



# WWC Single Study Review

A review of the design and summary of findings for an individual study



September 2016

## WWC Review of the Report “Smoothing the Transition to Postsecondary Education: The Impact of the Early College Model”<sup>1</sup>

**The findings from this review do not reflect the full body of research evidence on *Early College High Schools*.**

### What is this study about?

The study investigated the effects of *Early College High Schools (ECHS)* on student outcomes in both high school and college. *Early College High Schools* focus explicitly on promoting college readiness for all students, offer a college preparatory high school curriculum as well as college-level courses, and provide students with transferable college credit upon graduation from high school. The study took place in schools in several districts in North Carolina. The *ECHS* in North Carolina are co-managed by the school district and a college partner, and most are located on college campuses. The nineteen *ECHS* in the study target students traditionally underrepresented in college—that is, first generation college students, those from low-income families, and/or members of underrepresented racial or ethnic minority groups. The *ECHS* in this study typically enroll fewer than 400 students and include grades 9–13 or 9–12.

Eighth-grade students who applied for admission to oversubscribed *ECHS* and met the eligibility criteria for the school were offered spots in the program via lottery. Students who were not admitted from the lottery were assigned to the comparison group and generally attended a typical high school in the district. Overall, 938 students in 12 schools were assigned to the intervention condition, and 736 students were assigned to the comparison condition.<sup>2</sup>

Students in the *ECHS* group were expected to take a standard high school curriculum that would

ensure they would meet all the requirements for the University of North Carolina system. In addition, *ECHS* students typically began attending college classes in their freshman year of high school; by the eleventh and twelfth grades, students took mostly college classes on the college campus. Students in the comparison group attended traditional high schools and enrolled in traditional high school curricula. Comparison students may have had access to college courses through other dual enrollment programs and may have received college credit while in high school via the Advanced Placement program. Students in the intervention group were expected to graduate from high school with 2 years of transferable college credit or an associate degree and a high school diploma, while students in the comparison group were expected to graduate high school with a high school diploma.

This study examined the impact of *ECHS* on attendance (high school), college readiness, completing high school, general academic achievement (high school), staying in school, and degree attainment (college). Additional comparisons are presented as supplemental findings in Appendix D. The supplemental findings do not factor into the intervention’s rating of effectiveness.<sup>3</sup>

### WWC Rating

#### ***The research described in this report meets WWC design standards without reservations***

This study is a well-executed randomized controlled trial. The impact estimates for attendance (high school), college readiness, completing high school, general academic achievement (high school), staying in school, and degree attainment (college) meet WWC evidence standards without reservations.

### What did the study find?

Among the outcomes measured while students were in high school, the study authors reported, and the WWC confirmed, that there was a statistically significant difference between the *ECHS* students and the comparison students in the number of days absent from school. *ECHS* students also were more likely to be on track with college preparatory coursework at the end of high school (81%) when compared to comparison group students (70%). The study authors reported that 85% of *ECHS* students graduated high school within 5 years, compared to 82% of comparison students. Tenth-grade *ECHS* students were more likely than comparison group students to pass the end-of-course exam in Civics and Economics (80% vs. 71%), English I (91% vs. 86%), and Biology (68% vs. 53%), and to have passed at least three end-of-course exams in college prep math courses (39% vs. 28%). The study authors reported that 94% of *ECHS* students continued to be enrolled in high school as tenth graders, while 89% of comparison students continued to be enrolled. All of these differences were reported as being statistically significant, which the WWC confirmed.

In terms of college outcomes, the study authors reported that by the end of the study, 30% of *ECHS* students had earned a postsecondary credential, compared to 4% of comparison students. This difference was reported as being statistically significant, which the WWC confirmed.

### Features of Early College High Schools (*ECHS*)

*ECHS* are high schools where students are expected to graduate (after 4–5 years) with a high school diploma and 2 years of transferable college credit. The program model encourages staff collaboration and participation in professional development, building positive relationships between students and staff, and providing student supports.

North Carolina's *ECHS* model includes six design principles:

- The College Readiness Principle focuses on preparing all students for college through a clearly articulated curriculum.
- The Powerful Teaching and Learning Principle focuses on providing the type of instruction students will encounter in college.
- The Professionalism Principle fosters staff collaboration and professional development.
- The Personalization Principle emphasizes academic and social supports to help students succeed.
- The Leadership Principle emphasizes collective responsibility and shared decision making.
- The Purposeful Design Principle focuses on creating structures to support the program model, including maintaining small schools and locating the early colleges on college campuses.

In North Carolina, these schools are co-managed by the school district and a college partner, and almost all high schools are located on the college campus.

### Appendix A: Study details

1. Edmunds, J., Unlu, F., Glennie, E., Bernstein, L., Fesler, L., Furey, J., & Arshavsky, N. (2015). *Smoothing the transition to postsecondary education: The impact of the Early College Model*. Retrieved from the SERVE website: <http://www.serve.org/>

#### Additional sources:

2. Arshavsky, N., & Edmunds, J. A. (2014, April). *The impact of Early College High Schools on mathematics teaching and learning*. Paper presented at the National Council of Teachers of Mathematics Research conference, New Orleans, LA.
3. Bernstein, L., Edmunds, J., & Fesler, L. (2014, March). *Closing the performance gap: The impact of the Early College High School Model on underprepared students*. Paper presented at the Spring Meeting of the Society for Research on Educational Effectiveness, Washington, DC. <http://files.eric.ed.gov/fulltext/ED562689.pdf>
4. Bernstein, L., Edmunds, J., & Unlu, F. (2014, April). *Catching up underprepared students in early college high schools: Reducing the performance gap*. Paper presented at the annual meeting of the American Educational Research Association, Philadelphia, PA.
5. Bernstein, L., Yamaguchi, R., Unlu, F., Edmunds, J., Glennie, E., Willse, J., . . . Dallas, A. (2010, March). *Early findings from the implementation and impact study of Early College High School*. Paper presented at the Spring Meeting of the Society for Research on Educational Effectiveness, Washington, DC. <http://files.eric.ed.gov/fulltext/ED512692.pdf>
6. Edmunds, J., Unlu, F., Glennie, E., Bernstein, L., Fesler, L., Furey, J., & Arshavsky, N. (2015, April). *Facilitating the transition to postsecondary education: The impact of the Early College Model*. Paper presented at the National Conference of the Association of Public Policy Analysis and Management, Miami, FL.
7. Edmunds, J., Unlu, F., Glennie, E., & Fesler, L. (2015, November). *Facilitating the transition to postsecondary education: The impact of early colleges*. Paper presented at the Association for Public Policy Analysis and Management conference, Miami, FL.
8. Edmunds, J. A. (2012). Early Colleges: A new model of schooling focusing on college readiness. *New Directions for Higher Education*, 158, 81–89.
9. Edmunds, J. A., Arshavsky, N., & Fesler, L. (2015, April). *A mixed methods examination of college readiness in an innovative high school setting*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.
10. Edmunds, J. A., Bernstein, L., Glennie, E., Willse, J., Arshavsky, N., Unlu, F., . . . Dallas, A. (2010). Preparing students for college: The implementation and impact of the Early College High School Model. *Peabody Journal of Education*, 85(3), 348–364.
11. Edmunds, J. A., Bernstein, L., Unlu, F., Glennie, E., & Arshavsky, N. (2011, March). *The impact of the Early College High School Model on core 9th and 10th grade student outcomes*. Paper presented at the Spring Meeting of the Society for Research on Educational Effectiveness, Washington, DC. <http://files.eric.ed.gov/fulltext/ED518187.pdf>
12. Edmunds, J. A., Bernstein, L., Unlu, F., Glennie, E., & Smith, A. (2013, May). *Graduating on-time: The impact of an innovative high school reform model on high school graduation rates*. Paper

presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

13. Edmunds, J. A., Bernstein, L., Unlu, F., Glennie, E., Willse, J., Smith, A., & Arshavsky, N. (2012). Expanding the start of the college pipeline: Ninth-grade findings from an experimental study of the impact of the Early College High School Model. *Journal of Research on Educational Effectiveness*, 5(2), 136–159.
14. Edmunds, J. A., Unlu, F., Glennie, E., Smith, A., Fesler, L., & Bernstein, L. (2013, November). *The impact of Early College High Schools on college readiness and college enrollment*. Paper presented at the annual meeting of the Association for Public Policy Analysis and Management, Washington, DC.
15. Edmunds, J. A., Unlu, F., Smith, A., Glennie, E., & Bernstein, L. (2013, April/May). *The impact of Early College High Schools on low-income students*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.
16. Edmunds, J. A., Willse, J., Arshavsky, N., & Dallas, A. (2013). Mandated engagement: The impact of Early College High Schools. *Teachers College Record*, 115(7).
17. Edmunds, J. A., Willse, J., Unlu, F., Glennie, E., & Bernstein, L. (2014, September). *Increasing high school students' engagement: The impact of a high school reform model focused on college readiness*. Paper presented at the Fall Meeting of the Society of Research on Educational Effectiveness, Washington, DC.
18. Unlu, F., Yamaguchi, R., Bernstein, L., & Edmunds, J. (2010, March). *Estimating impacts on program-related subgroups using propensity score matching: Evidence from the Early College High School study*. Paper presented at the Spring Meeting of the Society for Research on Educational Effectiveness, Washington, DC. <http://files.eric.ed.gov/fulltext/ED512823.pdf>

**Setting** This study took place in school districts throughout the state of North Carolina and included schools located in rural and urban settings with diverse demographics.

**Study sample** All participants applied to *Early College High Schools (ECHS)* in the eighth grade, began their *ECHS* program or traditional high school in the ninth grade of high school (during the 2005–06, 2006–07, 2007–08, and 2008–09 school years), and were followed through the sixth year after starting ninth grade. Eighteen cohorts of students are represented in this study. The final longitudinal sample included 1,651 students (938 intervention, 736 comparison). The intervention group was 59.0% White, 27.9% Black, 8.6% Hispanic, and 40.6% male, while the comparison group was 62.7% White, 25.0% Black, 7.3% Hispanic, and 41.3% male. The study reported on first generation college student status (40.8% of the intervention group and 40.5% of the comparison group), and free/reduced-price lunch eligibility (51.1% intervention, 49.7% comparison).

**Intervention group** The North Carolina's *ECHS* model includes a program of study (grades 9–12 or 9–13) intended to lead to an associate degree or 2 years of college credit within 4–5 years. Operationally, the model includes rigorous instruction, staff collaboration and professional development, a focus on building positive relationships between students and staff, and student supports. In contrast to traditional high schools, the *ECHS* in North Carolina are typically located on college campuses, are small (fewer than 400 students), have autonomous governance, and require students to complete 2 years of college credits while in high school.

### Comparison group

The comparison condition was assignment to the high school the student would have attended if not granted admission by lottery to the *ECHS*.

### Outcomes and measurement

The eligible outcomes in this study were taken from administrative databases maintained by the North Carolina Department of Public Instruction (NCDPI), the National Student Clearinghouse, and the North Carolina Community College System.

In the attendance (high school) domain, the eligible primary outcome was absences (days). The secondary outcomes of excused absences and unexcused absences were also reported as supplementary outcomes. The data were obtained from the NCDPI.

In the college readiness domain, the primary outcome was the percentage of students on track to complete college preparatory coursework at the end of high school. The supplementary outcomes in this domain included on-track percentages in English, math, science, and social studies. These data were available at multiple time points, including ninth, tenth, eleventh, and twelfth grades. The study also reported on college credits earned in high school and enrollment in college courses in high school; these outcomes did not meet review requirements because they are overlapped with the intervention. College readiness data were obtained from transcript data collected by NCDPI.

For the completing high school domain, the primary outcome was the 5-year high school graduation rate. The data were obtained from the Graduate Data Verification System.

For the general academic achievement (high school) domain, the primary outcomes included the percentage of students passing the end-of-course exam in three or more college prep math courses, the end-of-course exam in Biology, the end-of-course exam in Civics and Economics, and the end-of-course exam in English I. The study also reported the percentage of students passing the end-of-course exam in two or more college prep math courses, the end-of-course exam in one or more college prep math courses, the end-of-course exam in Algebra I, the end-of-course exam in Algebra II, and the end-of-course exam in Geometry. These outcomes were not eligible for review because they describe a subset of the information contained in the primary outcome of passing three or more college prep math courses. These outcomes were obtained from transcript data collected by NCDPI.

For the staying in school domain, the primary outcome was the percentage of students still enrolled in high school. The supplementary outcome in this domain was high school dropout. These outcomes were obtained from transcript data collected by NCDPI.

In the college access and enrollment domain, the authors reported postsecondary enrollment and postsecondary enrollment in a 2-year or 4-year college, but these were overlapped with the intervention because the figures included enrollment in any postsecondary institution during or after high school. The data were obtained from the National Student Clearinghouse and checked against the NCDPI data.

For the degree attainment (college) domain, the primary outcome was attaining a postsecondary credential. The data for earning a postsecondary credential came from the National Student Clearinghouse.

For a more detailed description of these outcome measures, see Appendix B.

### Support for implementation

The *ECCHS* in this study collaborated with their higher education partners to develop a curriculum plan of high school and college courses that would enable students to graduate with a diploma and 2 years of transferable college credit. Two of the design principles of North Carolina's Learn and Earn *ECCHS* model (Professionalism and Leadership) also supported implementation. As part of the Professionalism Principle, teachers received ongoing professional development, collaboration with other staff members, and had collective responsibilities and decision making. As part of the Leadership Principle, staff worked together to create a shared mission and improve student outcomes.

### Reason for review

Several federal grant funding programs require that funding applications be supported by evidence of effectiveness based on WWC standards. This study was identified for review by the WWC because it was cited by a grant applicant.

**Appendix B: Outcome measures for each domain**

<b>Attendance (high school)</b>	
<i>Absences (days)</i>	To measure absences, the study authors used administrative measures from the North Carolina Department of Public Instruction (NCDPI). This outcome was operationalized as the number of absences per student during the school year. Subgroup results for absences were reported by free/reduced-price lunch status. These are considered supplemental findings and do not factor into the intervention's rating of effectiveness.
<b>College readiness</b>	
<i>On track for college</i>	To measure on track for college, the study authors used data from the NCDPI. On track for college was defined as taking a course in the latest year possible, without taking two courses in that subject area in that year, that a student could take courses required for college entrance. The authors reported this outcome at the end of ninth, tenth, eleventh, and twelfth grades, and the end of high school. The primary time point was at the end of high school. All other time points, subgroups (i.e., underrepresented minority vs. not underrepresented minority, first-generation student vs. not first-generation student, free/reduced-price lunch student vs. not free/reduced-price lunch student), and the subject specific measures (i.e., on track in English, math, science, and social studies) are secondary outcomes. These are considered supplemental findings and do not factor into the intervention's rating of effectiveness.
<b>Completing high school</b>	
<i>Five-year high school graduation rate</i>	To measure high school graduation, study authors used the Graduate Data Verification System. The outcome was operationalized as the percentage of students who graduated high school within 5 years of enrolling in ninth grade. Results were also presented for the first generation vs not first generation, free/reduced-price lunch vs. not free/reduced-price lunch, and minority vs. not minority subgroups. These are considered supplemental findings and do not factor into the intervention's rating of effectiveness.
<b>General academic achievement (high school)</b>	
<i>Passed the end-of-course exam</i>	To measure passing end-of-course exams, the study authors used transcript data collected by NCDPI. The authors reported the percentage of students who passed the end-of-course exam in several college preparatory courses, including Biology, Civics and Economics, English I, and passing three or more college preparatory math courses. The study also reported the percentage of students passing the end-of-course exam in two or more college prep math courses, the end-of-course exam in one or more college prep math courses, the end-of-course exam in Algebra I, the end-of-course exam in Algebra II, and the end-of-course exam in Geometry. These outcomes were not eligible for review because they describe a subset of the information contained in the primary outcome of passing three or more college prep math courses.
<b>Staying in school</b>	
<i>Continued enrollment</i>	To measure continued enrollment in high school, the study authors used transcript data collected by NCDPI. This outcome was measured as the percent of students who continued to be enrolled at the time point measured. Subgroup results were presented for the free/reduced-price lunch students and the not free/reduced-price lunch students. These supplemental findings do not factor into the intervention's rating of effectiveness.
<i>Dropout</i>	To measure dropout, the study authors used transcript data collected by NCDPI. This outcome was measured as the percent of students who dropped out of school. This is a secondary outcome because the results are reported for the free/reduced-price lunch and not free/reduced-price lunch subsamples rather than the full study sample. The supplemental findings do not factor into the intervention's rating of effectiveness.
<b>College access and enrollment</b>	
<i>Percent planning to attend a 4-year college</i>	To measure the percentage of students planning to attend a 4-year college, the study authors surveyed students in the sample. The study authors presented this outcome for students in tenth grade (primary) and ninth grade (supplemental). The supplemental findings do not factor into the intervention's rating of effectiveness.
<b>Degree attainment</b>	
<i>Postsecondary credential</i>	To measure postsecondary credential, the study authors used data from the National Student Clearinghouse. This outcome was measured as the percent of students who earned a postsecondary credential. The study authors presented supplemental findings for the first generation vs. not first generation, free/reduced-price lunch vs. not free/reduced-price lunch, and minority vs. not minority subsamples. The supplemental findings do not factor into the intervention's rating of effectiveness.

**Table Notes:** This study reported on a number of outcomes that are not included in this single study review. The following outcomes were not eligible for review according to the protocol: student aspirations to attend college, student engagement, student engagement and higher order thinking, academic expectations, rigorous instruction, academic and social support, relationships with teachers, student collaboration, engagement in elaborated communication, evidence of formative assessment, and student work perseverance. In addition, course taking and course passing outcomes were not eligible measures of academic achievement according to the protocol. Finally, the following outcomes were not eligible because they are partially redundant with the eligible outcome of passing three or more college preparatory math courses: the percentage of students passing the end-of-course exam in two or more college prep math courses, the end-of-course exam in one or more college prep math courses, the end-of-course exam in Algebra I, the end-of-course exam in Algebra II, and the end-of-course exam in Geometry.

The study reports on two outcomes that do not meet standards: college credits earned in high school and enrollment in a postsecondary institution. These outcomes are overaligned with the intervention because *Early College High Schools* are designed to ensure that students earn college credit and enroll in college while in high school. The authors also examined excused and unexcused absences, but insufficient data were provided to compute effects on these supplemental outcomes.

Appendix C: Study findings for each domain

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			p-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
<b>Attendance (high school)</b>								
<i>Absences (days)</i>	High school students	1,554 students	4.70 (5.56)	6.30 (7.89)	1.60	0.20	+8	< .001
<b>Domain average for attendance (high school)</b>						<b>0.20</b>	<b>+8</b>	<b>Statistically significant</b>
<b>College readiness</b>								
<i>On track for college at end of high school (%)</i>	High school students	1,355 students	81 (na)	70 (na)	11	0.37	+14	< .001
<b>Domain average for college readiness</b>						<b>0.37</b>	<b>+14</b>	<b>Statistically significant</b>
<b>Completing high school</b>								
<i>Five-year high school graduation rate (%)</i>	High school students	1,594 students	85 (na)	82 (na)	3	0.13	+5	.009
<b>Domain average for completing high school</b>						<b>0.13</b>	<b>+5</b>	<b>Statistically significant</b>
<b>General academic achievement (high school)</b>								
<i>Passed the end-of-course exam in Biology (%)</i>	Tenth-grade students	676 students	68 (na)	53 (na)	15	0.38	+15	< .001
<i>Passed the end-of-course exam in Civics and Economics (%)</i>	Tenth-grade students	676 students	80 (na)	71 (na)	9	0.30	+12	< .001
<i>Passed the end-of-course exam in English I (%)</i>	Tenth-grade students	676 students	91 (na)	86 (na)	5	0.30	+12	< .001
<i>Passed the end-of-course exam in three or more college prep. math courses (%)</i>	Tenth-grade students	676 students	39 (na)	28 (na)	11	0.30	+12	< .001
<b>Domain average for general academic achievement (high school)</b>						<b>0.32</b>	<b>+13</b>	<b>Statistically significant</b>
<b>Staying in school</b>								
<i>Continued enrollment (%)</i>	High school students	718 students	94 (na)	89 (na)	5	0.40	+16	< .001
<b>Domain average for staying in school</b>						<b>0.40</b>	<b>+16</b>	<b>Statistically significant</b>

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			p-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
<b>Degree attainment (college)</b>								
<i>Postsecondary credential (%)</i>	High school students	1,651 students	30 (na)	4 (na)	26	1.41	+42	< .001
<b>Domain average for degree attainment (college)</b>						1.41	+42	<b>Statistically significant</b>

**Table Notes:** For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The outcome absences (days) measures a negative behavior; thus, signs were reversed on the mean difference, effect size, and improvement index to demonstrate that the intervention group was favored when negative differences were reported and not favored when positive differences were reported. The effect size is a standardized measure of the effect of an intervention on student outcomes, representing the average change expected for all students who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average student's percentile rank that can be expected if the student is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size. The statistical significance of the study's domain averages was determined by the WWC. This study is characterized as having a statistically significant positive effect because the effect for at least one measure within the domain is positive and statistically significant, and no effects are negative and statistically significant, accounting for multiple comparisons. For more information, please refer to the WWC Procedures and Standards Handbook (version 3.0), pp. 25–26. na = not applicable.

**Study Notes:** Except for the general academic achievement (high school) domain, which required a multiple comparison correction, the WWC did not need to make corrections for clustering, multiple comparisons, or to adjust for baseline differences. Reports are referenced by the numbers provided on pages 3 and 4 of this SSR. An author query (AQ) was sent to the primary author requesting: 1) the randomized sample size for students who were prepared for ninth grade as presented in report 18; 2) the standard deviation of the number of days absent as presented in report 16, page 16, table 4; 3) the randomized and analytic sample size for students who were prepared for ninth grade as presented in report 14, page 5, table 3; 4) the standard deviations for the student absences for the free/reduced-price lunch students and not free/reduced-price lunch students as presented in report 15; and the standard deviations for days absent as presented in report 11, page 149, table 3. Absence data were provided in report 16 on page 16. We contacted the author via AQ to provide unadjusted standard deviations and they were provided. On track for college at the end of high school (%) was provided in report 7 on pages 11–12. Five-year high school graduation rate (%) was provided in report 1 on pages 46 and 49. Passed the end-of-course exam in Biology, Civics and Economics, English I, and in three or more college prep. math courses (%) was provided in report 9, pages 3 and B-4. Continued enrollment (%) in tenth grade was provided in report 9 on page B-4. Postsecondary credential data were provided in report 1 on page 50.

The means and standard deviations reported in the table for absences are unadjusted means reported by the author; the mean difference and effect size were computed from the covariate-adjusted regression coefficient and the unadjusted standard deviations. The p-values presented absences (days), on track for college at end of high school, and 5-year high school graduation rate were reported in the original study. The remaining p-values in this table were calculated by the WWC. The authors did not report p-values for the outcomes in the general academic achievement (high school) domain or the degree attainment (college) domain, so although multiple comparisons corrections were needed in the former domain, the resulting p-values could not be compared to the calculated WWC p-values. This study is characterized as having statistically significant positive effects, because the effect for at least one measure within the domains is positive and statistically significant, and no effects are negative and statistically significant, accounting for multiple comparisons.

Appendix D: Supplemental findings by domain

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			p-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
<b>Attendance (high school)</b>								
<i>Absences (days)</i>	Eleventh grade, free/reduced-price lunch	710 students	7.7 (10.08)	8.8 (8.37)	1.1	0.04	2	.569
<i>Absences (days)</i>	Eleventh grade, not free/reduced-price lunch	711 students	5.6 (6.37)	7.1 (7.22)	1.5	0.16	6	.031
<b>College readiness</b>								
<i>On track for college at end of ninth grade (%)</i>	Ninth-grade students	1,355 students	93 (na)	85 (na)	8	0.52	+20	< .001
<i>On track for college at end of tenth grade (%)</i>	Tenth-grade students	1,355 students	89 (na)	73 (na)	16	0.66	+25	< .001
<i>On track for college at end of eleventh grade (%)</i>	Eleventh-grade students	1,355 students	84 (na)	73 (na)	11	0.40	+16	< .001
<i>On track for college at end of twelfth grade (%)</i>	Twelfth-grade students	1,355 students	78 (na)	68 (na)	10	0.31	+12	< .001
<i>On track for college by end of high school - English (%)</i>	High school students	1,355 students	97 (na)	98 (na)	-1	-0.25	-10	< .001
<i>On track for college by end of high school - math (%)</i>	High school students	1,355 students	87 (na)	75 (na)	12	0.49	+19	< .001
<i>On track for college by end of high school - science (%)</i>	High school students	1,355 students	98 (na)	98 (na)	0	0	0	1.00
<i>On track for college by end of high school - social studies (%)</i>	High school students	1,355 students	100 (na)	100 (na)	0	0	0	1.00
<i>On track for college by end of high school (%)</i>	Minority	466 students	75 (na)	67 (na)	8	0.24	+9	.013
<i>On track for college by end of high school (%)</i>	Non-minority	861 students	80 (na)	68 (na)	12	0.38	+15	< .001
<i>On track for college by end of high school (%)</i>	First generation	502 students	72 (na)	57 (na)	15	0.40	+16	< .001
<i>On track for college by end of high school (%)</i>	Not first generation	814 students	82 (na)	75 (na)	7	0.25	+10	< .001
<i>On track for college by end of high school (%)</i>	Free/reduced-price lunch	621 students	74 (na)	59 (na)	15	0.41	+16	< .001
<i>On track for college by end of high school (%)</i>	Not free/reduced-price lunch	675 students	83 (na)	75 (na)	8	0.30	+12	< .001
<b>Completing high school</b>								
<i>Five-year high school graduation rate (%)</i>	First generation	623 students	82 (na)	78 (na)	4	0.15	+6	.061
<i>Five-year high school graduation rate (%)</i>	Not first generation	915 students	90 (na)	86 (na)	4	0.23	+9	.001

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	p-value
<i>Five-year high school graduation rate (%)</i>	Free/reduced-price lunch	767 students	84 (na)	75 (na)	9	0.34	+13	< .001
<i>Five-year high school graduation rate (%)</i>	Not free/reduced-price lunch	749 students	92 (na)	88 (na)	4	0.27	+11	< .001
<i>Five-year high school graduation rate (%)</i>	Minority	546 students	88 (na)	83 (na)	5	0.25	+10	.005
<i>Five-year high school graduation rate (%)</i>	Non-minority	1,026 students	86 (na)	81 (na)	5	0.22	+9	< .001
<b>Staying in school</b>								
<i>Continued enrollment (%)</i>	Eleventh grade, free/reduced-price lunch	710 students	92 (na)	83 (na)	9	0.52	+20	< .001
<i>Continued enrollment (%)</i>	Eleventh grade, not free/reduced-price lunch	711 students	95 (na)	89 (na)	6	0.52	+20	< .001
<i>Dropout (%)</i>	Eleventh grade, free/reduced-price lunch	710 students	1.3 (na)	1.9 (na)	0.6	0.23	+9	< .001
<i>Dropout (%)</i>	Eleventh grade, not free/reduced-price lunch	711 students	0.3 (na)	0.6 (na)	0.3	0.42	+16	< .001
<b>Degree attainment (college)</b>								
<i>Postsecondary credential (%)</i>	First generation	643 students	23%	3%	20	1.37	+42	< .001
<i>Postsecondary credential (%)</i>	Not first generation	950 students	35%	6%	29	1.29	+40	< .001
<i>Postsecondary credential (%)</i>	Free/reduced-price lunch	790 students	23%	2%	21	1.63	+45	< .001
<i>Postsecondary credential (%)</i>	Not free/reduced-price lunch	773 students	37%	7%	30	1.25	+39	< .001
<i>Postsecondary credential (%)</i>	Minority	568 students	20%	1%	19	1.94	+47	< .001
<i>Postsecondary credential (%)</i>	Non-minority	1,061 students	36%	6%	30	1.32	+41	< .001

**Table Notes:** The supplemental findings presented in this table are additional findings that do not factor into the determination of the evidence rating. For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The outcome absences (days) measures a negative behavior; thus, signs were reversed on the mean difference, effect size, and improvement index to demonstrate that the intervention group was favored when negative differences were reported and not favored when positive differences were reported. The effect size is a standardized measure of the effect of an intervention on student outcomes, representing the average change expected for all students who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average student's percentile rank that can be expected if the student is given the intervention. na = not applicable.

**Study Notes:** The WWC did not need to make corrections for clustering, multiple comparisons, or to adjust for baseline differences. On track for college at the end of ninth, tenth, eleventh, and twelfth grades was reported by the authors in report 12 on page 43. On track for college in English, math, science, and social studies was reported by the authors in report 7 on pages 11–12. The data for minority and non-minority students' 5-year high school graduation rate (%) were provided in report 12 on page 44, postsecondary credential was provided in report 1 on page 50, and being on track for college by the end of high school was provided in report 12 on page 43. The data for first generation and not first generation college students' 5-year high school graduation rate were provided in report 12 on page 44, earning of a postsecondary credential was provided in report 1 on page 50, and being on track for college at the end of high school was provided in report 12 on page 43. The data for students receiving free/reduced-price lunch and those not receiving free/reduced-price lunch continued enrollment were provided in report 15 on page 12, the 5-year high school graduation rate was provided in report 12 on page 44, postsecondary credential was provided in report 1 on page 50, on track for college by the end of high school was provided in report 12 on page 43, and dropout % was provided in report 15 on pages 11–12. The number of absences for students receiving free/reduced-price lunch and those not receiving free/reduced-price lunch was provided in report 15 on pages 11–12. We contacted the author via AQ to provide unadjusted standard deviations and they were provided. The p-values presented here were calculated by the WWC because the authors reported no p-values for these outcomes.

### Endnotes

<sup>1</sup> Single study reviews examine evidence published in a study (supplemented, if necessary, by information obtained directly from the authors) to assess whether the study design meets WWC design standards. The review reports the WWC's assessment of whether the study meets WWC design standards and summarizes the study findings following WWC conventions for reporting evidence on effectiveness. This study was reviewed using the Transition to College review protocol (version 3.2).

<sup>2</sup> The authors did not specify how many schools were present in the comparison condition.

<sup>3</sup> There were 16 outcomes included in the study that are not described in this WWC report. See the table notes in Appendix B for more information.

### Recommended Citation

U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2016, September). *WWC review of the report: Smoothing the transition to postsecondary education: The impact of the Early College model*. Retrieved from <http://whatworks.ed.gov>

### Glossary of Terms

<b>Attrition</b>	Attrition occurs when an outcome variable is not available for all participants initially assigned to the intervention and comparison groups. The WWC considers the total attrition rate and the difference in attrition rates across groups within a study.
<b>Clustering adjustment</b>	If intervention assignment is made at a cluster level and the analysis is conducted at the student level, the WWC will adjust the statistical significance to account for this mismatch, if necessary.
<b>Confounding factor</b>	A confounding factor is a component of a study that is completely aligned with one of the study conditions, making it impossible to separate how much of the observed effect was due to the intervention and how much was due to the factor.
<b>Design</b>	The design of a study is the method by which intervention and comparison groups were assigned.
<b>Domain</b>	A domain is a group of closely related outcomes.
<b>Effect size</b>	The effect size is a measure of the magnitude of an effect. The WWC uses a standardized measure to facilitate comparisons across studies and outcomes.
<b>Eligibility</b>	A study is eligible for review if it falls within the scope of the review protocol and uses either an experimental or matched comparison group design.
<b>Equivalence</b>	A demonstration that the analytic sample groups are similar on observed characteristics defined in the review area protocol.
<b>Improvement index</b>	Along a percentile distribution of individuals, the improvement index represents the gain or loss of the average individual due to the intervention. As the average individual starts at the 50th percentile, the measure ranges from -50 to +50.
<b>Multiple comparison adjustment</b>	When a study includes multiple outcomes or comparison groups, the WWC will adjust the statistical significance to account for the multiple comparisons, if necessary.
<b>Quasi-experimental design (QED)</b>	A quasi-experimental design (QED) is a research design in which study participants are assigned to intervention and comparison groups through a process that is not random.
<b>Randomized controlled trial (RCT)</b>	A randomized controlled trial (RCT) is an experiment in which eligible study participants are randomly assigned to intervention and comparison groups.
<b>Single-case design (SCD)</b>	A research approach in which an outcome variable is measured repeatedly within and across different conditions that are defined by the presence or absence of an intervention.
<b>Standard deviation</b>	The standard deviation of a measure shows how much variation exists across observations in the sample. A low standard deviation indicates that the observations in the sample tend to be very close to the mean; a high standard deviation indicates that the observations in the sample are spread out over a large range of values.
<b>Statistical significance</b>	Statistical significance is the probability that the difference between groups is a result of chance rather than a real difference between the groups. The WWC labels a finding statistically significant if the likelihood that the difference is due to chance is less than 5% ( $p < .05$ ).
<b>Substantively important</b>	A substantively important finding is one that has an effect size of 0.25 or greater, regardless of statistical significance.

Please see the [WWC Procedures and Standards Handbook \(version 3.0\)](#) for additional details.



Intervention  
Report



Practice  
Guide



Quick  
Review



Single Study  
Review

A **single study review** of an individual study includes the WWC's assessment of the quality of the research design and technical details about the study's design and findings.

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