EDC Education Development Center

ISSUE BRIEF

Expanding Access to Data Science Careers

Panel 2: Data Science Education Policy Support

Executive Summary. Life sciences employers need a workforce that can analyze large data sets to solve complex challenges. Yet in Massachusetts and nationwide, these employers are experiencing critical shortages of qualified data scientists. Within the field of life sciences, the bioscience industry—a branch of life sciences that focuses on developing biological solutions to address a range of problems and opportunities—is facing a particularly acute shortage. To begin to overcome this challenge, state agencies have developed innovative programs to support students as they prepare for such careers, especially students from historically underrepresented populations.

In this brief, we share highlights from the second in **a series of online panels** co-led by Education Development Center, Massachusetts Life Sciences Center, and Massachusetts Biotechnology Education Foundation. During the panel, leaders from several state agencies shared details about relevant policies and programs that support students throughout their education by generating interest in life science and data science, preparing them for careers in the field, and providing them counseling and mentorship throughout their college experience. Those policies and programs that might support specific pathways for data science are described in this brief.

Key Takeaways:

Innovation Pathways

- Launched in 2017 by the Massachusetts Department of Elementary and Secondary Education (DESE), the program creates strong partnerships with employers, exposing high school students to various career options in industry sectors with high labor market demand, which currently include manufacturing, information, environmental and life sciences, health, social assistance, and business and finance.

- The program currently includes 99 pathways, and reaches over 4,000 students in 42 schools across 36 districts.

- 16 pathways are in the environmental and life sciences, exposing students to career pathways that specialize in research and development, and manufacturing activities in a number of specialty fields, such as biopharma, medical devices, diagnostics, and digital health.

- Students take courses with the goal of industry recognized credentials upon completion, including subjects such as principles of biomedical science, forensics, nanotechnology, and AP courses in biology, environmental science, chemistry, statistics, or calculus.

- Students can complete a 100-hour work-based learning experience with local companies such as Novartis, Biomed, Institute's the life science careers, Amgen and Abiomed.

Early College

- Launched in 2017 alongside the Innovation Pathways, this program encourages students to be more intentional in making decisions about a potential career, thereby preparing them to make a more informed decision on a major or course of study.

- The initiative consists of 23 programs across 35 high schools with partnerships in 19 higher education institutions. As of the 2020-21 school year, about 20 percent of students are engaged in pathways. In the 2019-20 school year, the initiative served about 2,500 students and awarded roughly 20,000 college credits.

- High school students in this program take classes at a nearby higher education institution that are particularly focused on ensuring students' success in mathematics and English, gateway courses that often signify a student's likelihood to persist throughout college.

- The partnership between high schools and higher education institutions includes ensuring the program provides transportation between the high school and college campuses, curricular alignment, college and career exposure, and career counseling.

- In addition to deep college and career advising, the program allows high school students to see themselves as college students by exposing them to college and campus life. Such exposure helps students—particularly first-generation college students—build confidence that they can succeed in college.

Commonwealth Dual Enrollment Partnership

- Dual Enrollment allows high school students to enroll in college courses through local partnerships with institutions of higher education. Unlike Early College programs, however, in which cohorts of students stay together throughout the program, dual enrollment students self-select their courses as approved by their counselors and as approved for readiness by the higher education partners.

- Currently, roughly 7,000 students are involved in dual enrollment programs. The community college sector, concentrated in two or three community colleges, is the most actively involved, representing roughly 75% of all students enrolled. Middlesex Community College has the highest number of dual enrollment students (about 1,000 each year).

- Studies show that students who take two or more college level courses in high school are much more likely to enroll—and persist—in two- and four-year colleges.

- Recent additional support from the CARES Act has allowed expansion of the program, so its services can be available more consistently in as many communities as possible.

- Independent of the pandemic, the Massachusetts Department of Higher Education (DHE) launched a pilot program on remote college dual enrollment, using remote and hybrid learning models to break down some barriers of access.

TRIO: Student Success Program

- The Massachusetts Association of Community Colleges (MACC) has a U.S. Office of Postsecondary Education TRIO grant that enables it to provide outreach and student services programs. The programs deliver support and mentorship for students who may not know how to navigate college or see how they fit in—particularly first generation students, students of color, students with disabilities, and LGBTQ students.

- The TRIO programs expect to serve 4,500 students and provide services such as academic advising, career planning and assessment, tutoring, study and self-improvement workshops, financial aid assistance and advising, personal advising, and transfer assistance.

- Students take a specified program of courses (e.g., biotechnology or nursing). Then, through articulation agreements and with proper grades, they can transfer automatically to a four-year college or university, where they can earn a bachelor's degree or even an expedited master's degree.

- These services are currently offered at Middlesex Community College and will serve as a model to expand to other community colleges in the state.

STEM Starter Academy

- STEM Starter Academy (SSA) is a collaboration between the Massachusetts DHE and the 15 community colleges in the state. Recognizing that community college is the entry point to college for many students, especially those who are from underserved and historically underrepresented communities, the program seeks to recruit students into STEM, raising awareness of the opportunity to pursue STEM education at the community college level.

- Begun in 2013, SSA has served nearly 40,000 students, with about 50% female, 50% students of color, and 33% nontraditional age students (age 25 or above).

- Research has shown 64% of participants are outperforming their peers on a broad set of measures of student success, including measures of recruiting, readiness, retention, and completion, with Black students in particular achieving positive outcomes at twice the rate of their peers who are not participating in SSA.

- The program recently introduced case management in an effort to change from a transactional support program to a consistent, comprehensive, end-to-end experience for participants.

Conclusion

This second panel in the 4-part series focused on existing state-level agencies whose programs and policy initiatives provide a comprehensive array of supports for a wide range of underserved students pursuing careers in STEM. Panelists described these policies, suggesting opportunities for newly emerging data science curricula and certificate/degree programs to be incorporated into these initiatives going forward. The following implications arose from the discussion:

• Partnerships that engage industry, vocational schools, community colleges, four-year universities can help launch and sustain pathways to data science careers. One panelist referenced a Department of Defense-funded partnership focused on manufacturing that could serve as a model for "sector-based strategies to build a workforce."

• Life sciences and data science industry employers—such as those engaged in the Innovations Pathways program and work-based learning opportunities—play key roles in helping underserved students explore career options.

• Community colleges hold great potential to serve as an "on ramp to data science careers" for underserved students. As one panelist noted, "Community colleges have been referred to as 'democracy's colleges.' It's really the place where we give everybody the opportunity to higher education. It's affordable, it's accessible, it's nearby, and it's high quality."

• Dual enrollment programs can ensure all students can access learning opportunities in newer, more niche topics—such as data analytics—that may not be available in high schools.

• Early college programs can support underrepresented students in pursuing data science careers. These programs allow students—particularly those who are the first to attend college in their family—to experience "what college is like" and know they can succeed in a college course.

Panelists

A special thank you to our panelists for their time and thoughtful contributions to the discussion.

• **Elizabeth Bennett**, Associate Commissioner for College, Career, and Technical Education, Massachusetts Department of Elementary and Secondary Education

• **David Cedrone**, Associate Commissioner for Workforce Development and STEM, Massachusetts Department of Higher Education

• **Robert LePage**, Assistant Secretary for Career Education, Massachusetts Executive Office of Education

• **Tom Sannicandro**, Director, Massachusetts Association of Community Colleges

• *Moderator:* **Wade Blackman**, District Counsel, Congresswoman Katherine Clark (MA-05)