TAPPING THE POWER OF HEALTH PATHWAYS IN EARLY COLLEGE HIGH SCHOOLS

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ACKNOWLEDGMENTS

We would like to express our gratitude to all of the members of the working group. These leaders selflessly donated their time and expertise to the project, actively participating in meetings, promptly responding to various inquiries and requests throughout the process, and carefully reviewing and commenting on the draft report. We would also like to recognize the extensive support we received from our partners at the Massachusetts Business Alliance for Education. This project would not have been possible without their assistance with research and convening. Finally, we are extremely grateful to the Richard and Susan Smith Family Foundation for underwriting this research. While these leaders and organizations provided invaluable contributions to the project, the authors bear all responsibility for the analysis and recommendations contained in this report.

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ABOUT MBAE

The Massachusetts Business Alliance for Education (MBAE) and the employers we represent believe that an excellent public education system is the essential foundation of a sound and equitable economy. We promote and support continuous improvement in our schools and innovation that is needed to ensure that EVERY student receives a high quality education that prepares them for success in college, career and citizenship.

ABOUT MASSINC

MassINC's mission is to make Massachusetts a place of civic vitality and inclusive economic opportunity by providing residents with the nonpartisan research, reporting, analysis, and civic engagement necessary to understand policy choices, inform decision making, and hold the government accountable.

Graphic Design

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Suggested Citation

Ben Forman and Simone Ngongi-Lukula. "Tapping the Power of Health Pathways in Early College High Schools." (Boston, MA: MassINC, 2023).

Dear Friends:

The Massachusetts Business Alliance for Education (MBAE) and MassINC have each issued recent reports highlighting the need to strengthen secondary education to grow and diversify the commonwealth's skilled workforce.

Drawing from successful models in other states, MBAE's research described strategies to redesign high schools to provide true pathways to college and careers. MassINC's study presented a broad outline for how Early College high schools can offer such pathways.

The document you find before you today is an effort to advance these ideas with a blueprint to help education and health policymakers and practitioners design, strengthen, and scale Early College health care pathway programs.

From the high cost of delivering instruction to extremely tight regulation around training modes, a constellation of issues make health care by far the most difficult pathway to create high school to college linkages. While this blueprint does not resolve all of these issues, we have tried our best to surface them and present potential solutions.

To the extent that we have succeeded, recognition is due to the many leaders who selflessly devoted hours of their time to help us generate this strategy. On the inside cover, we acknowledged each member of our working group. While their participation in this project was invaluable, it is even more important to appreciate that each of them has contributed years of service to this cause. Without their efforts, we could not make a compelling case that Massachusetts is just a few steps away from building truly robust Early College health pathways.

This document is the beginning of what we hope will be a long and fruitful journey. MBAE and MassINC are eager to further this conversation, working with state and local leaders to refine and improve upon the ideas presented here. We hope that you will join us. Together, we can ensure that all students in Massachusetts fully develop their talents and deliver on their passion to care for our health and well-being.

Sincerely,

Ed Lambert
Executive Director
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President & CEO
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I. INTRODUCTION

Nearly 60 high schools in Massachusetts now operate designated Early College programs, and dozens more are launching them. To receive a designation from the state, Early Colleges must provide students with a choice of "guided academic pathways." Each pathway should include sequenced courses that allow students to progress in a broad field of study, as well as career exploration and development opportunities that offer exposure to high-demand occupations within the discipline.

Health is by far the most common and most popular pathway. Nearly all state-designated programs offer health, and administrators report that generally half of their Early College students select it.[1] At present, these pathways are underdeveloped, both in terms of their academic offerings and the pathway-focused counseling, mentoring, and career development experiences that students receive. But as Early College programs expand and mature, their health pathways have real potential to provide a systemic solution to our increasingly acute health care workforce crisis.

This paper presents a strategy to seize the opportunity. Drawing from conversations with more than two dozen leaders in health care, higher education, Early College, and workforce development, we map out a model pathway that allows students to explore their interests in clinical professions and puts them on a firmer and faster course through postsecondary studies and into medicine, nursing, and allied health careers. With this map as a blueprint, we detail actionable steps that state leaders and local Early College programs can take to build out this model health pathway.

But first, we present the value proposition for focusing attention and resources on Early College health pathways. Our hope is that readers across domains (educators, health providers, workforce development intermediaries, licensing boards, and policymakers) will gain a full appreciation of the unique opportunity that Early College presents as a disruptive solution to the health care workforce crisis, and that they will be inspired to contribute to collective efforts to make Early College health pathways more robust for thousands of aspiring clinicians.

II. THE VALUE PROPOSITION

Health care is not the only industry struggling to hire skilled workers. The Massachusetts economy is heavily reliant on talent, and the talent pipeline has slowed to a trickle, with international migration ebbing, domestic outmigration accelerating, the population aging, and young residents entering the workforce struggling to rebound from the learning disruptions of the COVID-19 pandemic. Absent a departure from current patterns, MassINC projections suggest the state will lose up to 200,000 prime working-age, college-educated residents before the end of this decade.[2]

Nowhere is the workforce crisis more intense than in health care. Serious staffing issues hampered the industry for years. Then the pandemic arrived, putting unmanageable demands on an aging and depleted corps of clinical workers. The resulting burnout has further slimmed their ranks, making it harder to train replacements. The Massachusetts Health and Hospitals Association reports that Massachusetts hospitals are 19,000 workers short, including an astoundingly high vacancy rate of 56 percent for licensed practical nurses.[3] According to a recent survey from the Massachusetts Medical Society, half of doctors plan to reduce their hours or leave the field altogether, in large part due to lack of nurses and clinical staff turnover.[4] The workforce shortage is an increasing area of concern for the state's Health Policy Commission, which has sought to draw attention to how the problem undermines efforts to contain rising medical costs.[5]

Remedying this situation will require a large and systemic workforce development intervention. There are four compelling arguments for why Early College offers a strong foundation for such an undertaking:

1. **Early College is doubling the likelihood that students enroll and persist in college.** All clinical health occupations (with the exception of low-wage assisting positions) require college degrees. At present, Early College is our most powerful college completion intervention. Massachusetts rigorously monitors the outcomes of students pursuing higher education through Early College. Data shows programs are doubling the odds that students enroll and persist in postsecondary programs.[6] Few interventions to increase college access and success have this much impact. While there are numerous explanations for the intervention's outsized performance, perhaps the most significant is how it reaches students during a critical phase of their college and career identity development. A vast body of literature shows that students form durable impressions about what they are interested in and capable of achieving in life during late-adolescence. These impressions heavily influence whether they will pursue and succeed in challenging STEM courses. For health fields that require an understanding of basic math and science, a well-developed intervention during this highly consequential period of personal growth and development can have powerful impact.[7]

2. **Early College has momentum to achieve scale. Even the most effective workforce initiatives will have little benefit if they cannot successfully scale.** Early College is on a strong upward trajectory, growing from around 1,800 students in 2019 to more than 5,000 today. Inspired by their success, educators are working harder than ever to expand access to Early College to thousands more students who can benefit. Public and private resources are converging around their efforts.

   Last year, nearly 100 organizations came together to form the Massachusetts Alliance for Early College. Members share the goal of increasing annual enrollment to over 45,000 students by the end of the decade.[8] Our rough

estimates suggest this volume of students progressing through Early College could increase the number of health graduates from Massachusetts public and private colleges who enter the commonwealth's health care workforce by approximately one-quarter annually **(see box on p. 5)**.

The state legislature is steadily providing the support necessary to reach this scale, tripling investment in Early College over the past two budgets.[9] Drawing on proceeds from the Student Opportunity Act, federal recovery funds, and other local sources, school districts are also devoting more resources to their Early College programs. And private philanthropy is playing a critical role. The Smith Family Foundation, the State Street Foundation, the Gates Foundation, and several other philanthropic organizations are helping Early College partnerships experiment with innovative delivery models and other approaches to reach more students and enhance the quality of their Early College offerings.

3. **Early College will diversify the health care workforce and increase the efficiency of public and private investment in higher education.** Patients of color often experience worse treatment outcomes because people of color are significantly underrepresented at higher levels of the health care workforce.[10] Inequity in both K–12 and higher education makes it difficult to staff health care institutions in a manner that reflects increasing patient diversity. The struggles students of color experience attempting to navigate the path through community colleges and into health careers are especially apparent.

   In Massachusetts, the majority of students of color pursue higher education through community colleges. While data is lacking, anecdotal reports suggest many enter with the hopes of preparing for a high-salary health profession. But students of color struggle to gain admittance to the selective health programs that community colleges offer. This leads to large disparities. For instance, White students make up less than half of community college enrollment, but more than two-thirds of completers in nursing.[11]

   Of all the community college completion challenges we face, inequities in health arguably deserve the most attention. Failure to achieve their postsecondary aspirations is enormously costly for students of color. Underserving these students is also costly for taxpayers and clearly contributes to the erosion of our health care workforce, as students of color make up an increasingly large share of graduates from Massachusetts high schools.

   Early College can remedy these disparities because it is particularly effective at supporting underserved students. Students of color currently make up nearly two-thirds of enrollment in Massachusetts's Early College programs, and unlike many educational interventions that inadvertently widen achievement gaps, the increases in postsecondary enrollment and persistence for students of color in Early College exceed the gains of White students.[12]

4. **By challenging us to seek solutions to the structural issues that lead so many students who aspire to clinical health careers to drop out along the way, Early College can be a disruptive force for the health care industry.** From lack of advising for students with an interest in health careers to a dearth of clinical instructors, our investigation of health pathways has surfaced a list of things that need fixing in order to position underserved students for success in health majors **(see box on p. 6)**. Health industry leaders can harness the momentum behind Early College to focus attention on these longstanding issues and bring about durable solutions.

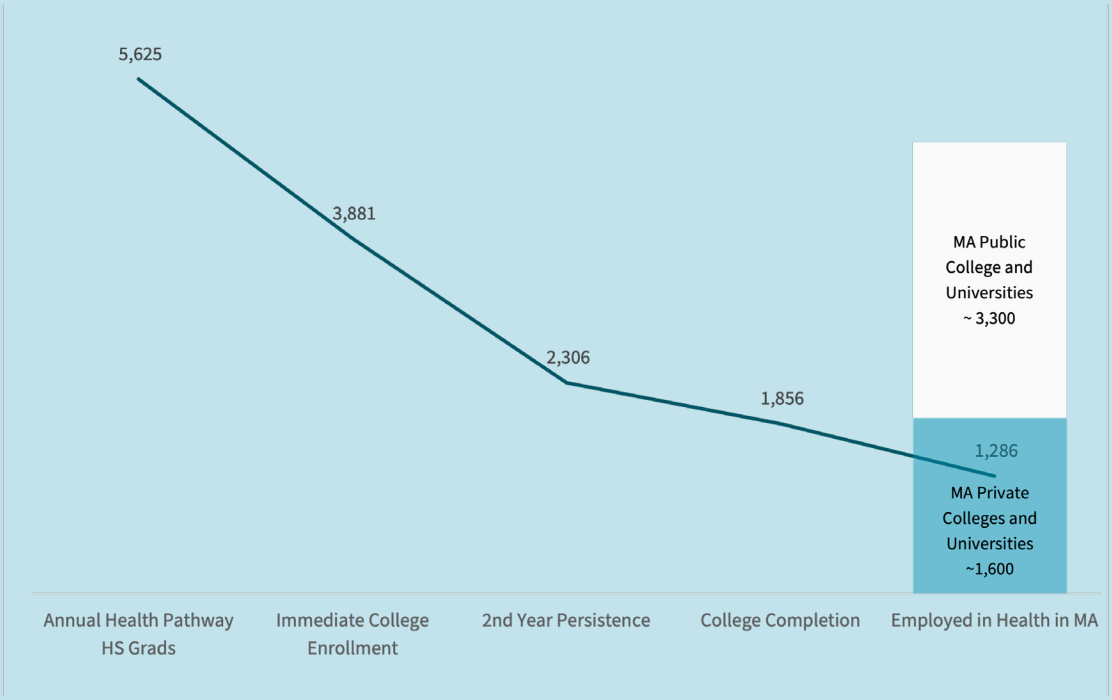
SIZING UP THE POTENTIAL IMPACT OF EARLY COLLEGE HEALTH PATHWAYS

There are still many unknowns when it comes to Early College's influence on student majors, due to data limitations at this relatively early stage. However, as more data becomes available, it should show that the intervention produces even higher yields in health care. Studies find a student's perceptions about their likelihood of succeeding in a major significantly influence the likelihood that they will select it.[13] If students believe Early College will help position them for success in health, they will be more likely to go into health. And if Early College does in fact prepare them well for the pathway, those who enter health majors will be more likely to complete them. While we lack the data to demonstrate these differential impacts for health, we can still begin to approximate the impact of Early College using the average effect size.

If the Early College initiative reaches 45,000 students in grades 9 – 12, there will be approximately 11,250 high school graduates each year, 5,625 of whom will exit via the health pathway, assuming half of Early College students continue to opt for this pathway. Under current trends, 70 percent of Early College students continue to college immediately, 40 percent will persist to a second year, and roughly one-third will earn a postsecondary degree.[14] US Census Bureau data indicates approximately 70 percent of graduates with health degrees from two- and four-year public colleges in Massachusetts are employed in health care in Massachusetts five years after graduation. If this final yield is similar for Early College pathways, they will ultimately contribute approximately 1,200 workers annually.

To put this figure in context, public two- and four-year colleges and universities currently produce 3,300 health graduates annually for the Massachusetts workforce, and the state's private colleges and universities contribute another 1,600. Early College's estimated yield is equivalent to approximately 25 percent of this total. While we do not know how many Early College students might have entered this pipeline absent the intervention, it is likely a modest number given that these students are underrepresented in higher education generally and especially in selective health programs.

Figure 1: Early College health pathways operating at scale could increase the number of health graduates entering the health care workforce in Massachusetts by 25 percent annually.



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

REMOVING SYSTEMIC BARRIERS TO POSTSECONDARY SUCCESS IN HEALTH: A TO-DO LIST

The foremost issue is lack of clinical instructors and supervisors. Public colleges and universities in Massachusetts do not have the faculty to provide clinical instruction to the volume of students that they currently serve, let alone the large infusion that Early College health pathways could provide.

This problem is particularly acute at the community college level, where the starting salary for a full-time nursing instructor with a master's degrees is between $55,000 and $70,000. The median salary for a nurse with a master's degree in Massachusetts is about double at $130,000.[15]

The compensation issues are a function of two problems. First, faculty at Massachusetts's public colleges and universities receive pay that is below the national average, despite the facts that this is a high-cost state and that faculty at private colleges in Massachusetts receive the highest pay in the country.[16] Second, collective bargaining agreements for public colleges and universities require salaries to be based mostly on the highest degree earned and years of teaching experience.

In health, where educators provide clinical care in addition to teaching instruction, this creates extreme distortions. Nursing faculty must maintain board certification. They must also assume primary responsibility for patient care and all of the attendant stress when leading students on rotations. However, they receive no compensation for the treatment that they administer. While full-time faculty may have light enough courseloads to allow them to add to their income with part-time nursing shifts, this compensation formula clearly is not producing a sufficient supply of clinical educators.

The field is also struggling with a shortage of preceptors, nurses, and other clinicians who oversee students on their final rotations. Pandemic burnout has left health care facilities with fewer experienced staff interested in filling these roles. Recently, the Board of Registration in Nursing increased the educational requirements for preceptors, which is likely to exacerbate the problem.

From the student perspective, lack of capacity creates major obstacles to success. Many students have difficulty enrolling in required courses, slowing their progression. Research consistently shows that this leads to significant reductions in the likelihood of degree completion.[17] Even more concerning for Early College, students can meet all of the minimum requirements but still not receive admission to a clinical program because space is limited. Many selective health programs at community colleges have twice as many qualified applicants as they can serve.

Early College health pathways cannot deliver on the promise unless we respond to longstanding capacity limitations that have been leading us to underserve the least privileged students seeking access to one of the most viable pathways for economic mobility in our state. If the momentum behind Early College can help us to reckon with these issues and provide breakthrough solutions, there is no doubt that it will be a major victory for equity, better health, and health-cost containment in our commonwealth.

RELATED HEALTH PATHWAYS EFFORTS IN MASSACHUSETTS

Early College pathways are not the only on ramp to health careers in Massachusetts high schools today. In recent years, the state has built over 40 health care and social assistance Innovation Pathways in high schools across the state. These programs are designed to guide students to relevant postsecondary education and training. Each one operates in partnership with the local workforce board and employers. Students complete at least two technical courses and at least two college-level classes aligned to an industry-recognized credential. They also receive 100 hours of work-based learning through an internship or capstone project.

In addition, access to clinical health training is provided through Chapter 74 programs at both career/vocational technical education (CVTE) high schools and comprehensive high schools. This includes medical assisting programs at 18 schools and dental assistant programs at 21.

Large urban high schools may offer Early College, Chapter 74 programs, and Innovation Pathways. With all of these offerings, some enterprising students find it possible to participate in and benefit from more than one program over the course of their high school educations.

It is also worth noting that the state has also made considerable effort to provide entry points for adult students through “after dark” programs at CVTE high schools. Currently, a dozen of these schools offer licensed practical nurse training. Increasingly, students in Early College pathways may have parents or other family members participating in these programs, increasing their knowledge of the field and the training required to succeed in clinical health careers.

III. A MODEL EARLY COLLEGE HEALTH PATHWAY MAP

While each Early College must tailor its health pathway to the needs of students, partners, and regional labor markets, variation should be relatively subtle. Standardization will ensure that Early College health pathways connect students seamlessly to as many postsecondary institutions as possible in Massachusetts. Uniformity will also provide economies of scale, giving students access to a more robust set of advising and career development experiences. By ensuring that there is synergy across programs, health pathways will produce stronger outcomes, operate more cost effectively, and generate a larger contribution to the health care workforce in the aggregate.

Standardizing the construction of health pathways begins by articulating a set of design principles. Below we offer six design principles and then map out an illustrative Early College health pathway that adheres to them.

Six Design Principles

1. **Build Early College health pathways that prepare students for admission to selective clinical programs.** Health pathway designers should focus their efforts on nursing and other clinical careers. To be sure, there are other high-demand occupations in fields like medical record keeping and health care management. However, these positions do not require a strong academic foundation in the sciences. Moreover, the labor force needs are generally not as acute, and the racial and ethnic disparities in degree completion are not as wide.

   Programs must acknowledge that Early College is fundamentally about success in college. Health pathway designs may include opportunities for students to earn non-credit-bearing certifications, but this is not the end goal. The foremost focus must be positioning students to succeed in high school and take the college courses necessary to gain entry to selective clinical degree programs.

   At present, many Early Colleges actively avoid enrolling students in these courses out of fear that students will have trouble getting the grades necessary to receive admission to nursing and other highly competitive degree programs. We must commit to building strong Early College health pathways that give students the motivation and support necessary to tackle this coursework so they can begin their postsecondary journey assured of their place in a clinical training program.

2. **Give students the opportunity to earn an associate degree.** Graduating underserved students from high school with a large number of transferable college credits and admission to a selective health program is transformational, but program designers can aim even higher. Students in health pathways should have the ability to graduate from high school with an associate degree. This unique opportunity is what draws many students to Early College and elicits greater academic commitment from them. Providing associate degree options, particularly associate degree paths that transfer seamlessly to four-year degrees, is critical if Early College is going to achieve the scale necessary to have meaningful impact on the state's workforce crisis and help close growing racial, ethnic, and socioeconomic disparities in college degree attainment in health.

Building pathways that lead to an associate degree in health is especially difficult because clinical programs require rotations in health care facilities beginning in the second year. Early College partnerships must find ways to overcome this barrier. The addition of a fifth year to the pathway, a common practice in Early College throughout the country and a model that Massachusetts is currently piloting, may provide the most practical solution.

3. **Select major offerings based on current local labor market conditions.** From dental hygiene and physical therapy to nursing and radiology, there are a wide variety of clinical health fields. Early College health pathways cannot serve all of them well. Regional labor market conditions should be the primary factor when selecting majors for incorporation. Early Colleges must regularly review earnings and job opening data with their partners to make informed decisions about which majors to offer, as regional health care labor markets fluctuate significantly over time.

Figure 2 demonstrates why such discipline will be necessary. Projections show Massachusetts will need nearly 6,000 additional nurses each year through 2030, with median salaries approaching $100,000. While respiratory therapy pays approximately $75,000 per year with only an associate degree, there will be fewer than 200 job openings for this position. If Early College pathways deliver at their potential, they could quickly saturate this market.

Figure 2: Labor market data shows wide variation in salaries and the number of projected annual job openings for health professions in Massachusetts.

Field	Occupation	Annual Job Openings (projected to 2030)	Median Salaries
Counselors and Health Aides	Community Health Workers	320	$48,120
	Health Care Social Workers	1,170	$61,000
	Home Health Aides	18,030	$36,300
	Mental Health Counselors	2,180	$48,960
Dental	Dental Hygienists	390	$95,360
	Dentists	130	$164,480
Nursing	Registered Nurses	5,900	$94,960
	Licensed Practical and Licensed Vocational Nurses	1,320	$60,190
	Nursing Assistants	5,200	$37,370
Pharmacy	Pharmacists	350	$128,160
	Pharmacy Technicians	800	$37,240
Physical and Occupational Therapy	Physical Therapists	520	$96,410
	Physical Therapist Assistants	360	$64,980
	Occupational Therapists	380	$95,870
	Occupational Therapy Assistants	200	$62,910
Technicians	Respiratory Therapists	180	$77,060
	Radiologic Technologists and Technicians	460	$77,360
	Phlebotomists	510	$44,830

Source: US Dept. of Labor

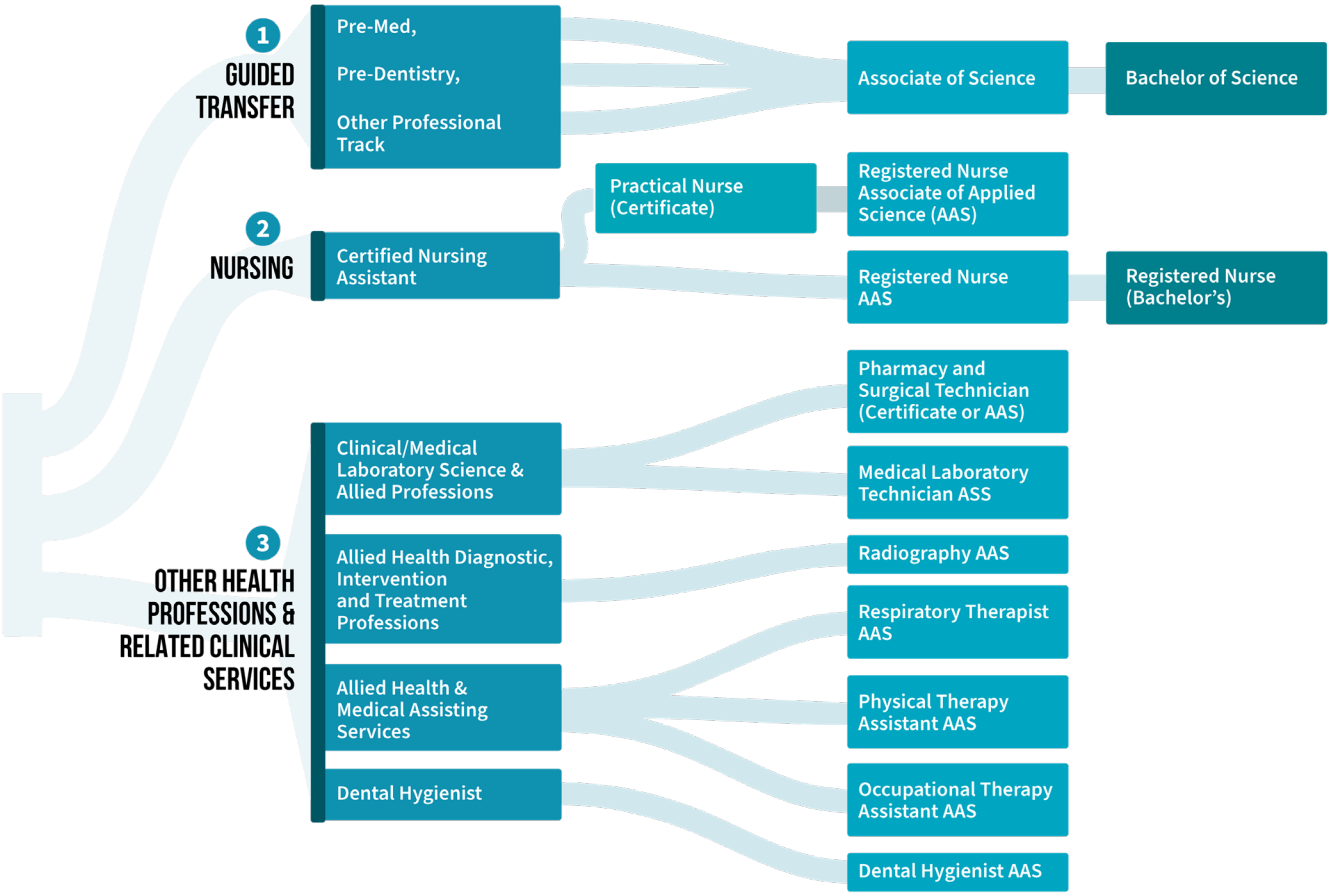
4. **Accelerate health pathway selection, but extend entry into a college major as long as possible.** Early College students generally select a pathway in their junior or senior year. This allows them time to complete general education requirements and gain an understanding of the widest range of postsecondary options possible. However, this approach will dull the potential impact of Early College for students interested in health. Health pathways should be set up to serve interested students at the beginning of high school to ensure that they are building the strong academic foundation in the sciences required for these careers.

   However, rushing the selection of a specific major or clinical degree program is not necessary. Most college students have difficulty choosing. It is even more challenging for high school students to gain sufficient perspective on of their abilities, interests, and opportunities to make informed decisions. Fortunately, there is little variation in the core courses students must take to qualify for admission to most health degree programs. This gives pathway designers time to allow students to thoroughly explore their options before selecting a narrowly focused health major.

5. **Provide access to advisors with expertise in health care.** The higher education landscape for clinical health programs is especially complex. Students must take special standardized tests to gain entry, and there are also background checks and immunization requirements. Latex allergies can pose problems. Students face a variety of additional expenses, and they must understand how financial aid packages will stack up against these costs. Perhaps the most challenging issue is the branching of associate degree programs into terminal and guided transfer paths **(Figure 3)**.

   Nursing, which accounts for roughly half of all jobs in health care, allows students to transfer all credits earned for an associate degree toward a bachelors degree. While other associate degrees offer fast pathways to well-paying occupations like radiologic technician and dental hygienist, few credits from these programs will transfer to a four-year degree program. Once students choose this route, it is more difficult for them to find their way back to college and higher paying professions. Advisors must be prepared to help Early College students assess all of their options and make informed decisions.

Figure 3: The branching to guided transfer and terminal associate degree programs makes decision-making support from advisors with expertise in health vital.



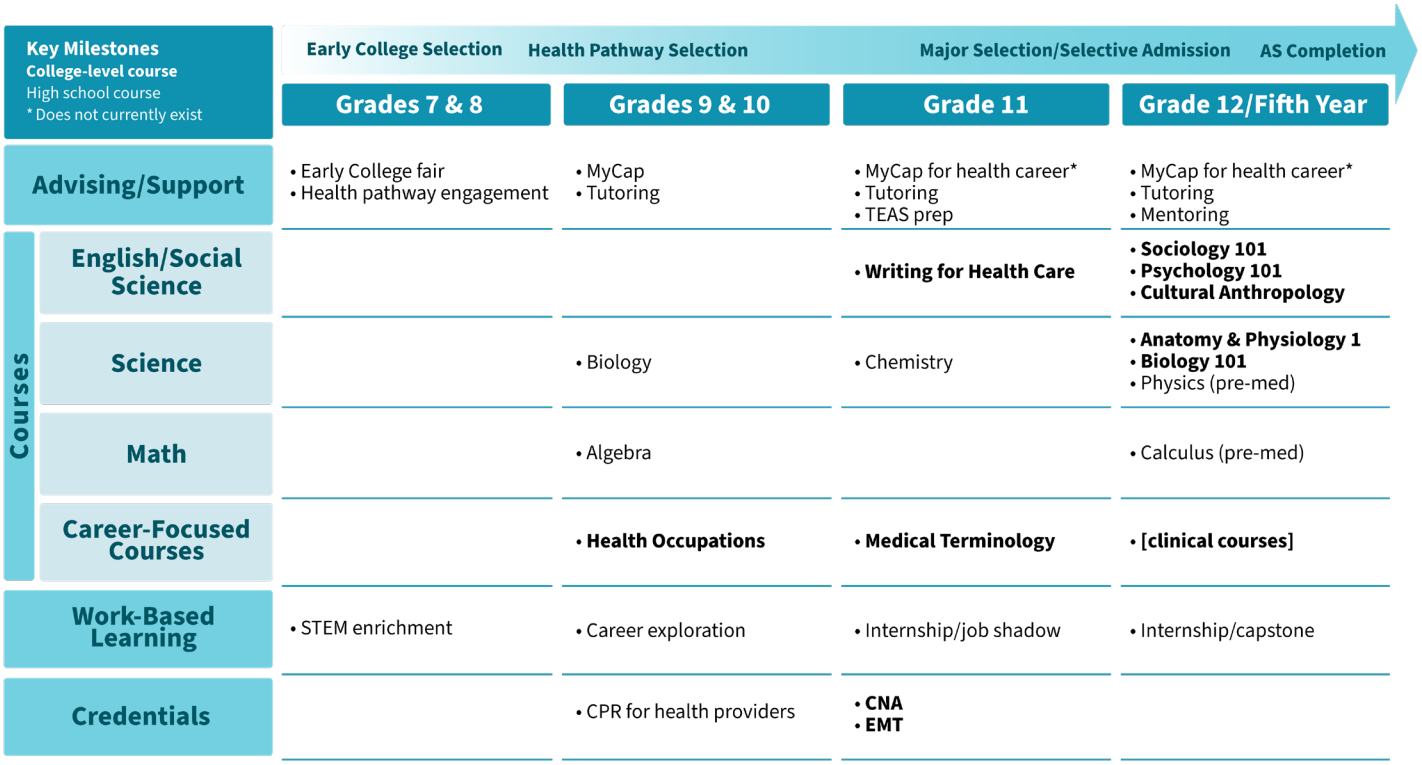
Source: Adapted from "State of Illinois Model Programs of Study Guide: Health Sciences and Technology." (Springfield, IL: Illinois Community College Board, 2020).

6. **Provide high-quality career exploration, internships, and mentoring experiences beginning in middle school and continuing through high school.** Health careers are not for everyone. Burnout is common and costly to both students and the industry. Health pathways must ensure that students gain a true understanding of these professions so they can make informed choices. Health pathway designers have significant leverage to ensure that students have these opportunities. This begins by ensuring that feeder middle schools offer high-quality STEM enrichment opportunities that help students explore interests in the sciences. By motivating and fully supporting students over an extended pathway, Early College programs can demonstrate their value proposition to employer partners, who are essential to providing youth with these experiences.

A Model Health Pathway Design

Our conversations with leaders in health care, higher education, Early College, and workforce development ultimately led us to the map presented in Figure 4. The map provides definition to the health pathway by charting key milestones and showing how these milestones align with grade spans and the core components of the program, including advising and student support services, course content, work-based learning, and opportunities to earn non-credit credentials.

Figure 4: An Illustrative Early College Health Pathway



Advising and Student Support

Advising and student support are central to the Early College design, but the complexity of health requires some augmentation. This should begin with the initial engagement of students and families. Students must first get an introduction to Early College and all of the possibilities it affords. For those that express interest in the health pathway, there should be additional forums to meet with partners involved in the program. This will give students and families a chance to learn more about the unique opportunity the pathway offers, the demands and expectations, and initial steps that students can take to prepare, as they complete middle school and enter Early College.

As students progress through high school, the health pathway must also offer tailored advising and support. Most Early Colleges currently rely on the state's My Career and Academic Plan (MyCAP) process and associated college career assessment and planning tools (e.g., MEFA Pathway and Naviance) to identify career interests and establish individual learning plans. While MyCAP provides an excellent framework, the pacing may be off for students accelerating their postsecondary progression, and the resources available through tools like MEFA Pathway may not be sufficiently specialized for those pursuing health careers through Early College. Health pathways must adapt the MyCAP framework and augment the information offered by college and career planning tools to ensure that students have access to the information they need at the appropriate time.

Preparation for the Test of Essential Academic Skills (TEAS) is another unique component that the health pathway must incorporate. All nursing and many other selective health programs require this standardized test. Health pathways programs should provide the support necessary to ensure that Early College students have high enough scores to gain entry.

One-on-one mentoring is especially important for underrepresented students pursuing careers in health. It is also a viable strategy to leverage of the skills of a large number of health care workers entering retirement. Nursing has spent more than a decade honing this approach to ensure that the relationship is impactful for students and rewarding for mentors.[18] Health pathways can use their scale to connect students to trained mentors as they begin their clinical rotations.

Courses

As shown in Figure 5, the course requirements are relatively consistent for admission to two-year programs with the opportunity to transfer to a four-year degree program, such as nursing, and terminal programs like radiology and dental hygiene. Students generally need college-level biology and anatomy and physiology courses. Programs can prepare them by ensuring that they take high school biology in ninth or 10th grade, followed by college-level biology and anatomy and physiology. Chemistry is less frequently required, but all students pursuing health should have at least a high school level course. Math requirements beyond algebra are uncommon, but students interested in pre-med will need more, especially high school calculus.

With their higher education partners, Early College health pathway designers should also think creatively about how they make use of general education course requirements. For instance, Writing for Health Care can satisfy English Composition I, while also readying students for demands that are unique to the health care workplace. Sociology and psychology courses can also be contextualized for those seeking health careers. These classes build critical consciousness, a deeper knowledge of the processes behind inequality. This can empower underrepresented students by helping them see how they can actively work to create change in their communities as health professionals.[19]

Health pathways must also include an introduction to health careers and a medical terminology course. These college-level classes provide formative experiences, helping students build career identities as aspiring clinicians. For those pursuing an associate degree, clinical coursework will consume the final year of the program.

Figure 5: Standard entry requirements would be helpful, but core courses are fairly consistent across programs.

Selective Admission Nursing Programs

College	TEAS Cutoff Score				Required Courses											
	Math	Science	English	Reading	Anatomy & Physiology I	Anatomy & Physiology II	HS Biology	HS Chemistry	College Biology	College Chemistry	College Psychology	Algebra I	Algebra II	Statistics	English or Writing	Health Careers Course
Bristol	65%	65%	65%	65%	B-				(prereq)		B-				B-	B-
Bunker Hill	60%	60%	60%	60%	C			C	(prereq)						C	
Massasoit	65%	65%	65%	65%	Scored	Scored			Scored							
Middlesex	60%	60%	60%	60%				C	B							
Mt. Wachusett	63%	46%	60%	69%	C+				(prereq)					C +		
North Shore	73%	60%	67%	69%					C	C		C				
Northern Essex	63%	45%	60%	69%	B				(prereq)	B						
Quinsigamond	65%	65%	65%	65%			B									C
STCC	69%	54%	64%	71%									B			

Selective Admission Dental Hygiene Programs

College	TEAS Cutoff Score				Required Courses											
	Math	Science	English	Reading	Anatomy & Physiology I	Anatomy & Physiology II	HS Biology	HS Chemistry	College Biology	College Chemistry	College Psychology	Algebra I	Algebra II	Statistics	English or Writing	Health Careers Course
Middlesex					B					B						
Quinsigamond	65%	65%	65%	65%			B	B								
STCC							C						C			

Selective Admission Radiologic Technician Programs

College	TEAS Cutoff Score				Required Courses											
	Math	Science	English	Reading	Anatomy & Physiology I	Anatomy & Physiology II	HS Biology	HS Chemistry	College Biology	College Chemistry	College Psychology	Algebra I	Algebra II	Statistics	English or Writing	Health Careers Course
Middlesex					C					B						
North Shore					C			C								
Northern Essex	65%	45%	55%	65%	B			B					C			
STCC					C			C								

Note: As noted in the tables above, some selective admission programs have minimum required grades or list completion of the course as a prerequisite. Other programs score students by their grades, giving higher points to the applicant for higher grades.

Work-Based Learning

As with all Early College pathways, work-based learning experiences are a core component of the model because they contextualize learning and make coursework more relevant to students. This exposure is especially important for health pathways that prepare students for clinical careers. Students need an understanding of what it is like to work in a caring profession day after day to make informed choices about whether the field is right for them. Equally important, these experiences give underrepresented students the ability to demonstrate to both selective health programs and employers that they are cut out for this work.

Ideally, this process begins in middle school with STEM enrichment programs that provide broad exposure to the sciences, including health. Students must then have career exploration opportunities that include visits to a variety of health care settings, progressing to job shadowing and internship opportunities.

Massachusetts Early College health pathway scan draw from the experiences of longstanding programs to expose high school students to health fields. These include Brigham and Women's Hospital's Student Success Jobs Program, Massachusetts General Hospital's Youth Scholars Program, Beth Israel Deaconess Medical Center's Agress Summer Health Corps, Harvard Medical School's MEDscience program, and the Baystate Springfield Educational Partnership **(see box on p. 17)**.

Credentials

While Early College health pathways are designed primarily to set students up for success in higher education, some students may wish to earn credentials as a way to burnish their qualifications, gain professional experience, and increase their earnings power. Many programs afford opportunities to earn certifications such as CPR for health professionals as a component of their introduction to health career courses. These certifications can help high school students gain self-efficacy and foster career identity development.

Some students may wish to gain credentials that require more time. While pathway designers must be careful not to overburden students or take their focus away from completing rigorous college-level coursework, they can provide opportunities to earn these credentials during the summer. In particular, EMT and CNA certifications can give students the ability to work part-time in the field and substantially increase their earnings as college students.

Industry-recognized credentials can provide an especially valuable steppingstone if they lead to credit for prior learning in degree programs. The design of Early College pathways provides an opening for employers and higher education partners to create these opportunities and make them more visible to students.

IS HIGH SCHOOL TOO EARLY TO MAKE COLLEGE AND CAREER CHOICES?

Early College generally, and pathways in particular, provoke fundamental questions about equity. Many wonder how condensing the high school and college experience for underserved students will benefit them. Why not simply make higher education accessible to all through more generous financial aid?

There are two responses to this common question. First, high school students have demonstrated the ability to tackle more demanding coursework when they are in environments that challenge them. This was the theory behind the first Early College, which was founded at Simon's Rock in the 1970s to serve mostly affluent families. Students in underfunded urban high schools are especially likely to be in courses that progress at a far slower pace than they can handle. Early College offers an antidote to this stubborn problem.

Early College can be equally disruptive by ensuring that underserved students have a stronger grasp of the career opportunities available to them. Students and educators consistently report that limited knowledge of career options is one of the largest barriers to success in higher education. Career fairs and other light-touch interventions are not a sufficient response. Because Early College students are demonstrating an exceptional commitment to preparing for the field, employers are more likely to partner, opening up opportunities for richer career development opportunities. Early College health pathways will also accelerate their entry into the workforce, where significant learning about various professions and their requirements takes place. Students who have these formative work experiences in their early 20s can then make more informed choices with respect to additional postsecondary studies, or they may simply get a jump on their careers, competitively positioning them for advancement.

MASSACHUSETTS MODELS

Early College health pathways can build on years of experience that our hospitals have gained through efforts to introduce teens to health careers. One of the most robust examples is the **Student Success Jobs Program** (SSJP), a year-round internship program at Brigham and Women's Hospital delivered in partnership with the Boston Private Industry Council. Each year, SSJP introduces approximately 100 Boston high school students to medical, health, and science professions. Each student is matched with a health care professional for mentoring. Through the program, students have access to tutoring, monthly seminars, and support on the college application and financial aid process. SSJP alumni also have summer internship opportunities at BWH departments aligned with their college majors.

MGH Youth Scholars is a weekly program on the Massachusetts General Hospital (MGH) campus for high school students from Boston, Chelsea, and Revere. The program seeks to increase students' interest and aspirations in science and health care, supports their academic success in high school, and prepares them for college. MGH also serves more than 100 teens in in the Boston Mayor's Summer Jobs program, providing opportunities to learn about jobs in health and offering weekly professional development and skills workshops.

Similarly, Beth Israel Deaconess Medical Center runs the **Agress Summer Health Corps** program for Boston-area students in grades 10 through 12, with a focus on serving those from underrepresented backgrounds. Each participant in the program reports to one department or unit. Throughout the summer, they gather for lunches, tours, and panel presentations, which expose them to a range of health occupations and BIDMC clinicians at various stages of their careers.

The **Baystate Springfield Educational Partnership** is a slightly different design. The program is open to Springfield students in grades nine through 12, and they can return over several summers to progress through three levels of hospital-based learning experiences, beginning with career exploration courses, continuing to career development experiences, and concluding with career preparation.

In collaboration with MGH, Harvard Medical School's **MEDscience** program offers a weeklong summer experience for high school students interested in health. Over the course of the week, students are presented with symptoms from a patient and work on developing a diagnosis and treatment options. They also meet with medical professionals to learn about different career options and educational pathways. While the competitive program primarily serves affluent students, there are scholarships available to Boston-area applicants.

IV. BUILDING TO THE BLUEPRINT: A PLAN FOR STATE AND LOCAL ACTION

The guided academic pathways that our Early College high schools currently operate are an artifact of how the field emerged—industrious educators patching together programs, often with support from private philanthropy. Those who led the way deserve enormous recognition for all that they have helped achieve, but as captured by an outside assessment in 2016, the development of Early College in Massachusetts was scattershot, incremental, and poorly resourced.[20]

State leaders have since stepped up, providing the state's Early College programs with substantial funding to improve their practice and expand their reach. For the first time, programs can envision providing students with the opportunity to earn up to an associate degree before high school graduation. But how do they approach this daunting challenge in health?

If Massachusetts is going to harness the potential of its investments in Early College to help address the acute health care workforce crisis, state policymakers must take action to guide the way. At the same time, Early Colleges should act without delay, building allegiances with industry partners and forming their own leadership tables and strategies to build to the blueprint. Toward these ends, we offer recommendations for state policymakers, Early College partnerships, and business leaders in health industries.

Recommendations for State Policymakers

- **Take immediate steps to solve the clinical educator staffing shortage.** There are numerous efforts underway to solve the clinical educator shortage, most notably the Massachusetts Nursing Council on Workforce Sustainability. Appropriately, they are taking a systematic approach and evaluating all potential solutions. However, state leaders need not wait for these groups to form committees and issue final reports. The governor and other highly visible leaders can call attention to the problem and encourage nurses and health professionals to become educators. Massachusetts can offer financial assistance to help cover the educational costs for those who rise to the challenge, and can ensure that health departments in state colleges and universities have the budgets that they will need to offer clinical faculty competitive compensation. These investments will pay dividends many times over, as health instructors are central to providing the workforce necessary for our health care system to function effectively and contain costs.

- **Create a predictable fifth-year policy.** In the fall 2021, DESE provided seven school districts with grants to pilot an Early College model that included an additional fifth year. These Early College Promise programs allow students to complete up to an associate degree at no cost. While the pilots have not been built to address the challenges in the health field specifically, experience from around the country demonstrates that this approach can work **(see box on p. 23)**. Massachusetts urgently needs an Early College model that provides a fifth year for health pathways.

- **Increase the state's per-credit reimbursement for Early College lab sciences.** The state course reimbursements are one of the primary sources of funding to make Early College available to students at no cost. Currently, the state provides $180 per credit. While there are efforts underway to increase the reimbursement rate to $200 per credit in the coming year, this is still far short of what institutions require to invest in the build

out of complicated health pathways. Community colleges typically charge around $260 per credit for lab courses and over $400 per nursing credit.

As Early College grows, course reimbursements that are significantly below the costs that higher education partners incur are an increasing concern. Remedying this problem is particularly critical in the context of limited space in clinical programs. If course reimbursements are below average, colleges will have a strong financial disincentive to admit Early College students to their selective clinical programs.

- **Create a consistent and predictable process for selective admissions health programs.** Higher education leaders from institutions throughout the state have worked hard in creating alignment with postsecondary schools to facilitate Early College. They have also put significant effort into standardizing transfer pathways, allowing students to move from two-year to four-year colleges without repeating coursework. Leaders in our decentralized higher education system can build on this track record of collaboration by creating a consistent admissions process for Early College students pursuing degrees in nursing and allied health.

  Course requirements across the state for selective degree programs are fairly similar at present. Making them uniform will help Early College programs work together to get students over the bar. Consistency is also important, given the high degree of residential instability that housing markets impose on Early College students. Rising rents are pushing households from Brockton to Fall River, Chelsea to Lawrence, and Worcester to Springfield. If entry requirements are the same, students will be able to continue their journey despite these disruptions.

  Equally important, partnerships must provide a predictable process for admissions. We recognize that colleges are in the unfortunate position of turning qualified students away from clinical programs each year due to capacity constraints. However, the Early College formula will not work if programs cannot fulfill the promises they make to students. Taking regional labor force needs and the number of applicants into account, partnerships must find a way to guarantee seats to Early College students who dedicate themselves to earning the grades and test scores required for entry.

- **Offer a summer experience for all students in the health pathway statewide.** Building Early College pathways to scale creates opportunities to efficiently provide unique offerings, such as a residential summer experience at UMass Chan Medical School or the UMass Mount Ida campus. Spending time with peers from across the state and leaders in the health industry could provide a transformational experience for underserved youth, who are rarely afforded such opportunities. With sufficient resources, program designers could also look at this approach as an option to increase credit accumulation.

- **Explore opportunities to enhance MyCAP for health careers, provide access to advisors with specialized knowledge of the pathway, and create mentoring programs.** Economies of scale also afford opportunities to put thought into how the MyCAP framework and associated college and career planning tools can better support students who are working to accelerate their entry into college and navigate the intricacies of the pathway. Beyond enhancing the advising protocols, the state can also examine strategies to give each student access to advisors with a keen understanding of clinical health careers. As demonstrated during the pandemic, technology opens new opportunities to centralize efforts to provide virtual access to knowledgeable advisors. Similarly, the state should explore opportunities to provide students with mentors, who can provide support as needed throughout their clinical training.

- **Provide professional development for faculty teaching intro-level college science courses.** Through efforts like Mass Insight's Advanced Placement STEM & English program, educators have spent years building pedagogy to successfully support high school students taking on biology, chemistry, and other college-level STEM courses that are often "weed-out" classes, disproportionately diverting underserved students from entering careers in health. If Early College is going to send thousands of students into these courses each year, training a large cadre of educators to deliver instruction in a manner that positions them for success is paramount.

Recommendations for Early College Partnerships

- **Work with a knowledgeable workforce development intermediary.** Building these pathways will require a collection of local partners invested in the concept and willing to make significant contributions to see it succeed. But communities should not shy away from bringing in outside intermediaries with expertise leading pathway development efforts. Jobs for the Future, for example, has helped establish health pathways for Early College partnerships and other local college-to-career initiatives throughout the country. The Boston Private Industry Council, the MassHire Hampden County Workforce Board, and the MassHire North Shore Workforce Board also have deep experience in this field, which Early College partnerships in their service areas can tap.

- **Empower teacher leaders.** Many educators are drawn to Early College because of its transformative potential. Their efforts are often rewarded many times over with something they highly value—student success. Health pathways built to this blueprint are sure to be even more potent. Still, teachers who devote additional time to this difficult work must receive appropriate financial compensation. Partnerships must plan ahead, providing stipends to teacher leaders and giving them the release time that they will need to work with peers statewide to innovate and train.

- **Build one piece at a time, but move expeditiously.** The blueprint includes many new components. Early College partnerships must not be daunted. They can start by building one component at a time: Work on the Introduction to Health Careers course to ensure that it is as robust as possible, add a health pathways night to their student recruitment strategy, and help feeder middle schools draw more students into their STEM enrichment programs. There is no need to do it all at once or to tackle the most difficult pieces first, but partnerships need a plan to proceed rapidly.

- **Place the student at the center.** This paper outlines a response to an acute workforce crisis, but first and foremost, programs must ensure that all design decisions remain student-centered. Rather than filling job openings, equity demands that programs fully support students as they develop their own aspirations and make their own choices. As they build this pathway with attention to equity, programs should pay particular attention to gender balance. Early College is already heavily tilted toward enrolling female students, and the health pathway tends to predominantly draw young women. Equity demands strategies to serve more male students with this well-resourced endeavor. As partnerships recruit design teams, they can ensure that the health pathway is as student-centered as possible by incorporating student voices.

Recommendations for Business Leaders

- **Help Early College partnerships stay in sync with the needs of industry.** As noted earlier, a key principle of pathway design is serving current and emerging labor market needs. The health care sector is especially susceptible to change, with technology, policy, and the population's health needs constantly evolving. Health care industry leaders should develop open lines of communication with Early College programs and share, on a regular and consistent basis, information about their current and upcoming workforce needs and how they may affect program curricula as well as the degrees and credentials offered to Early College students. Industry leadership can play an especially valuable role in helping Early Colleges provide the right industry-recognized credentials that have value in the labor market.

- **Create a community of practice around internships and other work-based learning experiences for Early College students.** Health providers have decades of experience introducing high school students to their fields. As demonstrated by a recent evaluation of the Boston Private Industry Council's summer internship program, these efforts are already having a sizeable impact on academic outcomes and postsecondary enrollment for the underserved students who experience them.[21] Working together, industry leaders can help Early College partnerships and education policymakers develop templates, guides, and resources to establish a spectrum of work-based learning experiences for students in Early College health pathways. These can range from structured career days, where students visit companies and gain exposure to the different departments in a health care organization, to year-round internship programs, where students are paired with mentors. Industry-led collaboration will be particularly valuable as Early College programs devise strategies to harness their scale through remote learning, residential summer experiences, and other creative strategies to collectively serve health pathway students from across the state at a far larger scale than we have been able to achieve to date.

- **Engage Early College leaders as allies in the effort to build a diverse health care workforce for the future.** Throughout the state, Early College leaders have demonstrated exceptional commitment to creative problem-solving and cross-sector collaboration to meet the needs of underserved students. The intentional focus of Early College programs on recruiting and supporting students who are traditionally underrepresented in high-growth fields like health care aligns closely with the diversity, equity, and inclusion goals established by many business leaders. This is especially important for the health care field because we know that people of color face a number of health inequities, including a lack of access to high-quality care as well as a lack of culturally informed providers who understand the challenges faced by traditionally underserved communities. As health providers seek policy solutions to their workforce challenges, they will find powerful partners and champions in this growing network of Early College providers.

COMMUNICATING THE CRITICAL ROLE EDUCATORS PLAY IN TRAINING FUTURE CLINICIANS

The nursing crisis is increasingly front-page news. This gives leaders a unique opportunity to communicate the need for health educators to tackle this challenge. Two features of health make it particularly difficult for people to see education as a potential career path.

One is the variety of advanced degrees that students can pursue. Many opt for clinical doctorates, such as the Doctor of Nursing Practice or Doctor of Physical Therapy. These degrees offer more clinical expertise. While many students who pursue them are not likely to consider a Ph.D. as an alternative, diverting even a fraction of students from health research and teaching has a meaningful impact, given the very small number of students who earn Ph.D.s in any field.

The media's tendency to turn to clinicians when covering health issues creates another challenge for academia. We rarely hear from the Ph.D.s producing research and delivering instruction at colleges and universities. Moreover, when seeking perspective from clinicians, the media generally consults doctors rather than nurses. Studies have associated this with gender bias that discounts the knowledge and expertise of a mostly female workforce delivering the most direct patient care.[22]

As leaders work to help nursing schools recruit faculty, they need to be particularly cognizant of these issues. Building a strong health faculty is critical to not just training the next generation, but also building the pedagogy that ensures the training keeps up with the changing needs of learners and industry.

NATIONAL MODELS

Throughout the country, there are several examples of wall-to-wall Early College high schools focused on preparing students for health careers that can serve as models for pathway designers in Massachusetts.

One of the oldest is the Wake Early College of Health and Sciences. Launched in 2004, the school admits up to 80 freshmen each year to explore health careers through partnerships with Wake Technical Community College and WakeMed Health and Hospitals. The five-year Early College design allows students to graduate with an associate degree, and all credits transfer to the University of North Carolina system if a grade of C or better is earned.

The Texas Academy of Biomedical Sciences (TABS) is another example with a long record of accomplishment. Founded in 2011, TABS is a public Early College high school for students who have expressed interest in biomedical careers. Located in Fort Worth, the school admits 100 students each year through a lottery system. Students take courses on Tarrant County College's campus. The goal is for students to graduate with up to 60 hours of transferrable college credit. Over 90 percent of students complete 30 or more credit hours, half earn an Associate of Arts degree and one-quarter earn an Associate of Science degree. Many students also earn certifications, such as patient care technician or pharmacy technician.

In Dearborn, Michigan, Henry Ford Health Early College (HFEC) provides a five-year model for students interested in health-related careers. The partnership includes Henry Ford Health, Henry Ford College, and Dearborn Public Schools. Each year, the program admits 54 students, who attend classes on Henry Ford College's main campus. The goal is to complete a health career college certificate, an associate degree in a health-related field, or up to two years of transferrable college credits toward their undergraduate degree. The curriculum is taught by teachers and faculty from Dearborn Public Schools and Henry Ford College. Beginning in ninth grade, students spend one day per week at Henry Ford Health in Midtown Detroit, where they have access to state-of-the-art science labs and gain exposure to real-life experiences in health careers, with Henry Ford Health employees as preceptors.

In Maryland, Montgomery College is notable for its Early College A.S. Nursing program. The pathway provides acceleration by allowing students to complete their prerequisite college courses during the junior year and the following summer. They then begin their first year of nursing courses as seniors, matriculating to the community college after high school graduation and completing their associates degree after one more year of full-time coursework.

Cabarrus College of Health Sciences offers an example at a private college for health care professions. Located on the campus of Atrium Health in Concord, North Carolina, Cabarrus College launched an Early College high school last fall. The program is designed for all students to graduate with a minimum of a nurse aide certificate and significant coursework toward a college degree. The programs offered include life sciences, medical assisting, nursing, occupational therapy, and surgical technology.

The P-Tech model, which includes extensive partnerships with employers to help students build college and career readiness, is another place where health pathway designers will find inspiration. The network includes more than two dozen health-focused Early College high schools.

NOTES

1. This estimate should be interpreted with caution. At present, the state does not collect data on Early College pathway participation. The authors surveyed programs to obtain this figure. In many cases, the programs do not keep track of the number of students in each pathway. In these instances, we asked them to approximate when responding to the survey.
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3. “An Acute Crisis: How Workforce Shortages are Affecting Access & Costs.” (Burlington, MA: Massachusetts Health and Hospital Association, October 2022).
4. “Supporting MMS Physicians’ Well-Being Report: Recommendations to Address the On-Going Crisis.” (Waltham, MA: Massachusetts Medical Society, March 2023).
5. “Health Care Workforce Trends and Challenges in the Era of COVID-19.” (Boston, MA: Massachusetts Health Policy Commission, March 2023).
6. Ben Forman and Simone Ngongi-Lukula. “New Data Show Early College Is Delivering as Promised for Massachusetts.” (Boston, MA: MassINC, 2023).
7. Ben Forman and Simone Ngongi-Lukula. “Early College as a Student-Centered Workforce Solution.” (Boston, MA: MassINC, 2023).
8. For more on this scale goal, see: Ben Forman and Simone Ngongi-Lukula. “Early College as a Force for Equity in the Post-Pandemic Era.” (Boston, MA: MassINC, 2021).
9. State funding has increased from just over $5 million in FY 2021 to $18 million in FY 2023.
10. David Williams and Lisa Cooper. "Reducing Racial Inequities in Health: Using What We Already Know to Take Action." *International Journal of Environmental Research and Public Health* 16.4 (2019); Kristen Wilbur and others. "Developing Workforce Diversity in the Health Professions: A Social Justice Perspective." *Health Professions Education* 6.2 (2020).
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13. Rachel Baker and others. “The Effect of Labor Market Information on Community College Students’ Major Choice.” *Economics of Education Review* 65 (2018).
14. Authors’ estimate from DESE Early College performance and DART for Postsecondary Success data. This figure assumes that the share of Early College students who persist to a second year completing is equal to the rate of persisters completing statewide for the most recent Massachusetts cohort in the National Student Clearinghouse data, as reported by DART (the expected high school class of 2012).
15. US Department of Labor, www.careeronestop.org.
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17. Silvia Robles and others. “The Effect of Course Shutouts on Community College Students: Evidence from Waitlist Cutoffs.” *Journal of Public Economics* 199 (2021).
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