Research Brief
Program Evaluation Unit
Legislative Finance Committee
July 12, 2019

Early College High Schools

AT A GLANCE

New Mexico ranks low nationally on many key indicators of high school and postsecondary success. The state had the second-lowest four-year high school graduation rate in the country in 2017 at 71 percent, with lower rates for English learners and economically disadvantaged students. Students who enter college face achievement gaps, with 37 percent of white residents earning a bachelor's degree or higher, compared to 13 percent and 9 percent, respectively, of Hispanic and Native American residents. At the same time, the value of postsecondary education is growing, with significant evidence that a postsecondary degree or credential leads to higher lifetime earnings and other positive outcomes, compared to a high school diploma.

One model designed to increase students' chances of postsecondary success is the early college high school. Early college high schools combine high school coursework with structured college coursework, industry certifications, and work experience, allowing students to earn college credits and complete some or all of an associate degree while still in high school, or earn an industry-recognized workforce certification.

Quasi-experimental analysis of student outcomes for two early college high schools in the state found positive effects on students who attended, in terms of postsecondary degree attainment.

Early college high schools are an evidence-based practice that have shown positive effects on student high school and college achievement. Experimental research from other states found that students who attended an early college high school were more likely to graduate from high school, enroll in college, and earn degrees than their peers.

In New Mexico, there are 20 early college high schools serving approximately 3,100 students. Quasi-experimental analysis of student outcomes for two early college high schools in the state found statistically significant effects on students who attended, in terms of postsecondary degree attainment, compared to students who applied for attendance via a lottery, but did not attend. Effects were most significant for students who attended for three years (the length of the program). Preliminary but promising results suggest that further rigorous research on early college high school effects in New Mexico could be beneficial to assess the statewide impact of the model.

Background

The early college high school (ECHS) model is a dual credit or dual enrollment model designed to help students graduate from high school while simultaneously earning college credits and career certifications through a postsecondary partner such as a community college or four-year college or university.

The first large-scale implementation of the ECHS model began in 2002, when the Bill & Melinda Gates Foundation launched the Early College High School Initiative (ECHSI), a $40 million effort to launch a network of ECHSs.

ECHSs offer a cohesive curriculum that integrates both high school and college-level coursework into a single course of study, whereas in a general dual credit model, students typically take individual college-level courses that are not necessarily part of a cohesive plan of study. The model is designed to target students who are underrepresented in higher education, like low-income and first-generation college students.

ECHSs usually adhere to one of three location models – co-located (a dedicated ECHS on the same campus as its postsecondary partner), freestanding (a dedicated ECHS located separately from the postsecondary partner), or academy (an ECHS program within a traditional high school). Students are taught either by college instructors, or high school instructors who are accredited to teach college courses.

While ECHS models vary by state, district, and school, an ECHS should meet five core principles, according to the ECHSI (Figure 1).

Proponents of the ECHS model point to several benefits for students, including a head start on a degree or certification and cost savings through early completion of college credits, and in some cases, early graduation from a four-year college.

The ECHS model is an evidence-based practice that has shown positive effects on student high school and college achievement.

The Institute for Education Sciences, the research division of the U.S. Department of Education, identifies ECHSs as an evidence-based model shown to have positive effects on high school completion, credit accumulation, college enrollment, and college degree attainment.

See Table 1 for a summary of research outcomes from a key ECHS study.

Table 1. Summary of ECHS Research

Study	Outcome	Difference
American Institutes for Research	Enrolled in college (Chart 1)	+9% points*
	Earned any postsecondary degree	+20% points
	Earned an Associate degree	+20% points
	Earned a Bachelor's degree	+3% points

Source: AIR ECHSI Impact Study report exhibit 2.2 and 2.5

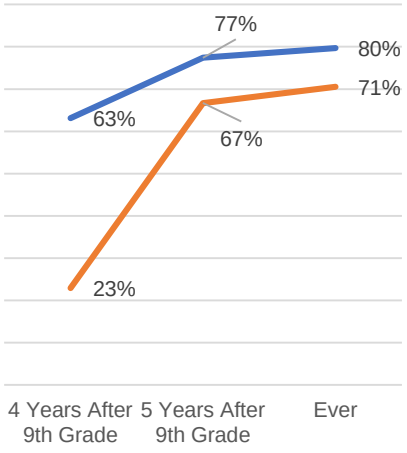
Figure 1. ECHSI Core Principles

Early college high schools should:

1. Be committed to serving students underrepresented in higher education.
2. Be created and sustained by a local education agency, a higher education institution, and the community, all of whom are jointly accountable for student success.
3. Jointly develop, along with their higher education partners and community, an integrated academic program so all students earn one to two years of transferable college credit leading to college completion.
4. Engage all students in a comprehensive support system that develops academic and social skills as well as the behaviors and conditions necessary for college completion.
5. Work with intermediaries to create conditions and advocate for supportive policies that advance the early college movement.

Source: ECHSI

Chart 1. Percentage of Students Enrolled in College by Group (AIR Study)



Source: ECHSI Impact Study, American Institutes for Research, September 2013

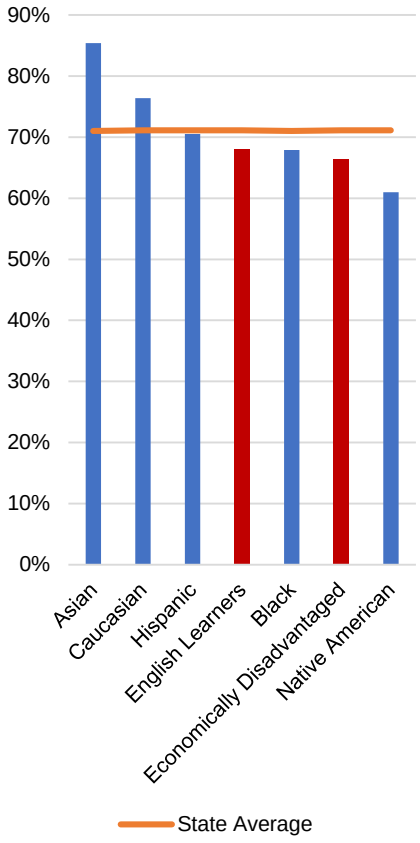
The Washington State Institute for Public Policy, which estimates the benefit to cost ratio of social programs, finds a positive ratio for ECHS (Table 2).

Table 2. Benefits of Early College High Schools

Benefit to Cost Ratio	Chance Benefits Will Exceed Costs
$16.54	92%

Source: Washington State Institute for Public Policy

Chart 2. Four-Year Graduation Rates, 2017 Cohort



Source: PED

Twenty early college high schools in New Mexico serve over three thousand students statewide.

The longest-operating ECHS in New Mexico – Middle College High School, in Gallup – was established in 2002. On its website, PED lists 18 ECHSs. PED's College and Career Readiness Bureau lists five "defining characteristics" of early college high schools:

- Small size – typically 100 students per grade level;
- Responsible growth – typically opens with ninth grade and takes 4 years to reach full capacity;
- Close proximity to the partner postsecondary – often on their campus;
- Block scheduling – allows for acceleration of the graduation requirements so upperclassman can take college courses; and
- Limited high school electives – most elective credits are earned through dual credit coursework.

In SY19, there were approximately 3,100 students enrolled in 20 ECHSs – the 18 schools listed on PED's website, as well as The MASTERS Program, which follows the ECHS model, and McKinley Academy, a new ECHS in Gallup. The 20 schools are spread across 13 school districts. Five are charter schools.

See Appendix A for an overview of New Mexico ECHSs.

PED offers a designation for ECHSs that meet certain requirements. For more detail, and a list of designated schools, see Appendix B.

The ECHS model may help to address New Mexico's poor educational outcomes.

New Mexico ranks low nationally on many indicators of high school and postsecondary success, and also faces persistent achievement gaps. As of 2017, New Mexico had the second-lowest high school graduation rate in the

country, and the four-year graduation rate for economically disadvantaged students was almost five percentage points below the state average (Chart 2).

Achievement gaps also show up in college degree attainment – 37 percent of white residents earn a bachelor's degree or higher, compared to 13 percent and 9 percent, respectively, of Hispanic and Native American residents (Chart 3).

The value of postsecondary education is growing. There is significant evidence that a postsecondary degree or credential leads to higher lifetime earnings and other positive outcomes, compared to a high school diploma. According to the Bureau of Labor Statistics (BLS), median earnings in 2017 for those with the highest levels of educational attainment—doctoral and professional degrees—were more than three times those with less than a high school diploma. Unemployment rates also vary significantly based on educational attainment, with higher rates for lower levels of educational attainment. BLS projects that between 2016 and 2026, the highest levels of job growth will occur in occupations that require some type of postsecondary degree.

The ECHS model is designed to address many of the educational challenges that New Mexico faces – low graduation rates, low degree attainment, and significant disparities in achievement between racial and ethnic groups.

This research brief examines whether attending a New Mexico ECHS leads to greater degree attainment for students.

Figure 2. Criteria Used to Select ECHS Schools for Analysis

For this analysis, the LFC selected ECHSs that met the following criteria:

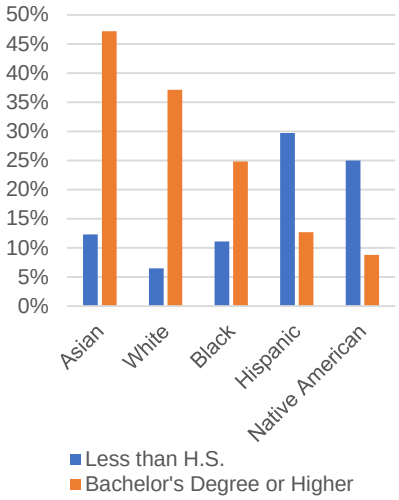
- Exhibited core ECHS features, including students taking college courses at a postsecondary partner institution, offering workforce certifications, targeting underrepresented students, and small size;
- Had at least one graduating cohort between 2010 and 2018;
- Held randomized admissions lotteries; and
- Retained records on the names of lottery applicants.

Analysis on ECHS outcomes has been conducted in other states, suggesting that attending an ECHS leads to better postsecondary outcomes for students, but there has not been any experimental or quasi-experimental research on New Mexico ECHSs to date.

This analysis aims to answer the following question: does attending an ECHS lead to greater degree attainment for students, and does the dosage (or number of years that a student attended) impact degree attainment?

The LFC performed a quasi-experimental analysis of student outcomes for two New Mexico ECHSs**.** The analysis examines college degree outcomes for groups of students who attended ECHSs that held random admissions lotteries, comparing students who attended the ECHS (treatment group) with those who did not (control group). The LFC selected two ECHSs for the study that met certain criteria (see Figure 2). See descriptions of the two schools in Figure 3.

Chart 3. New Mexico Educational Attainment by Ethnicity, 2009



Source: US Census Bureau, American Community Survey 2009, S0201 Selected

Figure 3. Middle College High School and The MASTERS Program

- **Middle College High School** (MCHS) was established in 2002 and offers concurrent enrollment through UNM-Gallup, where it is located. MCHS provides students with Associate degree options including Liberal Arts, Science, Nursing, and Business Administration. Features of the school program include eight hours of tutoring per week, job shadowing, and service learning.
- **The MASTERS Program** (TMP) in Santa Fe is located on the campus of Santa Fe Community College, its postsecondary partner. The school currently serves grades 10-12, but will add a ninth grade in SY20. Students work towards either a certificate in academic transfer (for students intending to complete their studies at a four-year HEI) or an industry certification. Features of the school program include mentorships with local professionals, required community service, and on-demand tutoring.

Source: School websites, interviews with school leadership

Data on degree outcomes are based on records from the National Student Clearinghouse, a service that tracks college enrollment and degree data, based on reporting from colleges and universities.

For more detail on the analysis and methodology, see Appendix C.

The LFC partnered with the Abdul Latif Jameel Poverty Action Lab (J-PAL) at the Massachusetts Institute of Technology to develop and conduct this study. J-PAL is a global research center working to reduce poverty by ensuring that policy is informed by scientific evidence. Through its network of affiliated professors at universities around the world, J-PAL conducts randomized impact evaluations to answer critical policy questions. The LFC received technical support from J-PAL's State and Local Innovation Initiative, which supports state and local leaders in using randomized evaluations to identify which programs work, which work best, and why. The partnership allowed the LFC to access J-PAL's network of academic researchers. For more information on J-PAL, see Appendix D.

Attending two New Mexico ECHSs leads to better postsecondary outcomes for students

Quasi-experimental research examining student outcomes found statistically significant effects on degree attainment for students who attended the two ECHSs included in the analysis.

Attending an ECHS increases the likelihood of receiving a postsecondary degree by 10 percentage points.

Between 2010 and 2018, almost 24 percent of treatment group students attained a postsecondary degree (associate, bachelor's, or master's), compared to nearly 14 percent of control group students, a 60 percent difference, controlling for free and reduced price lunch (FRL) and English Learner (EL) status (Chart 4).[1]

The impact of attending an ECHS was seen for both associate and bachelor's degree attainment (Chart 5). There was no statistically significant difference in master's degree attainment, although the number of students in either group who attained a master's degree during the time period was very small. There was no difference in attainment of science, technology, engineering, and math (or STEM) degrees between the two groups.

Compared to ECHS findings from other experimental and quasi-experimental studies, New Mexico ECHS outcomes are smaller, but still show a positive impact (Table 3). For bachelor degree attainment, New Mexico ECHSs have a slightly greater impact than what has been shown in previous research. However, the national data followed one cohort for six years after ninth grade, while the LFC analysis examined multiple cohorts ranging from zero years to six years after expected high school graduation.

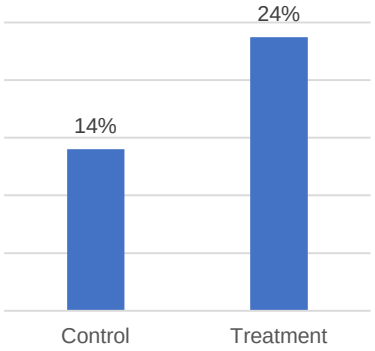
Table 3. Summary of ECHS Research

Outcome	Impact of ECHS in National Research	Impact of ECHS in LFC Study*
Earned any postsecondary degree	+20%	+10%
Earned an Associate degree	+20%	+4%
Earned a Bachelor's degree	+3%	+4%

Source: American Institute for Research ECHSI Impact Study report
*New Mexico data is from multiple cohorts with variable time since graduation

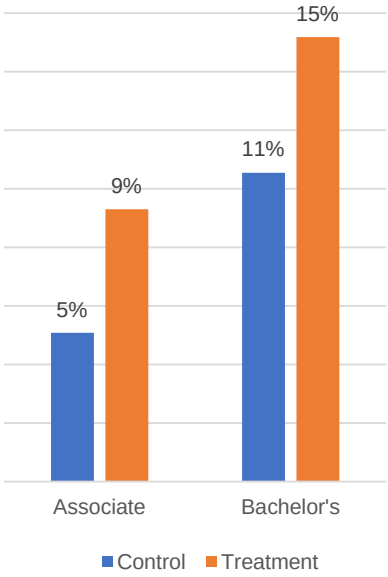
Students who attended an ECHS for the full duration of the program were more likely to attain a degree than those who attended for just one or two years. Of students who attended an ECHS from grades 10 through 12, 29 percent attained at least one degree, compared to 15 percent of students who attended for just one year (Chart 6).[2] In fact,

Chart 4. Percent of Students Recieving Any Degree



Source: LFC analysis of early college high school, PED, and National Sudent Clearinghouse data
Note: Includes associate, bachelor's, and master's degrees

Chart 5. Percent of Students Receiving Associate or Bachelor's Degrees



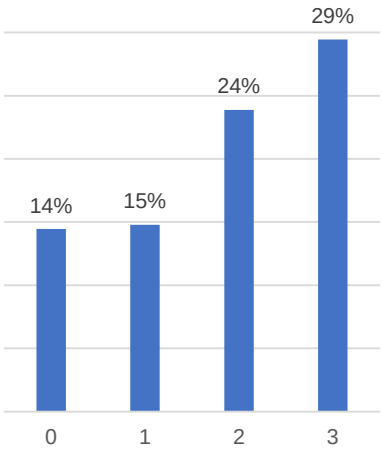
Source: LFC analysis of early college high school, PED, and National Sudent Clearinghouse data

[1] This outcome, and the other outcomes in this section, only include students whose records were found in the National Student Clearinghouse database; in other words, those known to have enrolled in a postsecondary institution.
[2] Both MCHS and the MASTERS Program are three-year schools (grades 10 through 12), although the MASTERS program is adding a ninth grade beginning in SY20. PED data used to determine dosage (number of years attended) only indicates whether a

there was little difference in degree attainment between the control group (zero years) and students who attended an ECHS for one year. Students who attend for fewer than three years may face mobility effects, in which moving schools negatively impacts academic achievement, potentially offsetting any gains from attending an ECHS. This finding suggests that it is important for ECHSs to focus on student retention and ongoing support, as well as recruitment.

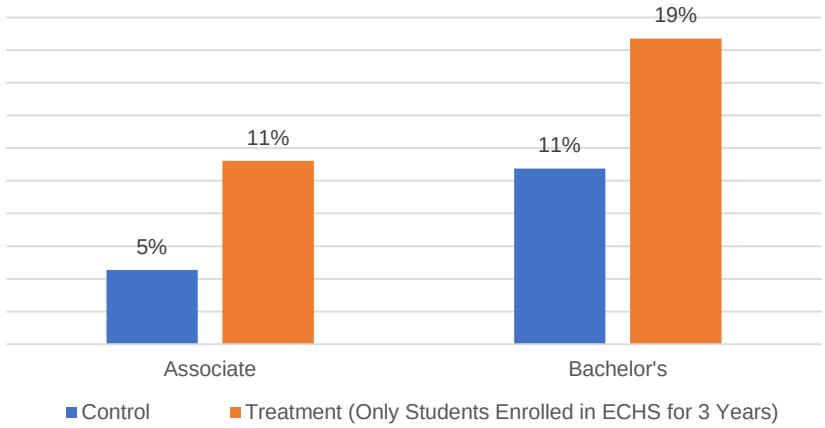
When comparing students in the control group with those in the treatment group who attended for all three years, those who attended for three years were more than twice as likely to obtain an associate degree and nearly 75 percent more likely to obtain a bachelor's degree (Chart 7).

Chart 6. Percent of Students with Any Degree By Number of Years at an ECHS



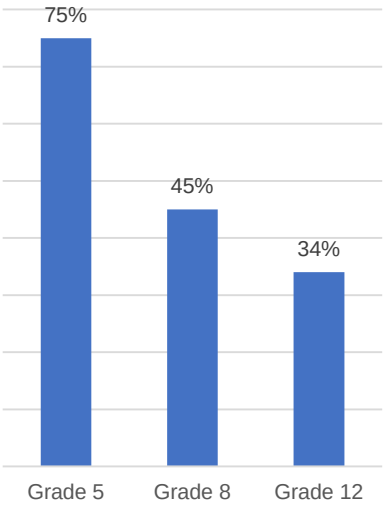
Source: LFC analysis of early college high school, PED, and National Sudent Clearinghouse data

Chart 7. Percent of Students Attending an ECHS for Three Years Receiving Associate or Bachelor's Degrees



Source: LFC analysis of early college high school, PED, and National Sudent Clearinghouse data

Chart 8. Student Engagement in School by Grade, 2015



Source: Gallup Student Poll 2015

Some research suggests that increased student engagement may be a key factor behind positive ECHS outcomes.

While it is difficult to isolate the specific mechanisms that produce results in ECHSs, a 2013 study from the University of North Carolina found that much of the success of the ECHS model is due to "mandated engagement" – or teachers who "purposefully and proactively" work with students to prevent them from disengaging. The study found that school personnel at ECHSs had higher expectations for students, relationships among adults and students were stronger, and instructional practices were more rigorous. The study also found that students at ECHSs were more likely to indicate that their schools facilitate engagement, through factors like rigorous instruction, academic and social supports, and relationships with teachers.

More generally, increased school engagement is associated with better academic performance and higher graduation rates. Overall, students report lower engagement in school as they get older. A 2015 Gallup poll found that while 75 percent of fifth graders felt engaged, this number dropped to 45 percent by eighth grade, and 34 percent by twelfth grade (Chart 8).

student was enrolled at one point in a school year, not whether the student completed the entire school year at that school.

An example of "mandated engagement" is College and Career High School's (Albuquerque) use of an early warning system that allows administrators and teachers to closely monitor on a weekly basis every student's academic performance, attendance, and other indicators, and assign a staff member to intervene when students are flagged as at-risk of disengaging.

Smaller schools are also associated with better student outcomes, although some research suggests that outcomes are not due to the school size but rather to other factors facilitated by small schools, such as greater engagement between students and teachers.

The LFC analysis had several limitations, due to quality and availability of data.

The above analysis was limited by a number of factors, including:

- Sufficient data only existing for two schools;
- A lack of complete randomization in creating the treatment and control groups; and
- Incomplete student data from both the student's K-12 student record and from college records from the National Student Clearinghouse.

Given the lack of comprehensive randomized lottery records from ECHSs, systemic differences may exist between the treatment and control groups, and effects found could be due to those preexisting differences, at least in part. Two key variables – FRL and EL status – were controlled for in the analysis to minimize confounding effects. However, there may be other differences between the groups, such as demographic characteristics not available in student data. Without comprehensive data for all students, additional differences may exist between the two groups that are not accounted for in the analysis.

In addition, since two of the 24 colleges and universities in New Mexico (New Mexico Institute of Mining and Technology and Luna Community College) do not report data to the National Student Clearinghouse, it is possible that a number of students enrolled in these colleges but do not show up in the records, and thus, were not included in the analysis of outcomes.

Furthermore, records were found for only 59 percent of the study population. The absence of records does not necessarily mean these students did not enroll in college – for example, a student may have changed his or her name, used a different name or name spelling, moved out of the country, or passed away – further complicating conclusions from the analysis.

In addition, some of the difference in degree attainment may be attributed to the analysis covering a limited time period (2010 through 2018), in which ECHS students may have gotten a "head start" on degree attainment. Over time, the gap between the treatment and control groups may narrow. This effect is seen in the American Institutes for Research study, in which there was a 40 percentage point gap in college enrollment four years after ninth grade, which shrunk to a nine percentage point gap when examining students'

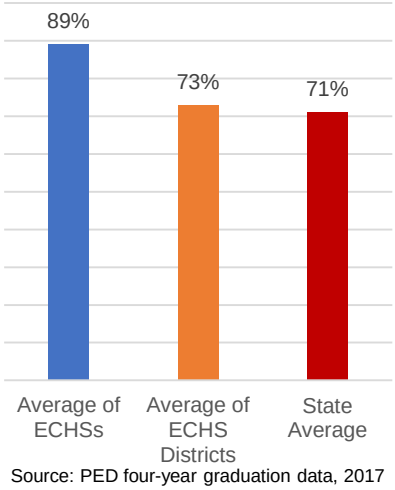
enrollment at any point after ninth grade. Were the analysis of New Mexico ECHSs extended by several years, it is possible that the degree attainment gap would shrink.

LFC findings, along with encouraging statewide data, point to the potential of ECHSs, but more comprehensive study is needed

On many measures of student and school performance, ECHSs perform better than other schools in their districts, and better than the statewide average. This, coupled with promising results from the LFC's quasi-experimental analysis of two schools, suggests that well-designed ECHSs may help to improve high school and college outcomes for New Mexico students. Expanding the ECHS model to reach more students across the state may be beneficial; however, given the limited scope of the LFC analysis, and limitations of current statewide data, a longer-term, prospective study of the state's ECHSs could provide a more comprehensive, accurate picture of outcomes to better inform policymaking.

ECHSs perform better than their districts on some measures of school and student achievement, but their student populations differ.

Chart 10. Average Four-Year Graduation Rates for ECHSs, Their Districts, and Statewide, 2017



Source: PED four-year graduation data, 2017

Overall, ECHSs receive better school grades, compared to schools statewide. In 2017, 85 percent of ECHSs with a school grade received an A or a B grade, compared to 39 percent of all schools (Chart 9).

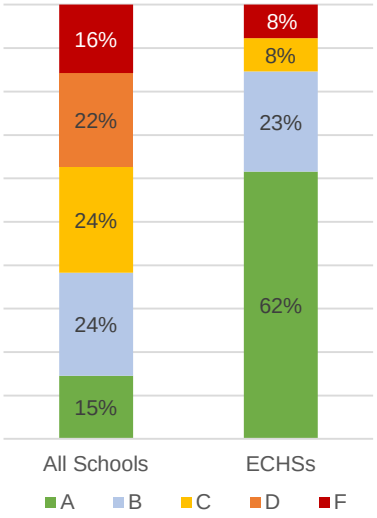
ECHSs, on average, have higher four-year graduation rates than their districts, and higher than the state average (Chart 10), although of 20 ECHSs, five either were too small or too new to have reported four-year graduation rates in 2017, in addition to the six academy-model ECHSs that don't separately report data.[3]

Similarly, average college remediation rates for the eight ECHSs with reported remediation data in 2016 were lower than both the average rate of their districts and the state average (Chart 11).

Structured ECHS programs also lead to greater credit attainment than non-structured dual credit programs. See Appendix E for more detail.

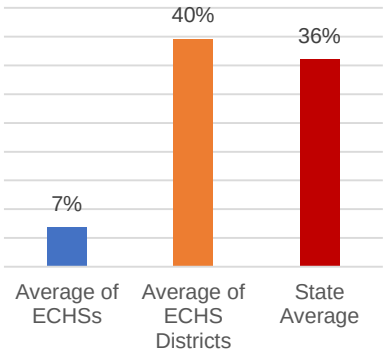
ECHS students are less likely to be Hispanic or Native American, and less likely to be low-income, than their district peers. On

Chart 9. School Grades Distribution, 2017



Source: PED school grades website and dataset
Note: Academy-model ECHSs not included; Arrowhead ECHS school grade

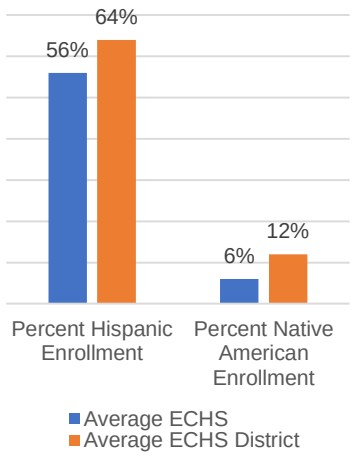
Chart 11. Average College Remediation Rates for ECHSs, Their Districts, and Statewide, 2016



Source: HED remediation by HS data, Fall 2016
Note: Data includes first-time freshman for summer and fall of 2016 taking any type of remediation, including co-requirements

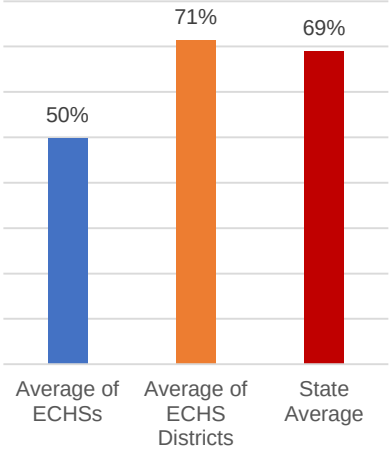
[3] Because academy-model ECHSs are programs within traditional high schools, there is no standalone data available on their student demographics or student performance.

Chart 12. Average Hispanic and Native American Enrollment for ECHSs and Their Districts



Source: PED District Report Card data;

Chart 13. Average FRL Rates for ECHSs, Their Districts, and Statewide, SY18



Source: PED FRL rates, SY18

average, ECHSs have lower percentages of Hispanic and Native American students, compared to their districts (Chart 12). Of 13 ECHSs for which demographic data is available, seven have student bodies that are 10 percentage points or more less Hispanic than their districts.

Rates of FRL eligibility, a proxy for low-income status, are also lower, on average, at ECHSs than the statewide average (Chart 13).

These trends echo findings about dual enrollment programs in general. A 2019 article from the Chronicle of Higher Education pointed out that students whose parents attained a bachelor's degree or higher were more likely to take dual enrollment courses than those with less-educated parents – 42 percent, compared to 26 percent for students whose parents had less than a high school diploma.

While these outcomes are promising, on their own they are not sufficient to draw clear conclusions. Statewide performance data is correlational, not causal, meaning that while students who attend ECHSs may have better outcomes, it is not clear that ECHSs *cause* better outcomes. Furthermore, differences in student demographics – known and unknown – between ECHS and non-ECHS students may explain at least some of the differences in outcomes. The LFC analysis of two ECHSs provides some evidence that attending an ECHS may be a cause of better outcomes, but it is limited in scope. Beyond college enrollment and degree attainment, it would also be beneficial to understand the impact of ECHSs on students' time to degree and cost savings achieved through completion of college credits while still in high school.

PED has applied for a federal grant for scaling and evaluation of the ECHS model in New Mexico, a promising approach to more rigorously evaluating ECHS effects. PED recently applied for an Education Innovation and Research grant from the U.S. Department of Education. The grant can be used to fund implementation and rigorous evaluation of a program model that demonstrates effects on improving student outcomes, based on at least one experimental study. PED's grant application proposes to use funding to launch more academy-model early college high schools across the state and partner with RAND, a national research organization, to evaluate student outcomes, including high school graduation rates, college enrollment rates, and employment outcomes, using results of randomized admissions lotteries. This type of rigorous evaluation would be beneficial in assessing the broader impact of the ECHS model in New Mexico, although findings would focus only on academy-model schools, not on freestanding or co-located ECHSs.

In addition to the PED proposal, other low-cost means of evaluating ECHSs could be considered, such as requiring schools to implement and keep records on open-access, randomized admissions lotteries for a certain period of time, allowing researchers to assess the effects on larger, randomized treatment and control groups.

APPENDICES

Appendix A. Overview of Early College High Schools in New Mexico

School	District	School Type	Model	Postsecondary Partner(s)	Students (SY 19)
East Mountain High School	Albuquerque	Charter	Freestanding	CNM	364
Early College Academy	Albuquerque	District	Freestanding	CNM, UNM	193
College and Career High School	Albuquerque	District	Co-located	CNM	168
Carlsbad Early College High School	Carlsbad	District	Co-located	NMSU-Carlsbad	227
Bond Wilson Technical Center	Central Consolidated	District	Academy	Navajo Technical University	80
San Juan College High School	Farmington	District	Co-located	San Juan College	235
Alta Vista Early College High School	Gadsden	District	Freestanding	DACC	159
Middle College High School	Gallup McKinley	Charter	Co-located	UNM-Gallup	91
McKinley Academy	Gallup McKinley	District	Academy	UNM-Gallup	80
Hobbs Early College High School	Hobbs	District	Academy	New Mexico Junior College	35
Arrowhead Park Early College High School	Las Cruces	District	Co-located	DACC, NMSU	339
Arrowhead Park Medical Academy	Las Cruces	District	Co-located	DACC, NMSU	239
Los Alamos Early College and Career Academy	Los Alamos	District	Academy	UNM-Los Alamos	62
School of Dreams Academy*	Los Lunas	Charter	Freestanding	UNM-Valencia	80
Peñasco High School (RISE)	Peñasco	District	Academy	NNMC	25
Early College High School	Roswell	District	Co-located	ENMU-Roswell	156
Ruidoso Early College Academy	Ruidoso	District	Academy	ENMU-Ruidoso	140
Early College Opportunities	Santa Fe	District	Freestanding	SFCC	117
The MASTERS Program	Santa Fe	Charter	Co-located	SFCC	214
Taos Academy	Taos	Charter	Freestanding	UNM-Taos	116

Sources: PED ECHS website, school websites, interviews with school leadership
* School of Dreams Academy has over 200 students, but only ~80 participate in an ECHS program

Appendix B. PED Designation for Early College High Schools

PED offers a designation for ECHSs that meet certain requirements. Requirements for designation as a department-approved ECHS – as detailed in NMAC 6.30.13 – include integrating state standards, offering workforce recognized credentials, and reaching students underrepresented in higher education (Figure 4). To evaluate schools, PED uses a nine-part rubric (Figure 5), rating each school as "conditional early college," "early college designee," or "exemplary early college" in each evaluation area. To become an exemplary early college, the ECHS must meet all criteria for success and demonstrate research-based ECHS best practices in at least one or more of the criteria. Each domain includes a number of requirements, as well as one or two best practices. Conditional early colleges receive additional technical assistance to become early college designees.

Figure 4. PED Requirements for ECHS Designation

To be designated a department-approved ECHS, a school shall meet the following qualifications:

- **Integrates state standards** into courses within a structured pathway that meets local and state graduation requirements.
- Follows a pathway that **results in a workforce recognized credential** without tuition cost to the student or the student's family.
- Focuses on efforts **to reach youth underrepresented in higher education** by establishing outreach and recruiting processes striving for equitable access. Focused recruiting efforts shall encourage applicants from underrepresented populations to enroll in an ECHS.
- **Accelerates student learning** through the use of dual credit courses beginning no later than grade ten. Dual credit courses shall:
  - Accelerate the timeline for high school students to complete college;
  - Be delivered through one or more postsecondary partners;
  - Be tuition free;
  - Be taught by instructors who meet the higher learning commission qualifications for college instructors;
  - Use innovative, interactive, research-based support structures; and
  - Align with: (a) the pathway indicated on the student's next step plan; (b) the established New Mexico higher education general education curriculum; and (c) either the student's declared CTE pathway or declared major or meta major
- **Operates in partnership with one or more workforce partners**. Partnerships shall include: (1) meaningful work-based learning experiences in alignment with student pathways; and (2) CTE courses that use career and technical education standards to support core academic growth.

Source: NMAC 6.30.13

Designated schools will be identified as such on PED's website, and PED indicated that schools that do not receive designation will not be permitted to call themselves early college high schools nor to 'tag' their students as ECHS students for tracking and monitoring purposes. As of June 2019, PED had designated 12 schools as early college high schools (Figure 6).

The rule also calls for the department to annually review designated schools' data, including the share of low-income students enrolled, and the number of credits completed by students, in order to determine compliance. Schools that do not meet compliance will be placed on a one-year probation during which they can make required changes. Schools that do not achieve compliance during the probationary year will lose their designation.

Figure 5. PED Criteria for Success for ECHS Designation

In order to be designated as an ECHS the school must meet the ECHS designation in all criteria for success and in the outcomes-based measures below.

1. Staffing
2. Proposed pathway(s) description & Next Step Plans
3. Workforce-recognized credentials for each pathway
4. Students served
5. Outreach and recruitment process
6. Written agreement(s) with postsecondary partner(s)
7. Written agreement(s) with workforce partner(s)
8. Sustainability plan
9. Tribal consultation

Source: PED website

Figure 6. PED Designated Early College High Schools

- Bond Wilson Technical Center (Shiprock)
- Carlsbad Early College High School
- College and Career High School (Albuquerque)
- Early College Academy (Albuquerque)
- Early College High School (Roswell)
- Early College Opportunities (Santa Fe)
- Los Alamos Early College and Career Academy
- Middle College High School (Gallup)
- RISE Program at Peñasco High School
- Ruidoso Early College Academy
- San Juan College High School (Farmington)
- School of Dreams Academy (Los Lunas)

Source: PED website

Appendix C. Early College High School Analysis and Methodology

The LFC performed a quasi-experimental analysis of student outcomes for two New Mexico ECHSs. Specifically, the analysis examines outcomes for groups of students who attended ECHSs that held random admissions lotteries, comparing students who attended the ECHS (treatment group) with those who did not (control group).

For this analysis, the LFC selected ECHSs that met the following criteria:

- Exhibited core ECHS features, including students taking college courses at a postsecondary partner institution, offering workforce certifications, targeting underrepresented students, and small size;
- Had at least one graduating cohort between 2010 and 2018;
- Held randomized admissions lotteries; and
- Retained records on the names of lottery applicants.

Two schools met all these criteria – Middle College High School in Gallup and The MASTERS Program in Santa Fe.

Because lottery records that schools provided were not comprehensive enough to determine initial lottery results in all cases, treatment and control groups were constructed in the following way:

- Treatment groups include all students who entered the lottery and attended the ECHS in at least one school year, based on PED demographic files, with an expected graduation year between SY10 and SY18.
- Control groups include any student who entered the lottery and is not shown to have attended an ECHS, based on PED demographic files, with an expected graduation year between SY10 and SY18.

This method of creating treatment and control groups does not reflect complete randomization of lottery results – for example, some students who attended the ECHS may have gotten in from a waitlist, and conversely, some students who did not attend may have gotten in via a lottery but decided not to attend. However, this method allows for comparison of outcomes between students who expressed an interest in attending an ECHS.

Using results of random or quasi-random assignment to evaluate outcomes makes it more likely that students in the treatment and comparison groups are similar prior to entering high school. Therefore, differences in high school and postsecondary outcomes may be attributed to the high schools they attended rather than to any preexisting differences in academic performance, motivation, family support, or other characteristics. However, individuals in the treatment group were slightly less likely to be eligible for FRL and more than twice less likely to be EL. See Table 4 for summary characteristics of treatment and control groups.

Table 4. Characteristics of ECHS Treatment and Control Groups

Indicator	Treatment Group	Control Group
Total Number of Individuals	901	425
Percent FRL	45%	40%*
Percent EL	5%	12%**

Source: LFC analysis of ECHS, PED, and National Student Clearinghouse data
Note: FRL and EL status apply if a student had this status for at least one year of records
*Of the control group, 17 percent had an unknown FRL status
**Of the control group, 18 percent had an unknown EL status

Since students who applied for ECHS entry via a lottery may differ from other district students who did not apply, this analysis only compares outcomes of students who expressed interest in attending an ECHS, and not outcomes of ECHS students compared to district students in general.

To determine if ECHS attendance affected college degree attainment, the LFC ran multiple analyses of variance and chi-squares, controlling for FRL and EL status, where appropriate. These analyses specifically examined the effect of ECHS on associate, bachelor's, and master's degree attainment as well as total and any degree attainment. In addition to degree attainment, the LFC also examined whether those attending ECHSs were more likely to have a STEM degree and if they were more likely to have a higher degree. Furthermore, dosage of ECHS was also examined. The effect of attending an ECHS, as well as ECHS dosage, on both total and any degree attainment, reached statistical significance. In addition, when limiting the analysis to only those who were enrolled in ECHS for three years and the control group, there were significant effects on associate and bachelor's degree attainment. No effect was found for the other analyses, although some had p values below 0.1.

The LFC compared degree attainment (associate, bachelor's, and master's) between individuals in the treatment and control groups. Data on degree outcomes are based on records from the National Student Clearinghouse, a service that tracks college enrollment and degree data, based on reporting from colleges and universities.[4]

Of the treatment group, the National Student Clearinghouse was able to find 58 percent of individuals in its database, meaning that 58 percent of students from that group were enrolled in a postsecondary institution at some point. Of the control group, 60 percent of students were found in the database. Differences in percentages of records found between the treatment and the control groups are not statistically significant. While this could suggest that students whose records were not found never enrolled in a postsecondary institution, there are other reasons why records may not be found, including names that were misspelled in records from the ECHSs, name changes, or students moving out of the country or passing away. Therefore, this analysis is unable to determine enrollment rates for treatment and control groups, or any statistical differences in enrollment between the two groups, and degree attainment analysis only includes students with found records.

[4] Of New Mexico HEIs, the New Mexico Institute of Mining and Technology and Luna Community College do not report data to NSC.

Appendix D. J-PAL North America and the State and Local Innovation Initiative

J-PAL North America, a regional office of the Abdul Latif Jameel Poverty Action Lab, is a research center in the Department of Economics at the Massachusetts Institute of Technology, established with support from the Alfred P. Sloan Foundation and the Laura and John Arnold Foundation. J-PAL North America works to reduce poverty by ensuring that policies are informed by scientific evidence. Its State and Local Innovation Initiative supports state and local governments in using rigorous evaluation to answer critical questions about what works to reduce poverty.

State and local leaders across the United States are actively experimenting with new approaches to better serve their constituents. Increasingly, they are looking to data and evidence to inform their decision-making. Through J-PAL North America's State and Local Innovation Initiative, state and local governments can apply for support in using randomized evaluations to better understand the impact of policies and programs in their jurisdictions. Selected partners receive pro bono technical support from J-PAL North America staff, flexible project funding, and connections with J-PAL's network of leading academic researchers.

Since the initiative's launch in 2015, J-PAL North America and affiliated researchers have partnered with 12 state and local governments. J-PAL North America's selected partners are united in their commitment to generating rigorous evidence to inform their policy decision and ultimately improve people's lives.

For more information, see: https://www.povertyactionlab.org/stateandlocal

Appendix E. Early College High Schools and Credit Attainment

Early college high schools provide structured programs that lead to greater credit attainment than non-structured dual credit programs

ECHSs are not the only path for New Mexico students to take college-level courses. Dual credit programs allow high school students to take college-level classes, receiving both high school and postsecondary credit. Dual credit programs can serve as a pathway for students to earn college credit and become college-ready, and are an evidence-based practice shown to positively impact student graduation rates and college outcomes. Typically, dual credit programs rely on three mechanisms to improve achievement – they allow students to experience college-level work while having additional support, they give students a head start in accumulating credits, and they often offer free or low-cost tuition to reduce the overall financial burden of college.

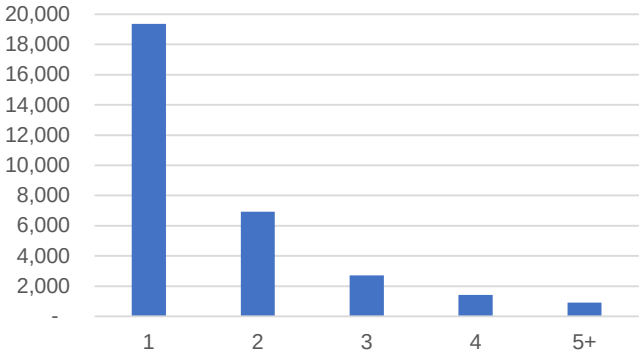
New Mexico requires students to complete at least one dual credit, honors, Advanced Placement, or distance learning course to graduate from high school, and all LEAs must have an agreement with at least one public or tribal postsecondary institution. The number of students in the state taking dual credit coursework increased by 115 percent between FY09 and FY18, to almost 21 thousand, while the number of dual credit courses increased by 140 percent over the same period.

The majority of students who enroll in dual credit take just one course. In SY18, almost two-thirds of New Mexico students who enrolled in dual credit in FY18 took only one course (Chart 14). One course is unlikely to give students a meaningful head start in accumulating college credits, or to reduce the overall cost of college. Moreover, LFC analysis from 2017 found that 58 percent of students took dual credit courses outside the core education transfer curriculum, meaning that courses are not guaranteed to transfer between HEIs.

On average, ECHS students took almost three time as many dual credit courses as non-ECHS students in SY17. While non-ECHS high school students who took dual credit completed two dual credit courses, on average, in SY17, for a total of 6.3 credits, ECHS students took an average of 5.9 dual credit courses, for a total of 17.5 credits (Chart 15).[5]

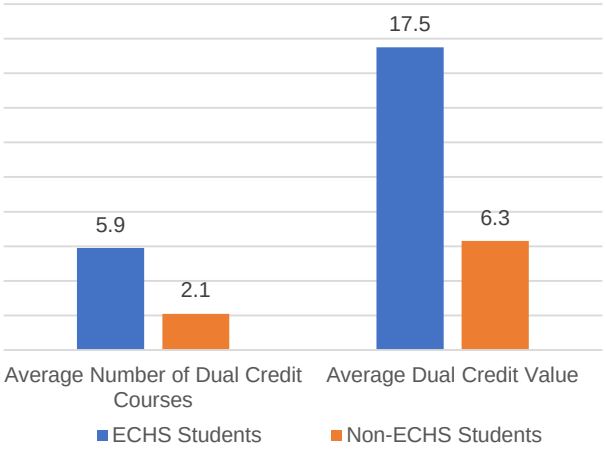
Among ECHSs, the average amount of dual credit attained by students in SY17 ranged from 4 to 24. These figures represent the average amount of dual credit taken in one school year, not the total amount of credit earned by an individual student by the time he or she graduates.

Chart 14. Number of Dual Credit Classes Taken by Students, SY18



Source: HED Dual Credit Annual Report, 2017-2018

Chart 15. Average Annual Number of Dual Credit Courses Taken and Credit Attained by School Type, SY17



Source: HED Dual Credit Data 2016-2017
Note: Dual credit courses do not include remedial courses. Non-ECHS students include district, charter, and private school students, but not home school and GED students

[5] ECHS figures do not include students at academy-model schools, as these programs are not tracked separately.