

# Building Ohio's Workforce Through Stackable Credentials

Instead of enrolling for four or more years to get a bachelor's degree, what if individuals could work their way toward a degree gradually? First, they would attend college or a trade school for six months or a year and earn a certificate that prepares them for an entry-level job in various fields. Then, they would pursue additional knowledge and skills at the time they need them to advance their careers, reenrolling in college to continue progress toward a second certificate or degree. This might allow these individuals to invest their time and tuition dollars more strategically, and they might come away with training that better fits their needs.

This approach to education and training is often referred to as *stackable credentials*. Stackable credentials are most common in fields that offer many “middle skill” jobs—those that require some postsecondary education and training below the bachelor's degree level—such as health care and information technology. The

## KEY FINDINGS

- Ohio saw strong growth in short-term credential programs over the past 15 years.
- Certificate programs reported more stackable features over time.
- The number of individuals in Ohio earning certificates increased over time, and many of those certificate-earners went on to stack credentials and earn degrees.
- Most individuals who stacked credentials earned a degree.
- Few individuals who earned a noncredit certificate went on to earn credit-bearing credentials.
- All types of institutions contributed to stacking, although most stacking took place within community colleges.
- Credential-stacking students earned more credit hours on the way to an associate's degree than those who pursued an associate's degree only.
- Individuals who stacked credentials saw gains in earnings, with the largest earnings gains for those who earned health care credentials.
- Earnings increased more for individuals who stacked higher levels of credentials.
- Rates of stacking and increases in earnings varied by the age, gender, race, and ethnicity of individuals.

hope is that stackable credentials might make post-secondary education and training more accessible to individuals who might not want to or be able to enroll in traditional college degree programs. Stackable credentials can also provide more on-ramps into college for people who want to upskill or reskill.

Ohio has been a leader in scaling stackable credential programs. The state passed initial legislation on stackable credentials nearly 15 years ago, and it has since rolled out a series of initiatives that expand opportunities for individuals to stack credentials. For example, Ohio established statewide agreements that require credits to be awarded for certain blocks of coursework that previously were not eligible for credit, and it increased the funding allocated to certificate programs. All of Ohio's public education and training programs are involved in its efforts. These include Ohio Technical Centers (OTCs), which award "clock-hour" certificates that do not award immediate college credit (i.e., noncredit certificates) but can potentially be transferred into credit-bearing programs, and the certificate and degree programs at the state's community colleges and universities.

Have institutions changed the programs that they offer? Are students stacking credentials, and, when they do, are they seeing an increase in earnings? Researchers at the RAND Corporation and the Ohio Department of Higher Education (ODHE) established a multiyear partnership to answer these questions and others. To find the answers, the team examined the state's stackable credential offerings and student outcomes in three fields: health care, manufacturing and engineering technology (MET), and information technology (IT). These three fields account for more than half of all certificates awarded in the state and have been a primary focus of its stackable credential efforts.

This research brief summarizes key findings and implications of the project. These findings can inform Ohio's efforts to scale effective education and training pathways and might offer useful evidence to states pursuing similar initiatives.

## How the Study Was Conducted

The team examined statewide educational records, focusing on credentials awarded between 2005 and 2019 by Ohio's public postsecondary institutions. Most of the analysis focused on student-level data. The researchers and state leaders were interested not only in aggregate

counts of credentials but also in how students earned these credentials, whether credentials led to increased earnings, and whether patterns of credential-stacking and earnings differed based on where an individual earned credentials, the type of certificate initially earned, or the demographic characteristics of the individual.

The study sample included any student who earned a certificate in one of the three fields: health care, MET, and IT. There were three different types of certificates that students earned: a "clock-hour" (i.e., noncredit) certificate from an OTC, a short-term credit-bearing certificate that requires less than one year of full-time enrollment to complete, and a long-term certificate that requires at least a year of full-time enrollment.

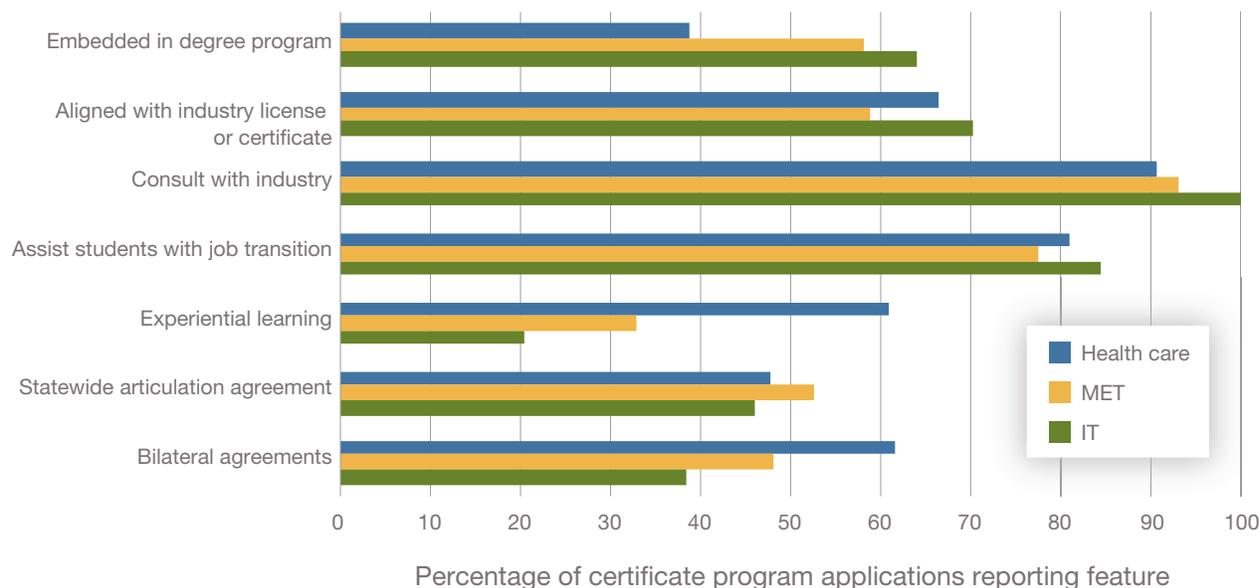
The team examined individuals who stacked credentials over varying time frames after completing the initial certificate, following students for up to six years to identify stacking. The additional credentials stacked could include another certificate, an associate's degree, or a bachelor's degree and could be in the same area of study or other areas of study. The research team then followed students into the workforce, using records from the state unemployment insurance system to estimate changes in an individual's earnings after earning and stacking credentials.

The team also examined data on the programs offered by Ohio public institutions. Using student-level credential data, the team tracked the number of programs that awarded credentials at different levels over time in the three fields. Using program application data that institutions submit to ODHE to obtain approval for technical certificate programs, the team examined the degree to which new certificate programs were being built with stackable features (e.g., certificate embedded in degree program, program aligned with industry license or certification).

## Key Findings

**Ohio saw strong growth in short-term credential programs over the past 15 years.** Between 2005 and 2019, the number of short-term certificate programs in health care and MET fields increased by 146 percent and 171 percent, respectively, while the number of short-term certificate programs in IT increased by 86 percent. Programs at the long-term certificate level also expanded, but to a lesser degree, with growth ranging from 27 percent to 84 percent across fields.

FIGURE 1  
Many Programs Offered Stackable Features



SOURCE: Author calculations based on technical certificate program application data submitted to ODHE.  
NOTE: The figure presents the percentage of new certificate program applications submitted between 2014 and 2019 on which an institution reported a particular feature.

Noncredit certificate programs offered by OTCs grew in health care and MET fields (by 82 percent and 143 percent), while IT programs decreased. Programs at the bachelor’s degree level grew at a slower rate than certificate programs, while associate’s degree programs decreased over the period for MET and IT fields.

**Certificate programs reported more stackable features over time.** Program applications submitted to the state between 2014 and 2019 for the approval of new certificate programs suggest that many institutions were building these programs with features that are important to stackable programs (Figure 1). The average program application submitted in 2019 reported five of the seven stackable features, compared with just four stackable features in applications for certificate programs submitted in 2014. More than half of new MET and IT certificate program applications were embedded in a degree program, while somewhat fewer health care certificate programs were embedded. Programs commonly reported strategies to ensure alignment with industry through program planning efforts and job-transition support for students. Experiential learning was less common, particularly outside health care fields. Similar numbers of programs reported alignment with statewide transfer agreements and bilateral

agreements. Bilateral agreements were less common for IT certificates than for those in health care and MET fields.

**The number of individuals in Ohio earning certificates increased over time, and many of those certificate-earners went on to stack credentials and earn degrees.** The number of individuals earning health care certificates and MET certificates more than doubled between 2005 and 2013, and IT certificate production also increased. A large percentage of these students went on to earn additional credentials (or stack credentials) within two years of completing the certificate, including 59 percent of those earning an IT certificate, 43 percent of those earning a MET certificate, and 33 percent of those earning a health care certificate. Although rates of stacking in MET and IT fields did not change much for certificate-earners in 2013 relative to those in 2005, health care saw a big increase over the eight-year period (Figure 2).

**Most individuals who stacked credentials earned a degree.** Of those who stacked credentials across the three fields, 71 percent earned an associate’s degree and 9 percent earned a bachelor’s degree within four years of certificate completion. This suggests that the majority of individuals stacked progressively (also called

vertically), moving from shorter-term to longer-term programs and noncredit to credit programs rather than earning two certificates at the same level.

**Few individuals who earned a noncredit certificate went on to earn credit-bearing credentials.** Only 16 percent of those who started with a noncredit certificate from an OTC went on to earn an additional credential within four years. It was rare for OTC certificate-earners to go on to earn credit-bearing credentials.

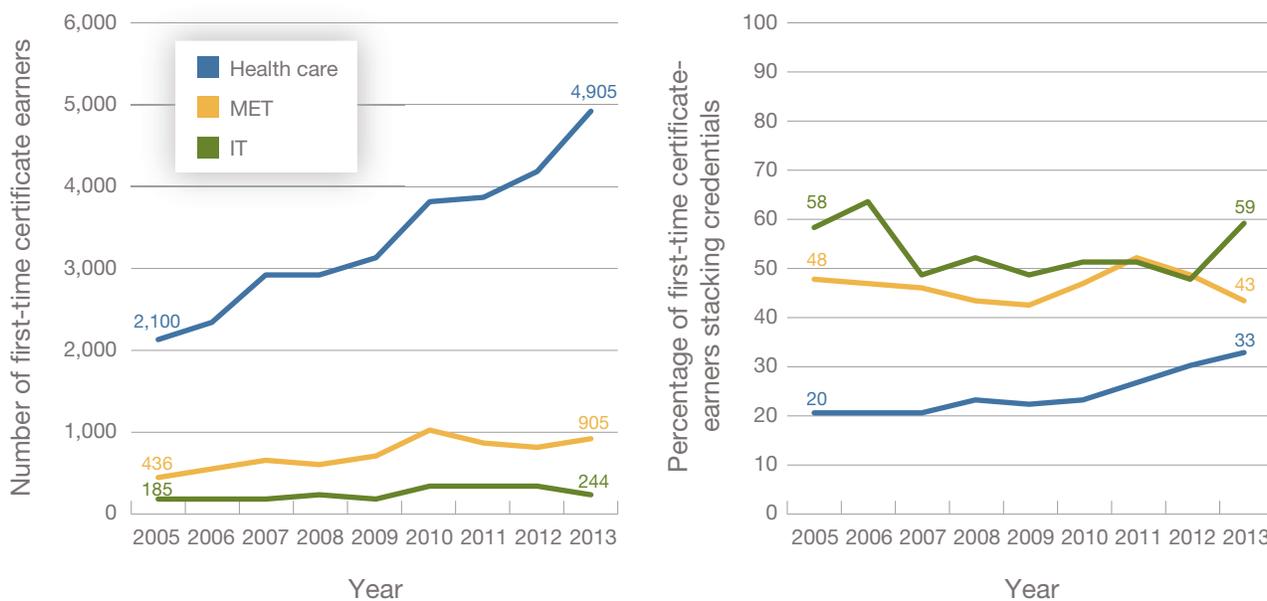
**All types of institutions contributed to stacking, although most stacking took place within community colleges.** Approximately 80 percent of certificate-earners in health care, MET, and IT fields earned their initial certificate at a community college, while 16 percent earned a certificate at an OTC and 4 percent earned a certificate at a university. When individuals went on to stack credentials, most did so within the same college.

**Credential-stacking students earned more credit hours on the way to an associate's degree than those who pursued an associate degree only.** Comparing students who earned a certificate and an associate's degree (i.e., stacked credentials) with students who

earned only an associate's degree, the team found that credential-stackers had earned an additional 17 credit hours and were enrolled for an average of one to two additional terms. Excess credit hours and terms of enrollment might suggest that coursework in stackable programs is not entirely overlapping or that students are facing other barriers to making progress from one credential to another. Individuals who stacked credentials in health care had the greatest differences in average credit hours relative to non-stackers (21 additional credit hours versus 12 and 13 for MET and IT fields, respectively), suggesting potentially greater inefficiencies in health care pipelines. Program data indicated that health care certificates were less likely to be embedded in degree programs.

**Individuals who stacked credentials saw gains in earnings, with the largest earnings gains for those who earned health care credentials.** Figure 3 shows that individuals who stacked credentials experienced substantial gains in earnings for each credential in health care; these individuals saw an average gain of 16 percent for the initial certificate and an overall gain of 37 percent from stacking multiple credentials. This is equivalent to approximately \$9,000 in additional earn-

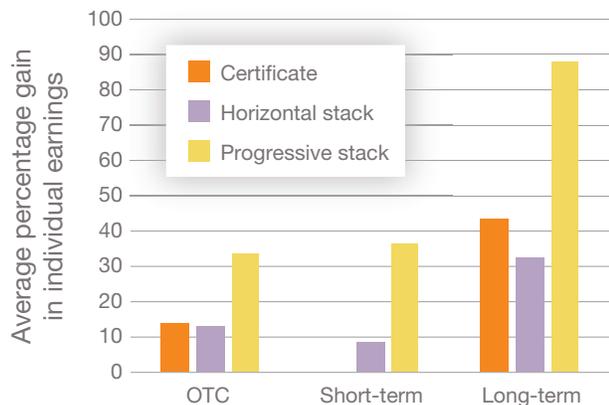
FIGURE 2  
Credential-Stacking Among Individuals Increased over Time



SOURCE: Author calculations based on Higher Education Information System data and OTC data in the Ohio Longitudinal Data Archive.  
NOTE: The figure on the left presents the number of individuals who earned an initial certificate in each of the three fields between 2005 and 2013. The figure on the right presents the percentage of these individuals who earned one or more additional credentials within two years.

FIGURE 3

### Stacking Credentials Primarily Led to Gains in Earnings When Individuals Went on to Earn Higher-Level Credentials in Health Care



SOURCE: Author calculations based on education and unemployment records data in the Ohio Longitudinal Data Archive.

NOTE: The figure presents average percentage gain in individual earnings by type of initial certificate earned between 2005 and 2013 (OTC, short-term, long-term). Earnings gains are broken out for those who earned only a certificate, horizontal stackers (i.e., those who earned multiple certificates at the same level), and progressive stackers (i.e., those who moved from a certificate to a degree or a noncredit certificate to a credit-bearing certificate).

ings per year. Individuals who started with a health care certificate and went on to stack credentials saw earnings gains of 46 percent, compared with gains of 20 percent and 15 percent for MET and IT fields, respectively.

**Earnings increased more for individuals who stacked higher levels of credentials.** Figure 3 also shows increases in earnings related to different patterns of stacking in health care. There were greater earnings gains from progressive (or vertical) stacking and for individuals whose first certificate was a long-term certificate. For example, individuals who progressed from an OTC certificate to a credit-bearing credential saw overall earnings gains of 33 percent, while those who earned a second noncredit credential saw no increase beyond the 17-percent gain in earnings from the initial certificate.

**Rates of stacking and increases in earnings varied by the age, gender, race, and ethnicity of individuals.** White students, younger students, and women were more likely to stack credentials. The team found higher average earnings gains for women relative to men (47 percent versus 22 percent) and for younger learners relative to learners aged 25 and older (53 per-

cent versus 31 percent). Results by race and ethnicity indicated that black and Hispanic individuals saw equal or greater earnings gains from the initial certificate relative to white individuals. However, when white certificate-earners went on to stack credentials, they experienced larger earnings gains, leading to greater overall gains relative to black individuals who stacked (38 percent versus 31 percent). Identifying the sources of demographic variation was beyond the scope of the study, but the data suggest that some of the variation is driven by sorting into different fields. For example, younger learners and women are more likely to enter into health care fields, which generate higher earnings relative to MET and IT credentials.

## Study Implications

The study suggests that stackable credentials offer a promising strategy for reshaping postsecondary education and training in applied fields like health care, MET, and IT. There was also evidence that pointed to some areas for further exploration and improvement. A few of these takeaways are highlighted here.

**Evidence suggests that Ohio has robust pipelines of students stacking credentials.** The state’s public institutions have been expanding certificate programs, and more students have been completing certificates. Program applications suggest that more than half of new certificate programs are embedded in degree programs, and large percentages of certificate-earners are going on to stack credentials and earn degrees. Stacking is happening across all types of institutions. When individuals stack credentials, they see substantial earnings gains. This suggests that Ohio is at least partially meeting its goals for scaling stackable credentials.

**Stackable credentials are new, and improvement might be needed to strengthen pipelines.** There was wide variation in stacking and earnings outcomes across fields, credential types, and demographic characteristics of individuals. More work might be needed to strengthen stackable credential pipelines in certain areas and ensure that high-quality stackable opportunities are accessible to individuals throughout the system. For example, short-term certificates and IT certificates did not result in positive earnings gains on their own, suggesting that institutions and individuals might want to examine these programs to ensure that they are providing value in the labor market. Cross-institution pipelines and noncredit-to-credit pipelines could also

potentially be strengthened. Despite large estimated earnings gains for individuals who moved on to earn credit-bearing credentials after earning noncredit credentials, very few noncredit certificate-earners from OTCs went on to earn credit-bearing credentials at community colleges and universities. Ohio's ongoing efforts to expand statewide agreements around transfer of coursework for credit across institutions is one example of a strategy the state is pursuing that might support more cross-institution and noncredit-to-credit stacking. And finally, given slightly lower rates of stacking and lower earnings gains from stacking among adult learners and black and Hispanic individuals, more work might be needed to ensure equity within stackable credential pipelines. Ohio should continue to identify and scale promising approaches and address challenges within stackable credential pipelines to ensure that they provide strong pathways for workforce development.

**More research is needed to fully understand the value of and to improve stackable credential pipelines.** Many important questions were beyond the scope of

this study. For example, more causal evidence is needed to determine whether the scaling of stackable programs and initiatives is leading to improved outcomes for students. In addition, more systematic evidence on how stackable credential programs are being implemented and how implementation practices or stackable design characteristics are related to student outcomes is needed. Researchers should continue to explore the drivers of variation in outcomes across fields and student subgroups to determine which credentials are providing value and who is benefiting from stackable credentials. Additional issues that are not well understood are how individuals are transitioning between work and stackable educational programs and how to smooth these transitions and create better partnerships with employers. As states and institutions scale stackable credentials, it is important to continue examining data on programs and student outcomes to ensure that these initiatives are achieving their intended aims of strengthening workforce development and pipelines into postsecondary education.

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This brief describes work done in RAND Education and Labor and documented in *Stacking Educational Credentials in Ohio: Pathways Through Postsecondary Education in Health Care, Manufacturing and Engineering Technology, and Information Technology*, by Lindsay Daugherty, Jenna W. Kramer, Drew M. Anderson, and Robert Bozick, RR-A136-1, 2020 (available at [www.rand.org/t/RR-A136-1](http://www.rand.org/t/RR-A136-1)); *Making Improvements to Stackable Credential Pipelines: A Toolkit on Using Data to Drive Improvement in Ohio Postsecondary Institutions*, by Lindsay Daugherty, TL-A136-1, 2020 (available at [www.rand.org/t/TL-A136-1](http://www.rand.org/t/TL-A136-1)); and *Stackable Credential Pipelines in Ohio: Evidence on Programs and Earnings Outcomes*, by Lindsay Daugherty and Drew M. Anderson, RR-A207-1, 2021 (available at [www.rand.org/t/RR-A207-1](http://www.rand.org/t/RR-A207-1)). To view this brief online, visit [www.rand.org/t/RBA207-1](http://www.rand.org/t/RBA207-1). The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. **RAND**® is a registered trademark.

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