with research-based recommendations. The selection parameters ensured that programs:

- Allow students to access rigorous college coursework, while also providing exposure to other aspects of college life;
- Have minimal entrance requirements/course pre-requisites in the interest of serving as many students as possible, including student populations underrepresented in higher education;
- Operate as a partnership between a public high school and a public institution of higher education; and
- Provide students with dual enrollment options, so that academic coursework can be “counted” for both secondary requirements (i.e., toward a high school diploma) and postsecondary requirements (i.e., toward a degree or credential).

The Rennie Center team chose to highlight three early college partnerships: a dual enrollment partnership between Amesbury High School and Northern Essex Community College; the college writing courses offered by Framingham State University as part of the larger STEM Pathway program at Marlborough High School; and a career-oriented dual enrollment program at Mount Wachusett Community College for 12th graders at Winchendon's Murdock High School.

Data collection and analysis

Once sites were selected, the Rennie Center team conducted 60-90 minute interviews with leaders at the high school and at the college at each of the three programs. The team paid particularly close attention to the activities undertaken to plan the programs, the procedures used for identifying eligible students, the types of courses made available to students for college credit, and the array of student support services offered to enrolled students. The team then compared these program model components to research-based practices identified in the literature scan. Through this process, we sought to identify how the sometimes-broad recommendations from the research are operationalized in the day-to-day work of public education. Ultimately, the team chose to distill and highlight research-aligned program components and practices that have the potential to increase opportunities for higher education success to a broad range of students.

Next, the Rennie Center team constructed detailed resource profiles that described the personnel and non-personnel resources associated with each relevant program component. A resource cost modeling (RCM) framework was used to identify these resources. Specifically, RCM applies an economic lens to educational program costs by first identifying, from the “bottom up,” all of the resources used to provide a service or program (e.g., tutors) and then assigning dollar values to these resources.³³ The strength of this approach lies in its ability to clearly articulate resources used by a program to estimate the costs associated with program operations in a way that other districts or colleges interested in replicating the selected models may apply.³⁴ To do so, RCM calls for enumerating all of the resources used by a program to produce observed effects and then assigning a dollar amount to these same resources.³⁵ The list of ingredients specified depends on the nature of each program's approach. Given the study's focus on early college designs, resource profiles and corresponding cost estimates reflect the personnel and non-personnel resources associated with supporting high school students in participating successfully in college level coursework, including costs associated with planning the program, preparing faculty to teach in the program, and tuition and fees. In order to standardize program model costs, estimates for district-level personnel are based on state average salary data for teachers and administrators. Similarly, costs for adjunct faculty are also based on average salary. Cost estimates for college staff (e.g., dean of K-12 partnerships) were based on actual salary data. Tuition was also based on actual rates for each of the participating institutions. Additional details are presented in Appendix C.

Study Limitations

As part of the analysis conducted for this study, the Rennie Center team selected practices found to be common across selected early college models that are also aligned to the research base. However, there are a number of limitations to the conclusions that the Rennie Center team was able to draw based on the program and cost data collected for this study. With respect to the cost estimates, it is important to note that only the dedicated program services provided to students who attend each program are included in these estimates. As noted in the body of the report, support services such as advising, tutoring,

or counseling are key components of early college designs and provide opportunities for students to engage in a comprehensive support system that develops early academic and social skills. Although each of the included programs offers a broad array of services to students, these support services are available to all students who attend the college. The extent to which the high school students availed themselves of these resources was unknown by program administrators and beyond the scope of our study to determine. Therefore, the costs of the programs are underestimated to the extent that the high school students are making use of the system of support services that each college provides.

Second, it was difficult to estimate the true costs of the efforts that went into planning each program. Because each of the programs was developed a number of years ago, the retrospective data provided by those who were interviewed may not be completely accurate. Moreover, in some cases, administrators who are currently engaged in program operations were not engaged in the planning process and those who were involved were no longer available to the research team. Thus, the cost estimates again may be understated as some respondents were unaware of all of the players and resources that went into the careful planning and development of each program.

Finally, because the programs are relatively new in terms of their operation and where students are in their postsecondary trajectory, the outcomes for students who participate in the program are not typically known. While the programs align well with the research suggesting that these types of programs will contribute to postsecondary persistence and success, the extent to which this is known for these programs is limited.

Table B.1: Program components included in resource cost estimates

	Amesbury High School/Northern Essex Community College	Murdock High School/ Mount Wachusett Community College	Marlborough High School/Framingham State University
Program Planning^K	<ul style="list-style-type: none"> •Amesbury/Northern Essex team participated in a year-long planning process in regular face-to-face meetings •Amesbury team included superintendent, director of curriculum, high school principal, and guidance counselor (30 hours each) •Northern Essex team included two program administrators (30 hours each) •Faculty planned syllabi and integrated courses (Five faculty members @15 hours each) 	<ul style="list-style-type: none"> •Program capitalized on existing offerings at the community college; a team including the director of dual enrollment, the VP of academic affairs, the cohort advisor, and the dean for access & transition met to identify appropriate programs (1 hour each) •Two guidance counselors and two school administrators worked together to plan the program details at the high school (10 hours each) 	<ul style="list-style-type: none"> •Marlborough/Framingham State team planned program one year prior to implementation in monthly face-to-face-meetings •High school team included program director, principal, and vice principal (30 hours each) and one additional administrator each month •College team included Associate VP for Academic Affairs, Dean of Continuing Education, and professor/program coordinator (30 hours each) •High school program director oversaw preparation, organization, and alignment (60 hours)
Student Recruitment/Eligibility	<ul style="list-style-type: none"> •ACCUPLACER, MCAS scores, attendance and other data used to identify eligible students (@\$16 per student) •High school guidance counselor identifies and recruits eligible students (.05 FTE) •Annual parent night held at high school for eligible students (NECC staff and AHS staff 1 hour each) •Registration night held on Northern Essex campus as well as on high school campus for students who cannot attend community college registration night (NECC staff and AHS staff 1 hour each) 	<ul style="list-style-type: none"> •ACCUPLACER used to identify eligible students in junior year, as identified by high school counselors (@\$16 per student) •Community college staff work closely with high school guidance counselors to recruit students, with a focus on low-income, first-generation college students (20 hours) •Two high school guidance counselors identify candidates for the program (5 hours each) 	<ul style="list-style-type: none"> •Framingham State University writing assessment administered by testing administrator for placement (.05 FTE) •Annual “College Readiness for Parents” event provided at the high school by Program coordinator (4 hours) •Activities of high school program director include marketing program, communicating with parents, meeting with students across grade levels, meeting with middle school and high school leaders (.10 FTE) •Development of marketing materials such as brochures, website material (\$1000)

^K Costs for program planning are not included in overall program costs as most planning activities occurred prior to the 2013-14 school year. These costs are reported separately.

<p>Academic Instruction</p>	<ul style="list-style-type: none"> •Most course offerings provided at high school and differ by grade level^L: •Literature courses at high school taught by high school teacher (.67 FTE) •Interdisciplinary courses (with some combination of history, arts, sociology, and college success strategies) taught to sophomores and juniors by adjunct college faculty (8 FTE) •English Composition (seniors) taught at community college (1 adjunct course) •Annual professional development provided to program faculty (5 faculty @ 4 hours each) 	<ul style="list-style-type: none"> •Seniors enroll in existing courses at the community college, selecting from allowable certificate-based programs, including auto tech, allied health, IT support, cyber security, accounting, bookkeeping, analytical lab and quality systems, and small business management (marginal costs not included in estimates) •Cost-sharing for first-year experience class (.25 FTE adjunct faculty) 	<ul style="list-style-type: none"> •College writing and expository writing taught at the high school by college faculty for 15 weeks, 100 minutes per week (2 adjunct courses)
<p>Student Support Services</p>	<p>Community College</p> <ul style="list-style-type: none"> •Provides on-campus support services (e.g., tutoring) available to students (participation rate unknown) •Students transported to campus for events and projects three times per year (\$360 per trip plus food costs of \$1000) <p>High School</p> <ul style="list-style-type: none"> •Guidance counselor (.25 FTE) 	<p>Community College</p> <ul style="list-style-type: none"> •Part-time advisor (6 hours weekly) •Weekly lunches with students, advisor, and occasionally the Dean of Access & Transition (1 hour weekly plus food cost) •Ad hoc support from VP of K-12 partnerships (1 hour monthly) •Professional Tutoring (1 hour weekly per student) •Peer Tutoring (2 hours weekly per student) •Other on-campus support services available (e.g., mental health, disability coordinator) available to students (participation rate unknown) <p>High School</p> <ul style="list-style-type: none"> •Guidance Counselor (2 staff, 1 hour each per week) 	<p>College</p> <ul style="list-style-type: none"> •On-campus support services (e.g., tutoring) available to students (participation rate unknown) •Students transported to campus for a tour and staff presentations (\$700) <p>High School</p> <ul style="list-style-type: none"> •Guidance counselor (.20 FTE)
<p>Materials & Supplies</p>	<p>High School</p> <ul style="list-style-type: none"> •Materials for college success course (\$450) •Textbooks @ \$200/student 	<p>Community College</p> <ul style="list-style-type: none"> •Mount Wachusett Foundation covers cost of books @ \$1,000/student/year 	<p>High School</p> <ul style="list-style-type: none"> •Textbooks @ \$200/student •Chromebooks (16 @ \$300 each)

^L Adjunct faculty spend four times as long with students in this program as with students in typical college courses and are compensated accordingly. Thus, resources for the 5 faculty who teach in the program work out to the equivalent of 20 adjunct faculty positions.

<p>Program Follow Up, Administration & Oversight</p>	<ul style="list-style-type: none"> •Bi-monthly meetings between high school and community college staff <p>Community College</p> <ul style="list-style-type: none"> •Director of PK-12 partnerships (.10 FTE) •Linkages coordinator (.10 FTE) •Administrative assistant (.10 FTE) <p>High School</p> <ul style="list-style-type: none"> •Principal (4 hours monthly) •Assistant principal (4 hours monthly) •Guidance counselor tracks students (.05 FTE) 	<p>Community College</p> <ul style="list-style-type: none"> •Dean, Access & Transition (1 hour/week) •Data coordinator provides responses to ad hoc requests regarding program and tracking students (20 hours) <p>High School</p> <ul style="list-style-type: none"> •Guidance counselor (2 staff, 1 hour each/week) 	<p>College</p> <ul style="list-style-type: none"> •Associate VP of continuing education (.10 FTE) <p>High School</p> <ul style="list-style-type: none"> •Program director (.15 FTE) •Data coordinator provides support to program director on ad hoc basis (20 hours)
<p>Tuition & Fees</p>	<p>High School</p> <ul style="list-style-type: none"> •District contributes 35% of cost (\$430 per student) <p>Students/Families</p> <ul style="list-style-type: none"> •Families contribute 65% of cost (\$800) 	<p>Community College</p> <ul style="list-style-type: none"> •Private grant funding covers tuition and fees @ \$5,308 per student 	<p>High School</p> <ul style="list-style-type: none"> •Flat fee of \$10,000 per course for up to 20 students per course (no family contribution)
<p>Number of student participants (2013–14)</p>	<p>60 students (20 per grade level)</p>	<p>6 students</p>	<p>18 students enrolled in college writing 7 students enrolled in expository writing</p>

Appendix C: Resource Values

Table 4: Resource Values Used in Calculations of Cost Estimates^M

Personnel	State Average Salary	State Average Salary with Benefits*	Information Source
Licensed Teachers	\$70,962	\$91,896	Massachusetts Department of Elementary & Secondary Education: http://profiles.doe.mass.edu/state_report/teachersalaries.aspx
Administrators	\$111,600	\$143,964	http://nces.ed.gov/surveys/sass/tables/sass1112_2013311_d1s_010.asp
Counselors	\$55,000	\$71,225	http://www.indeed.com/salary/q-Guidance-Counselor-l-Massachusetts.html
Adjunct Faculty	\$3,177	N/A	https://mccc-union.org/DCE/Salary_Seniority_Basics.htm

*Assumes a benefit rate of 29.5%

^M Actual salaries for college administrators and staff involved in each program (e.g., VP of K-12 Partnerships, Advisors) were used to calculate the costs of resources contributed by such staff to each program. Salary data were found at:
<http://www.masslive.com/politics/index.ssf/>.

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