

# Student Outcomes in Health Pathways

Technical Report on High School and Postsecondary Outcomes for the Oakland Health Pathway Project

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## Introduction

This technical report provides supporting detail for SRI's research brief on high school and postsecondary outcomes for students who participated in the Oakland Health Pathways Project (OHPP).

### About the Oakland Health Pathways Project

The OHPP is an initiative designed to improve educational and long-term employment outcomes for youth of color in Oakland (Alameda County), California, while expanding and diversifying the local health care workforce. In 2014, The Atlantic Philanthropies, a limited life foundation, awarded two grants totaling \$21 million to agencies charged with working together to support and expand health career pathways for high school students in Oakland. Oakland Unified School District (OUSD) and Alameda County Health Care Services Agency together received a grant of \$11 million, and Alameda Health System received a grant of \$10 million.

The OHPP health career pathways use the Linked Learning approach, which combines classroom learning with real-world work experiences. Linked Learning organizes education around industry-specific pathways and integrates four pillars—rigorous academics that meet college-ready standards; sequenced, high-quality career and technical education; work-based learning; and comprehensive support services—to help students graduate from high school ready to pursue meaningful postsecondary opportunities (Linked Learning Alliance, n.d.). The OHPP follows a multi-year investment in Linked Learning in OUSD that was funded by the James Irvine Foundation. OUSD has been implementing Linked Learning since 2010, including three health pathways that pre-dated the OHPP.

### Evaluation of the Oakland Health Pathways Project

SRI Education was engaged from the outset to evaluate the OHPP. Throughout the course of the project, we have implemented a multi-method research design that includes qualitative and quantitative data collection and analysis to understand the effects this investment has had on OUSD students and staff and on the OHPP industry partners. Through this research, we have produced a series of research briefs on subtopics of interest. The first, *How Education and Industry Partner on Work-Based Learning*, distilled lessons learned on effective cross-sector partnerships and delivery of authentic work-based learning. The second, *Student Experiences in Health Pathways*, described the perceived impact of pathway participation on students' college and career readiness based on surveys and focus groups of 12th grade students as well as interviews with pathway personnel.

In the third research brief, *Student Outcomes in Health Pathways*, and this accompanying technical report, we present findings on the high school and postsecondary outcomes of students in the class of 2018 who participated in health career pathways compared to similar students in traditional high school programs not in any pathway. For context, we also provide a secondary analysis comparing students in health pathways to students in other career-themed pathways (other pathway). Because OUSD implemented the OHPP initiative while simultaneously transitioning to wall-to-wall pathways, meaning they were moving toward having all high school students enrolled in a Linked Learning pathway, the class of 2018 was the only and last cohort of students that participated in a full sequence (10th through 12th grade) of OHPP health pathways for whom there was a sufficient group of students in typical traditional high school programs to compare them to. In other words, we were only able to include in our analyses the students in the three health pathways that pre-dated but were enhanced by the OHPP initiative. The four pathways that were newly created as part of the OHPP initiative did not serve the class of 2018 and were consequently not included in these analyses.

## Methods

### Context and Study Limitations

OUSD implemented the OHPP initiative while simultaneously transitioning to wall-to-wall pathways, meaning they were moving toward having all high school students enrolled in a career-themed pathway. As a result, the number of students remaining in traditional high school programs who could serve as a comparison group for the health pathway students was diminishing as the number of students in pathways increased. This reality created two key study limitations. First, the analysis is limited to one early cohort of students attending a subset of health pathways, limiting the generalizability of findings. Second, the analysis is vulnerable to selection bias.

**Limited cohort.** The class of 2018 was the first cohort that experienced a complete progression (10th through 12th grade) in pathways enhanced by the OHPP initiative. Because of the transition to wall-to-wall pathways, the class of 2018 was also the last cohort for whom there was a sufficient comparison group of students left in traditional high school programs. As a result, these analyses do not include the four pathways that were newly created as part of the OHPP initiative (two of which are in continuation high schools) because they did not serve the class of 2018.

The three pathways included in these analyses pre-dated the OHPP initiative but were enhanced by the additional supports and partnership opportunities afforded by the initiative. This is the same cohort surveyed in our second brief, *Student Experiences in Health Pathways*. These findings do not generalize to the newly created health pathways.

**Selection bias.** For the class of 2018, pathway enrollment was still voluntary but students were increasingly encouraged to enroll in a Linked Learning pathway. The students who continued to choose not to enroll were increasingly likely to be different from those who did in observed and unobserved ways. This type of phenomenon is known as selection bias. If students who chose health career pathways were more motivated, engaged, or had more stable home environments than students who remained in traditional high school programs (all unobserved characteristics), we would expect the bias to result in artificially large health career pathway effect sizes.

For this reason, we also examined health pathway students' outcomes in relation to students in other career-themed pathways (e.g., Engineering; Social Justice Reform; Fashion, Arts, and Design). This secondary pathway-to-pathway comparison provides some context to the focal health pathway vs. traditional high school comparison in that it reduces the threat of selection bias resulting from students choosing to enroll in a pathway instead of remaining in a traditional high school program. However, students who chose a health career pathway may still differ in unobserved ways from those who chose a pathway with a different career theme. This analysis also allowed us to consider whether health pathways specifically had effects on student outcomes above and beyond that of pathways generally.

### Data Source

The SRI team worked with OUSD data office staff to obtain student-level demographic, standardized test score, course taking, high school completion, and postsecondary enrollment data directly from district databases. Because career-themed pathways begin in the 10th grade in OUSD, we requested 7th through 12th grade data for all students who were enrolled in 10th grade in the 2015–16 school year. These students had an expected graduation date of June 2018 and were the first cohort that could have experienced a complete health pathway progression (10th through 12th grade) under the OHPP. This is

the same cohort described in our second brief, *Student Experiences in Health Pathways*. We received a dataset with records for 2,400 students in January 2019.

### Analytic Sample

Our sample of health pathway students consisted of 220 10th graders who were enrolled in health pathways at Life Academy, Oakland High School, and Oakland Technical High School (Exhibit 1). Because these three schools are traditional high schools, we restricted the sample from which we drew our traditional high school and other-pathway comparison groups to students in traditional high schools only. We excluded students in alternative or continuation schools to keep the comparison focused on the presence or absence of pathways within traditional schools rather than introduce other programmatic differences that could be attributed to school type. Our traditional high school comparison group consisted of 870 students at eight traditional high schools who were not enrolled in any career-themed pathway, and our other-pathway comparison group consisted of 1,070 students enrolled in 19 different pathways at eight schools (Exhibit 1).

*Exhibit 1. 10th Grade Students in Health Pathways, Traditional High School, and Other Pathways in OUSD Traditional High Schools in 2015–16*

School Name	Pathway Name	Number of Students
<b>Health Pathways</b>		
Life Academy	Health and Bioscience Academy	71
Oakland High School	Public Health Academy	64
Oakland Technical High School	Health Academy	85
<b>Total</b>		<b>220</b>
<b>Traditional High School</b>		
Coliseum College Preparatory Academy	N/A	3
Castlemont High School	N/A	67
Fremont High School	N/A	17
Madison Park Academy	N/A	109
McClymonds High School	N/A	49
Oakland High School	N/A	82
Oakland Technical High School	N/A	245
Skyline High School	N/A	298
<b>Total</b>		<b>870</b>
<b>Other Pathways</b>		
Coliseum College Preparatory Academy	Community Leadership and Service	34
Coliseum College Preparatory Academy	Entrepreneurship Pathway	33
Castlemont High School	Sustainable Urban Design Academy	83
Fremont High School	College Prep and Architecture Academy	96
Fremont High School	Mandela Law and Public Service Academy	63
Fremont High School	Media Academy	45
McClymonds High School	Project Lead the Way	33
MetWest High School	Social Entrepreneurship Pathway	42
Oakland High School	Khepera Pathway of Social Innovation	21
Oakland High School	Environmental Science Academy	62
Oakland High School	Project Lead the Way	72
Oakland High School	Social Justice Reform	56

School Name	Pathway Name	Number of Students
Oakland High School	Visual Arts and Academics Magnet	61
Oakland Technical High School	Computer Academy	57
Oakland Technical High School	Engineering Academy	54
Oakland Technical High School	Fashion, Arts, and Design Academy	63
Skyline High School	Computer Science and Technology Academy	65
Skyline High School	Education Academy	68
Skyline High School	Green Academy	62
<b>Total</b>		<b>1,070</b>
<b>Grand Total</b>		<b>2,160</b>

The analytic sample for each outcome of interest varied from these starting numbers based on the number of students for whom we had outcome data and whether other outcome-specific exclusions were made. Key exclusions include:

- Students' whose graduation status<sup>1</sup> on or prior to June 2018 was "removed from cohort," meaning the student left the state or country, transferred to a private school or another California district with a high school diploma program, or died, and was excluded from the analytic sample for all end-of-high-school and postsecondary outcomes. These students remained in the sample for 11th grade high school achievement tests if they had scores, indicating they were still present at the time of the test.
- Students who dropped out of high school were excluded from analyses of the course-related outcomes (i.e., credits earned, a-g status, number of a-g requirements met) because if pathways tend to reduce dropout, then including dropouts (who stop taking courses and are potentially disproportionately present in the traditional high school group) could artificially inflate pathway students' course outcomes. By limiting these outcomes to non-dropouts, we can say they are a reflection of the additional work students complete during high school and are not the result of students staying in school rather than dropping out.

## Covariates

In our analysis of students' high school and postsecondary education outcomes, we controlled for a variety of demographic and prior achievement variables. Exhibit 2 lists the variables we included as covariates in our statistical models, including descriptions of how we created each variable.

*Exhibit 2. Student Demographic and Prior Achievement Covariates Used in Analyses*

Variable	Description
<b>Student Demographics</b>	
Gender	Equal to 1 if student was female. Equal to 0 if student was male.
Latino	Equal to 1 if student was Latino. Equal to 0 if student was not Latino.

<sup>1</sup> OUSD graduation status categories (submitted to and updated from the California Longitudinal Pupil Achievement Data System [CALPADS]) include: removed from cohort; adult graduate; California High School Proficiency Exam (CHSPE) completer; dropout; General Educational Development (GED) completer; graduate; null; special education certificate; still enrolled; and transfer. "Removed from cohort" means the student left the state or country, transferred to a private school or another California district with a high school diploma program, or died. "Transfer" means the student transferred to an adult education program or community college. "Null" means data were missing. See: <https://www.cde.ca.gov/ds/sp/cl/gradcohortguidance18att1.asp>



Variable	Description
African American	Equal to 1 if student was African American. Equal to 0 if student was not African American.
Asian	Equal to 1 if student was Asian. Equal to 0 if student was not Asian.
White	Equal to 1 if student was White. Equal to 0 if student was not White.
Multiple race/ethnicities	Equal to 1 if student was multi-racial. Equal to 0 if student was not multi-racial.
Other race/ethnicity	Equal to 1 if student was American Indian/Alaska Native, Filipino, or Pacific Islander. These categories were combined due to small sample size, where students could potentially be identified even in aggregate data. Equal to 0 if student was not American Indian/Alaska Native, Filipino, or Pacific Islander.
Gifted and Talented (GATE)	Equal to 1 if student was in gifted and talented program in the 8th grade. Equal to 0 if student was not in gifted and talented program in the 8th grade.
English Language Learner (ELL)	Equal to 1 if student was an English Language Learner in 9th grade. Equal to 0 if student was categorized as English Only, Initial Fluent English Proficient, or Reclassified Fluent English Proficient in the 9th grade.
Special education (SP ED)	Equal to 1 if student had special education status in the 9th grade. Equal to 0 if student did not have special education status in the 9th grade.
<b>Prior Achievement</b>	
ELA CST	7th grade English Language Arts California Standards Test <sup>a</sup> score. Scale scores range from 150–600.
Math CST z-score	Z-score created from 7th grade mathematics CST score and Algebra I CST score. <sup>b</sup> Scale scores for both tests range from 150–600. Z-scores are zero-centered and allow us to take two different tests and use them as a single math score.
9th grade GPA	Grade-point average based on student's 9th grade course work.
9th grade a-g on track	Number of OUSD 9th grade internal course credit targets for the a-g subject areas <sup>c</sup> that were met, on continuous scale of 0–7.

<sup>a</sup>OUSD administered the California Standards Test (CST) for the last time in 2012–13, when our cohort was in the 7th grade. In 2014–15, they began using the Smarter Balanced Assessment Consortium (SBAC) tests. They did not administer a test consistently to all students in 2013–14, which was a transition year, so we rely on 2012–13 CST data to account for students' prior achievement in our analyses.

<sup>b</sup>Students in our cohort took either the grade-level math ( $n = 1,269$ ) or algebra ( $n = 92$ ) CST test in the 7th grade, corresponding to the course they were enrolled in. Although the two tests use the same reporting scale, scores are not exactly comparable so we converted them to z-scores using state-level means and standard deviations reported by the California Department of Education in their spring 2013 CST technical report found here: <https://star.cde.ca.gov/techreports/CST/cst13techrpt.pdf>. This allowed us to use one single 7th grade math score in our analyses.

<sup>c</sup>A-g subject areas (based on University of California [UC] and California State University [CSU] college eligibility requirements) are as follows: A – history/social science; B – English; C – math; D – laboratory science; E – language other than English; F – visual and performing arts; G – college preparatory elective.

## Outcomes

In addition to the demographic and prior achievement data described above, we also received high school and postsecondary outcome data for our cohort of students. Exhibit 3 lists the outcomes we examined in our statistical models, including descriptions of how we created each variable and determined its analytic sample.

Exhibit 3. High School and Postsecondary Outcome Variables

Variable	Description	Variable Creation and Analytic Sample
<b>High School Achievement Tests</b>		
ELA SBAC	11th grade ELA Smarter Balanced Assessment score. Scale scores range from 2299–2795. <sup>a</sup>	Used records for 11th grade only, regardless of associated school year. <sup>b</sup>
Math SBAC	11th grade Math Smarter Balanced Assessment score. Scale scores range from 2280–2862.	Used records for 11th grade only, regardless of associated school year.
<b>End-of-High-School Outcomes</b>		
Credits earned	Total number of course credits earned in three-year period of 2015–16, 2016–17, and 2017–18 (the expected grade progression), regardless of the actual grade student was in for each year.	Calculated using credits associated with each course taken and passing status, <sup>c</sup> only for students who did not drop out or move out of state/transfer to high school in another district. <sup>d</sup>
A-g status	Equal to 1 if student met all seven a-g requirements for UC/CSU college eligibility as of June 2018. Equal to 0 if student did not meet all seven a-g requirements by June 2018 and the a-g values were nonmissing.	Calculated only for students who were in 12th grade in the 2017–18 year, and did not drop out or move out of state/transfer to high school in another district.
Number of a-g requirements met	Number of a-g requirements met as of June 2018, on continuous scale of 0–7.	Calculated only for students who were in 12th grade in the 2017–18 year, and did not drop out or move out of state/transfer to high school in another district.
Dropout	Equal to 1 if student graduation status as of or prior to June 2018 was dropout, OR if graduation status was missing but student attendance status in 2017–18 was inactive and student also earned no course credits in 2017–18. <sup>e</sup> Equal to 0 if student graduation status in June 2018 was adult graduate; CHSPE completer; GED completer; graduate; special education certificate; still enrolled; or transfer.	Calculated only for students who had nonmissing graduation status and did not move out of state/transfer to high school in another district.
High school graduation	Equal to 1 if student graduation status as of or prior to June 2018 was graduate (i.e., on-time graduation). Equal to 0 if student graduation status in June 2018 was adult graduate; CHSPE completer; GED completer; graduate; special education certificate; still enrolled; or transfer. <sup>f</sup>	Calculated only for students who had nonmissing graduation status and did not move out of state/transfer to high school in another district.
<b>Postsecondary Outcomes</b>		
College enrollment	Equal to 1 if student enrolled in a 2- or 4-year <sup>g</sup> college in fall 2018. Equal to 0 if student did not enroll in a 2- or 4-year college in fall 2018 but did complete high school in June 2018.	Calculated only for students who completed high school (i.e., graduate or equivalent) <sup>h</sup> in June 2018.
4-year (vs. 2-year) college enrollment	Equal to 1 if student enrolled in a 4-year college in fall 2018. Equal to 0 if student enrolled in a 2-year college in fall 2018.	Calculated only for students who enrolled in college in fall 2018. All other students with no record of college enrollment excluded from analytic sample.

<sup>a</sup>See <https://caaspp.cde.ca.gov/sb2018/ScaleScoreRanges>.

<sup>b</sup>If students repeated 11th grade and had multiple SBAC records, the record with the highest score was used.

<sup>c</sup>OUSD provided us with “credits attempted,” “credits earned,” and “course grade” data as part of each course record. Credits earned is a precalculated variable that already accounts for whether students received a passing grade (i.e., letter grades A–D,

credit, or pass). We used the following rules in cleaning the credits earned data: if a student did not pass the course but still received credits earned, we set the credits earned to 0; if a student passed but was not given credits earned and there was an associated number of credits attempted for the course, we set the credits earned to equal the credits attempted.

<sup>d</sup>Move out of state/transfer to high school in another district = OUSD graduation status “removed from cohort.”

<sup>e</sup>Using these criteria, we recategorized 225 students’ graduation status from null to dropout. We felt that simultaneously having inactive enrollment status and no course credits earned in 2017–18 was a strong indicator a student had dropped out by that year although the district data system had not formally classified the student as a dropout. After recategorization, 36 students remained in the null category.

<sup>f</sup>We defined graduate using the updated 2017 state criteria found here: <https://www.cde.ca.gov/nr/ne/yr18/yr18rel50.asp>. Students who receive adult education high school diplomas or passed the CHSPE exam are no longer considered regular high school graduates, along with students who receive GEDs or special education certifications.

<sup>g</sup>If a student’s records indicated enrollment in multiple institutions including both 2- and 4-year colleges, we designated the student as a 4-year college enrollee.

<sup>h</sup>This is because OUSD receives postsecondary enrollment data from the National Student Clearinghouse (NSC) for only those students who completed high school within the district. This includes graduates, adult graduates, CHSPE completers, GED completers, and those who received special education certificates. This excludes students whose graduation status was dropout, null, still enrolled, transfer, or removed from cohort.

## Sample Descriptive Statistics

To prepare the data for analysis and minimize errors, we used the following data-cleaning steps for all variables where applicable:

- If students were in the same grade for multiple school years (e.g., in 10th grade in 2014–15 and again in 2015–16) but a single school year needed to be selected to represent a particular grade, we deleted records that were not in the target cohort year (i.e., 10th grade in 2015–16) or in the expected grade progression (i.e., 11th grade in 2016–17, 12th grade in 2017–18).
- If students repeated courses, we kept the course record with the highest grade earned and deleted the others.

Exhibit 4 shows the unadjusted means, standard deviations, and sample sizes for the demographic and prior achievement covariates of our three groups: health pathway, traditional high school, and other pathway students. These overall descriptive statistics display how the characteristics of students enrolled in health pathways differ from those of students not enrolled in any pathway, as well as from students enrolled in other career-themed pathways.

Compared to the traditional high school group, the health pathway group had a lower percentage of female students (45% vs. 58%), a lower percentage of African American students (19% vs. 32%), a higher percentage of Asian (18% vs. 12%) and White (12% vs. 8%) students, a higher percentage of students who were in GATE (22% vs. 14%), fewer ELLs (15% vs. 22%), and fewer students who were in special education (11% vs. 15%). Compared to traditional high school students, health pathway students also had higher 7th grade CST scores in both ELA (351 vs. 334) and math z-score (-0.25 vs. -0.49), higher 9th grade GPAs (2.9 vs. 2.3), and met a higher number of OUSD 9th grade internal course credit targets for the a-g subject areas (6.4 vs. 5.5).

Given that demographic characteristics often serve as proxy variables for risk factors such as poverty, and prior achievement is frequently a strong predictor of later achievement, these characteristics suggest that *prior to enrolling in pathways*, health pathway students were a lower risk group that was more likely to achieve academic success compared to students in traditional high school programs. The characteristics of students in other pathways suggest that they are, on average, less advantaged and

lower achieving than students in health pathways but more advantaged and higher achieving than traditional high school students.

*Exhibit 4. Unadjusted Demographic and Prior Achievement Descriptive Statistics for Health Pathway, Traditional High School, and Other Pathway Groups*

Variable	Health Pathway			Traditional High School			Other Pathway		
	Mean	SD	n	Mean	SD	n	Mean	SD	n
<b>Student Demographics</b>									
Female	0.45	0.50	220	0.58	0.49	870	0.51	0.50	1070
Latino	0.44	0.50	218	0.43	0.50	863	0.41	0.49	1060
African American	0.19	0.40	218	0.32	0.47	863	0.31	0.46	1060
Asian	0.18	0.39	218	0.12	0.32	863	0.17	0.38	1060
White	0.12	0.33	218	0.08	0.27	863	0.07	0.25	1060
Multiple race/ethnicities	0.04	0.19	218	0.02	0.12	863	0.01	0.10	1060
Other race/ethnicity	0.03	0.16	218	0.03	0.17	863	0.04	0.19	1060
GATE	0.22	0.41	212	0.14	0.34	673	0.18	0.38	934
ELL	0.15	0.36	219	0.22	0.41	741	0.19	0.39	1021
SP ED	0.11	0.36	219	0.15	0.35	749	0.12	0.32	1025
<b>Prior Achievement</b>									
ELA CST	351	58.6	164	334	54.7	460	343	59.2	687
Grade-level math CST	334	61.0	147	322	57.9	441	331	63.6	634
Algebra CST	381	43.0	17	362	57.9	19	379	71.2	56
Math CST z-score	-0.25	0.92	164	-0.49	0.9	460	-0.32	0.97	690
9th grade GPA	2.9	0.89	219	2.30	1.2	706	2.6	1.1	997
9th grade a-g on track	6.4	0.98	219	5.50	1.3	661	6.0	1.2	982

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education. We combined Filipino, Native American/Alaska Native, and Pacific Islander into a single “other race/ethnicity” group because sample sizes were less than 5 in each category in the health pathway group.

Exhibit 5 shows the unadjusted means, standard deviations, and sample sizes for the high school and postsecondary outcomes of health pathway, traditional high school, and other pathway students. Compared to students in traditional high school, health pathway students had higher SBAC scores in both ELA (2579 vs. 2538) and math (2514 vs. 2480), earned more high school credits (206 vs. 185), and met more a-g requirements (6.2 vs. 5.2). Compared to the traditional high school group, the health pathway group also had a lower percentage of students who dropped out (8% vs. 22%), a higher percentage of students who graduated high school (88% vs. 63%), and a higher percentage of students who enrolled in college (70% vs. 56%) among those who completed high school. As with the demographic and prior achievement covariates, the outcomes of students in other pathways were often lower than those of health pathway students but higher than those of traditional high school students.

*Exhibit 5. Unadjusted Outcome Descriptive Statistics for Health Pathway, Traditional High School, and Other Pathway Groups*

Variable	Health Pathway			Traditional High School			Other Pathway		
	Mean	SD	n	Mean	SD	n	Mean	SD	n
<b>High School Achievement Tests</b>									
ELA SBAC	2579	115	197	2538	121	514	2554	120	811
Math SBAC	2514	120	201	2480	124	502	2503	132	789
<b>End-of-High-School Outcomes</b>									
Credits earned	206	37.3	200	185	43.8	676	207	38.9	916
a-g status	0.69	0.46	190	0.38	0.49	559	0.54	0.50	836
Number a-g req met	6.2	1.4	190	5.2	2	559	5.9	1.6	836
Dropout	0.08	0.28	215	0.22	0.41	846	0.14	0.35	1052
HS graduation	0.88	0.33	215	0.63	0.48	846	0.79	0.40	1052
<b>Postsecondary Outcomes</b>									
College enrollment	0.70	0.46	192	0.56	0.50	579	0.62	0.49	842
4-yr (vs. 2-yr) college enrollment	0.57	0.50	135	0.51	0.50	323	0.59	0.49	520

## Analysis Methods

To run the most rigorous analysis possible within the constraints of our study context, we first imputed missing data to preserve sample size and maximize statistical power. We then used propensity score weighting (PSW) to try to statistically equate the health pathway group first with the traditional high school group, and then with the other pathway group. This weighting is especially important in light of the large differences between the health pathway and traditional high school groups in baseline (i.e., pre-intervention) demographic and prior achievement measures. Last, we used Hierarchical Linear Modeling (HLM) to estimate the effect of health pathway participation on student outcomes compared first to traditional high school participation and then to participation in other career-themed pathways.

### Missing Data Imputation

Among the 2,160 students that we have at least some data for, the missing data rates range from 51% to 2% for outcome variables and 0% to 36% for baseline covariates. Complete-case analysis using an unimputed data set has substantial weaknesses when considerable data are missing. First, listwise deletion limits the statistical power of the tests conducted because it uses a reduced sample size with complete cases (Allison, 2001; Olinsky, Chen, & Harlow, 2003; Roth, 1994). Second, if there is systematic difference between the complete cases and incomplete cases, the statistical inference from complete-case analysis may not be applicable to the population of all cases.

We utilized multiple imputation as an alternative technique for dealing with missing data in an attempt to eliminate this bias. We imputed missing data on baseline demographic and prior achievement measures using the EM (expectation-maximization) algorithm. Following What Works Clearinghouse (WWC) standards 4.0, the imputation model for each outcome variable included an indicator variable for treatment condition, all baseline demographic and prior achievement measures, and the outcome

variable. We used the SAS PROC MI procedure with EM statement for multiple imputation. Multiple imputation inference involves three distinct phases:

- For each imputation, the missing data are filled in ten times to generate ten complete data sets.
- The ten complete data sets are analyzed by using descriptive and mixed model procedures.
- The mixed-model results from the ten complete data sets are combined for subsequent inferential analyses using SAS PROC MIANALYZE.

In our analyses, we conducted imputation nine times, once for each outcome variable. As an example, for the ELA SBAC outcome, the multiple imputation model included the pathway indicator variable, the ELA SBAC outcome variable, and all of the baseline covariates listed in Exhibit 5 (gender, race/ethnicity, GATE, ELL, special education status, ELA CST, math CST z-score, 9th grade GPA, and 9th grade a-g on track). Multiple imputation filled in the missing data for all baseline characteristics and generated 10 imputed datasets. The outcome variable was used to improve the accuracy of the imputation of baseline variables but was not itself imputed. For each outcome, we restricted our imputed sample to students who had nonmissing outcome data. Again, to improve the accuracy of the imputation, we used the entire original dataset of 2,400 students and drew from the maximum amount of available data although only 2,113 are in our largest analytic sample.

### *Propensity Score Weighting*

Propensity score techniques are quasi-experimental approaches developed to approximate findings from randomized controlled trials (Becker & Ichino, 2002). They have been increasingly used in observational studies with cohort designs to reduce selection bias in estimating treatment or intervention effects when randomized controlled trials are not feasible or ethical (Rosenbaum & Rubin, 1983, 1984, 1985).

In our evaluation of the OHPP, it was not feasible to randomly assign students to health pathway or traditional high school programs of study. Instead, students self-selected into different pathway programs. We used propensity score weighting methods to statistically equalize the mean values of potentially confounding covariates (e.g., student baseline demographic characteristics and prior achievement) for the two groups within each of our two comparisons (health pathway vs. traditional high school and health pathway vs. other pathway), ensuring that differences in outcomes were not the result of differences in the covariates. The propensity score is the predicted probability of participating in a health pathway based on a set of potentially confounding covariates. For each outcome variable, we conducted propensity score weighting twice using two separate logistic regression models: once using traditional high school as the reference group and a second time using other pathway as the reference group.

Specifically, to contrast health pathway students with students in traditional high school, we set the weight for pathway students to 1.0 and the weight for traditional high school comparison students to  $\pi_i/(1-\pi_i)$ , where  $\pi_i$  is the propensity score for the  $i$ -th comparison student. The weighting created balance between the two groups on observed covariates and thus the estimated effect of health pathway participation on student outcomes is more accurate. We selected weighting over other approaches such as matching because it retains all sample members in the analysis and does not reduce sample size.

After applying propensity score weighting to the comparison students, we examined the standardized mean score difference—d, the difference between treatment and comparison group means divided by a

pooled standard deviation—for each covariate to ensure it was less than 0.25, thereby indicating covariate balance (What Works Clearinghouse, 2017). We also calculated the standardized mean score difference, *d*, without using propensity score weights (also called *d* before propensity score weighting). Exhibit 6 shows the two sets of *d*s (*d* before PSW and *d* after PSW) for the health pathway vs. traditional high school comparison for the SBAC ELA outcome. Before propensity score weighting, the *d* on covariates ranged from -0.21 to 0.36 standard deviations whereas after propensity score weighting, the *d* on covariates ranged from -0.028 to 0.02 standard deviations. This is lower than the What Works Clearinghouse 0.25 standard deviation cutoff for baseline equivalence for quasi-experimental studies in most cases (What Works Clearinghouse, 2017). In other words, health pathway and traditional high school students were very similar on all potentially confounding covariates after propensity score weighting. Similarly, Exhibit 7 (differences between health pathway and other pathway students for SBAC ELA) shows acceptable equivalence on all covariates. Analogous exhibits for the remaining health pathway vs. traditional high school outcomes can be found in Appendix A, and exhibits for the remaining health pathway vs. other pathway outcomes can be found in Appendix B.

*Exhibit 6. Imputed Demographic and Prior Achievement Variables for Health Pathway and Traditional High School Students Before and After Propensity Score Weighting, SBAC ELA Outcome*

Variable	Health Pathway ( <i>n</i> = 197 )	Traditional High School ( <i>n</i> = 514)	Traditional High School ( <i>n</i> = 514)		
	Imputed Mean	Imputed Mean	Before PSW <i>d</i>	PS weighted Mean	After PSW <i>d</i>
Female	0.55	0.50	0.11	0.55	0.002
African American	0.18	0.27	-0.21	0.18	-0.010
Asian	0.19	0.20	-0.02	0.20	-0.006
White	0.13	0.08	0.19	0.13	0.001
Multiple race/ethnicities	0.04	0.01	0.23	0.04	-0.028
Other race/ethnicity	0.03	0.04	-0.05	0.03	-0.004
GATE	0.22	0.19	0.07	0.22	-0.012
ELL	0.13	0.17	-0.09	0.13	0.020
SP ED	0.09	0.10	-0.03	0.10	-0.026
ELA CST	350	343	0.11	350	-0.014
Math CST z-score	-0.25	-0.32	0.07	-0.26	0.006
9th grade GPA	3.0	2.8	0.21	3.0	0.010
9th grade a-g on track	6.5	6.1	0.36	6.5	-0.001

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education. Male served as the reference group for the gender variables and Latino was the reference group among race/ethnicity variables.



*Exhibit 7. Imputed Demographic and Prior Achievement Variables for Health Pathway and Other Pathway Students Before and After Propensity Score Weighting, SBAC ELA Outcome*

Variable	Health Pathway (n = 197 )	Other Pathway (n = 811)	Other Pathway (n = 811)		
	Imputed Mean	Imputed Mean	Before PSW d	PS weighted Mean	After PSW d
Female	0.55	0.50	0.11	0.55	0.002
African American	0.18	0.27	-0.21	0.18	-0.010
Asian	0.19	0.20	-0.02	0.20	-0.006
White	0.13	0.08	0.19	0.13	0.001
Multiple race/ ethnicities	0.04	0.01	0.23	0.04	-0.028
Other race/ ethnicity	0.03	0.04	-0.05	0.03	-0.004
GATE	0.22	0.19	0.07	0.22	-0.012
ELL	0.13	0.17	-0.09	0.13	0.020
SP ED	0.09	0.10	-0.03	0.10	-0.026
ELA CST	350	343	0.11	350	-0.014
Math CST z-score	-0.25	-0.32	0.07	-0.26	0.006
9th grade GPA	3.0	2.8	0.21	3.0	0.010
9th grade a-g on track	6.5	6.1	0.36	6.5	-0.001

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education. Male served as the reference group for the gender variables and Latino was the reference group among race/ethnicity variables.

### *Hierarchical Linear Models*

We used HLM to test the difference in outcomes between health pathway and traditional high school students, as well as between health pathway and other-pathway students, adjusting for confounds using inverse propensity score estimators, as recommended by Rosenbaum and Rubin (1983). The coefficient associated with health pathway membership can be interpreted as the measure of the difference in student outcomes between health pathway and comparison groups, adjusting for the estimated propensity of being in the health pathway group as well as baseline demographics and prior achievement.

We performed a set of two-level HLMs to take into account the nesting structure of the data – students were nested within schools. We conducted our analyses using SAS 9.0 PROC MIXED and PROC GLIMMIX commands. The high school and postsecondary outcomes described in Exhibit 5 were the dependent variables. A constant, a pathway indicator variable, baseline student demographics, and prior achievement scores were the independent variables.

Outcome  $Y$  for student  $i$  in School  $j$  is given as

$$Y_{ij} = \gamma_{00} + \gamma_{01}Pathway_{ij} + \gamma_{02}P_{ij} + \gamma_{03}D_{ij} + \mu_{0j} + e_{ij}$$

where:

$Pathway_{ij} = 1$  for students in the health pathway and 0 for students in comparison group.



$P_{ij}$  = student prior achievement scores, including 7th grade ELA and math CST, 9th grade GPA, and 9th grade a-g on track.

$D_{ij}$  = student demographic characteristics, including gender, race/ethnicity, GATE status, ELL status, and special education status.

$\mu_{0j}$  = school random effect.

$e_{ij}$  = student random effect.

The coefficient  $\gamma_{01}$  associated with *Pathway<sub>j</sub>* in the above HLM indicates the average treatment effect in promoting improved student outcomes. All the covariates were grand-mean centered; therefore, our estimates predicted differences for an “average” student in the sample. We use the standard  $p < .05$  threshold to determine statistical significance throughout this report. To indicate the magnitude of the difference between health pathway and comparison groups, we report Hedges’  $g$  effect sizes for continuous outcomes. We calculated effect sizes by dividing the coefficient associated with the intervention effect from the HLM by the pooled within-group standard deviation of the outcome at the student level (What Works Clearinghouse, 2017).

For categorical outcomes, we report Cox index effect sizes, which are calculated by dividing the logged odds ratio by 1.65 (What Works Clearinghouse, 2017). For ease of interpretation in the brief, we also report percentage point differences in predicted probability for categorical outcomes. We calculated this by determining each student’s predicted probability individually, calculating the mean of the individual probabilities for treatment and comparison groups, and then subtracting the comparison group’s mean probability from the treatment group’s mean probability to result in a percentage point difference.

## Results

We found health pathway students significantly outperformed traditional high school students in high school course credits earned, number of college eligibility requirements met, graduation, and college enrollment (Exhibit 8).<sup>2</sup> The two groups did not differ in high school English Language Arts and math achievement, completion of college eligibility requirements, drop out,<sup>3</sup> and enrollment in 4-year (rather than 2-year) college.

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<sup>2</sup> We explored using coarsened exact matching (CEM) as an alternative to propensity score weighting (PSW) for constructing our comparison group to test whether a different approach would give different results. Using CEM on the college enrollment outcome gave a treatment estimate that was very similar to the treatment estimate derived using PSW, with health pathway students more likely to enroll in college than traditional high school students. However, the difference in groups did not reach statistical significance. This was likely due to the dramatic reduction in sample size and associated increase in standard error that occurred when using CEM, which relies on matching treatment students with similar comparison students (rather than weighting comparison students to increase their similarity to treatment students). However, the comparability in treatment estimates indicates that CEM created matched samples that looked very similar to the weighted groups created using PSW—so theoretically, if samples sizes were larger, the CEM model would likely have reached statistical significance with results similar to PSW. This indicates the two approaches give similar results, so we can view our findings using PSW with more confidence.

<sup>3</sup> Because we altered students’ graduation status by recoding from missing to dropout if their attendance status was inactive during the 2017–18 year and they also accumulated no course credits during the 2017–18 year, we examined whether using the original dropout data with no recoding resulted in different findings. It did not; there was no difference in likelihood of dropout between health pathway and traditional high school students regardless of which dropout variable (original or recoded) we used.

In interpreting these results, it is important to remember that they are for a single cohort of students. Also, because OUSD was moving to wall-to-wall pathway implementation, the pool of students in the traditional high school comparison group was shrinking (and becoming less “traditional”), so our results may be affected by selection bias that inflates the effects of health pathways. We use statistical methods to correct for *measured* differences between the health pathway and traditional high school students but are unable to account for selection bias based on unobserved characteristics (e.g., motivation, engagement, stability of home environment).

For full HLM results comparing students in health pathways with students in traditional high school programs, see Appendix C.

*Exhibit 8. Propensity Score Weighted Treatment Estimates for High School and Postsecondary Outcomes, Comparing Health Pathway with Traditional High School Students*

Variables	Coeff	SE	G <sub>1</sub> Est	G <sub>2</sub> Est	% Pt Diff	P	Effect Size	n <sub>s1</sub>	n <sub>s2</sub>	n <sub>t1</sub>	n <sub>t2</sub>
ELA SBAC	-1.63	6.7	2539	2540		0.81	-0.01	3	8	197	514
Math SBAC	-2.29	8.9	2477	2479		0.80	-0.02	3	8	201	502
Credits earned	7.8**	2.9	193	185		0.007	0.18	3	8	200	676
A-g status	0.43	0.4	0.46	0.42	4	0.29	0.29	3	8	190	559
Number a-g requirements met	0.21*	0.1	5.3	5.1		0.04	0.11	3	8	190	559
Dropout	-0.26	0.4	0.21	0.24	-3	0.54	0.23	3	8	215	846
HS graduation	0.78*	0.3	0.70	0.59	11	0.02	0.27	3	8	215	846
College enrollment	1.07**	0.4	0.66	0.46	20	0.008	0.30	3	8	192	579
4-yr (vs. 2-yr) college enrollment	-0.72	0.4	0.39	0.50	-11	0.09	0.30	3	8	135	323

Note. G<sub>1</sub> Est = model-adjusted mean outcome for health pathway group; G<sub>2</sub> Est = model-adjusted mean for traditional high school group; n<sub>t1</sub> = number of health pathway students included in the HLM analysis; n<sub>t2</sub> = number of traditional high school students included in the HLM analysis. n<sub>s1</sub> = number of schools that have health pathway students in the HLM analysis; n<sub>s2</sub> = number of schools that have traditional high school students in the HLM analysis. Two schools have both health pathway and traditional high school students.

The HLM results reported here are based on two-level models (students nested in schools). Students’ baseline demographic characteristics and prior achievement scores were imputed if there were any missing. Students’ outcome data were not imputed. The HLM controlled for student demographic characteristics and prior achievement scores.

Effect sizes for continuous outcomes are reported using Hedge’s g. Effect sizes for categorical outcomes are reported using Cox’s index.

\*p < .05; \*\*p < .01; \*\*\*p < .001.

We also found health pathway students did not differ from students in other career-themed pathways on any of these nine outcomes (Exhibit 9). For full HLM results comparing students in health pathways with students in other career-themed pathways, see Appendix D.

*Exhibit 9. Propensity Score Weighted Treatment Estimates for High School and Postsecondary Outcomes, Comparing Health Pathway with Other Pathway Students*

Variables	Coeff	SE	G <sub>1</sub> Est	G <sub>2</sub> Est	% Pt Diff	p	Effect Size	n <sub>s1</sub>	n <sub>s2</sub>	n <sub>t1</sub>	n <sub>t2</sub>
ELA SBAC	2.38	6.33	2556	2553		0.71	0.02	3	8	197	811
Math SBAC	-12.49	7.32	2490	2502		0.09	-0.10	3	8	201	789
Credits earned	1.8	2.3	206	204		0.43	0.04	3	8	200	916
A-g status	-0.09	0.40	0.59	0.60	1	0.83	0.29	3	8	190	836
Number a-g requirements met	0.03	0.08	5.9	5.9		0.67	0.02	3	8	190	836
Dropout	-0.13	0.39	0.13	0.15	-2	0.74	0.23	3	8	215	1052
HS graduation	0.23	0.33	0.80	0.78	2	0.50	0.27	3	8	215	1052
College enrollment	0.49	0.31	0.68	0.59	9	0.12	0.30	3	8	192	842
4-yr (vs. 2-yr) college enrollment	-0.55	0.36	0.54	0.63	-9	0.13	0.30	3	8	135	520

Note. G<sub>1</sub> Est = model-adjusted mean outcome for health pathway group; G<sub>2</sub> Est = model-adjusted mean for other pathway group; n<sub>t1</sub> = number of health pathway students included in the HLM analysis; n<sub>t2</sub> = number of other pathways students included in the HLM analysis. n<sub>s1</sub> = number of schools that have health pathway students included in the HLM analysis; n<sub>s2</sub> = number of schools that have other pathways students in the HLM analysis. Two schools have both health pathway and other pathway students.

The HLM results reported here are based on two-level models (students nested in schools). Students' baseline demographic characteristics and prior achievement scores were imputed if there were any missing. Students' outcome data were not imputed. The HLM controlled for student demographic characteristics and prior achievement scores.

Effect sizes for continuous outcomes are reported using Hedge's g. Effect sizes for categorical outcomes are reported using Cox's index.

\*p < .05; \*\*p < .01; \*\*\*p < .001.

Due to our concerns about selection bias, we applied the method described by Frank et al. (2013) to our results as a type of sensitivity analysis. This method allows us to quantify the amount of bias associated with nonrandom assignment to treatment that would be necessary to invalidate the inference that health pathway participation increased students' high school credits earned, number of a-g requirements met, high school graduation, and college enrollment as compared to students in traditional high school programs. In the Frank et al. (2013) framework, the robustness of an inference is a function of the percentage of the impact estimate that exceeds a threshold that would render the estimate statistically not significant. The estimated effect of health pathway participation on credits earned is 7.8, with a standard error of 2.9. The threshold for statistical significance of this estimate at the .05 level is therefore 5.7 = 2.9\*1.96. Using Frank et al.'s formula (estimate-threshold)/estimate, we calculated the percent bias that would invalidate the inference to be 27% = (7.8-5.7)/5.7. This means that to invalidate the inference that health pathway participation had a positive effect of increasing credits earned on the full sample of students, 27% of the estimated effect would have to be due to bias. In other words, 27% of the health pathway student sample would have to be replaced with students for whom health pathway participation had zero effect on them in order to invalidate the inference that health pathway participation had a positive impact on credits earned.

This analysis provides evidence of the relative robustness of the estimated impact. The amount of bias that would be needed to invalidate the inference for number of a-g requirements met, high school graduation, and college enrollment are 7%, 25%, and 27%, respectively. These bias analyses suggest that for three of the four outcomes, a very high level of selection bias would be needed to negate the entirety of our estimated treatment effects, so the effects are less likely to be strictly an artifact of selection bias. This allows us to have more confidence that our estimated treatment effects are not entirely spurious. However, it does not allow us to ascertain the degree to which our treatment effects are inflated due to selection bias.

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## Appendix A – Imputed Demographic and Prior Achievement Variables for Health Pathway and Traditional High School Students Before and After Propensity Score Weighting

*Exhibit A1. Imputed Demographic and Prior Achievement Variables for Health Pathway and Traditional High School Students Before and After Propensity Score Weighting, SBAC Math Outcome*

Variable	Health Pathway (n = 201 )	Traditional High School (n = 502)	Traditional High School (n = 502)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.56	0.45	0.21	0.57	-0.032
African American	0.18	0.30	-0.28	0.18	-0.017
Asian	0.19	0.15	0.10	0.20	-0.019
White	0.13	0.09	0.12	0.14	-0.019
Multiple race/ ethnicities	0.04	0.01	0.15	0.04	-0.029
Other race/ ethnicity	0.03	0.03	-0.01	0.03	-0.003
GATE	0.22	0.17	0.11	0.24	-0.063
ELL	0.14	0.18	-0.13	0.13	0.035
SP ED	0.10	0.08	0.06	0.10	-0.017
ELA CST	349.69	335.36	0.25	352.34	-0.060
Math CST z-score	-0.27	-0.44	0.19	-0.25	-0.031
9th grade GPA	2.99	2.50	0.48	3.00	-0.010
9th grade a-g on track	6.48	5.73	0.64	6.50	-0.024

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit A2. Imputed Demographic and Prior Achievement Variables for Health Pathway and Traditional High School Students Before and After Propensity Score Weighting, Credits Earned Outcome*

Variable	Health Pathway (n=200 )	Traditional High School (n=676)	Traditional High School (n=676)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.57	0.44	0.24	0.58	-0.03
African American	0.18	0.31	-0.29	0.19	-0.02
Asian	0.19	0.14	0.13	0.19	-0.01
White	0.14	0.09	0.17	0.14	-0.02
Multiple race/ethnicities	0.04	0.02	0.15	0.04	-0.02
Other race/ethnicity	0.03	0.03	-0.03	0.03	-0.01

Variable	Health Pathway (n=200 )	Traditional High School (n=676)		Traditional High School (n=676)	
GATE	0.21	0.15	0.18	0.22	-0.04
ELL	0.14	0.20	-0.16	0.13	0.03
SP ED	0.11	0.15	-0.12	0.11	0.01
ELA CST	351.65	332.53	0.34	353.83	-0.06
Math CST z-score	-0.25	-0.51	0.28	-0.23	-0.04
9th grade GPA	3.03	2.44	0.56	3.05	-0.03
9th grade a-g on track	6.53	5.62	0.75	6.56	-0.05

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit A3. Imputed Demographic and Prior Achievement Variables for Health Pathway and Traditional High School Students Before and After Propensity Score Weighting, A-G Status and Number of Requirements Met Outcomes*

Variable	Health Pathway (n = 190 )	Traditional High School (n = 559)		Traditional High School (n = 559)	
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.56	0.45	0.22	0.57	-0.008
African American	0.17	0.30	-0.30	0.18	-0.032
Asian	0.20	0.16	0.12	0.20	-0.013
White	0.13	0.10	0.11	0.13	-0.009
Multiple race/ethnicities	0.03	0.02	0.11	0.03	-0.018
Other race/ethnicity	0.02	0.03	-0.07	0.02	0.005
GATE	0.21	0.16	0.13	0.23	-0.041
ELL	0.14	0.17	-0.10	0.13	0.039
SP ED	0.11	0.15	-0.11	0.11	0.027
ELA CST	351.10	337.54	0.24	353.41	-0.057
Math CST z-score	-0.23	-0.44	0.22	-0.21	-0.040
9th grade GPA	3.08	2.58	0.50	3.07	0.015
9th grade a-g on track	6.57	5.73	0.72	6.57	0.002

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit A4. Imputed Demographic and Prior Achievement Variables for Health Pathway and Traditional High School Students Before and After Propensity Score Weighting, Dropout Outcome*

Variable	Health Pathway (n = 215)	Traditional High School (n = 846)	Traditional High School (n = 846)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.55	0.4	0.26	0.57	-0.05
African American	0.19	0.3	-0.29	0.19	-0.02
Asian	0.18	0.1	0.18	0.19	-0.01
White	0.13	0.1	0.16	0.13	-0.01
Multiple race/ethnicities	0.04	0.0	0.16	0.04	-0.04
Other race/ethnicity	0.02	0.0	-0.04	0.02	0.01
GATE	0.22	0.1	0.27	0.23	-0.06
ELL	0.15	0.2	-0.20	0.14	0.03
SP ED	0.10	0.1	-0.11	0.10	0.01
ELA CST	348.95	327.9	0.36	351.13	-0.06
Math CST z-score	-0.30	-0.6	0.30	-0.28	-0.03
9th grade GPA	2.94	2.3	0.59	2.96	-0.04
9th grade a-g on track	6.43	5.5	0.79	6.46	-0.04

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit A5. Imputed Demographic and Prior Achievement Variables for Health Pathway and Traditional High School Students Before and After Propensity Score Weighting, High School Graduation Outcome*

Variable	Health Pathway (n = 215)	Traditional High School (n = 846)	Traditional High School (n = 846)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.55	0.42	0.26	0.57	-0.054
African American	0.19	0.32	-0.29	0.19	-0.025
Asian	0.18	0.12	0.18	0.19	-0.009
White	0.13	0.08	0.16	0.13	-0.011
Multiple race/ethnicities	0.04	0.02	0.16	0.04	-0.045
Other race/ ethnicity	0.02	0.03	-0.04	0.02	0.007
GATE	0.22	0.12	0.27	0.23	-0.058
ELL	0.15	0.23	-0.20	0.14	0.037
SP ED	0.10	0.15	-0.12	0.10	0.018
ELA CST	348.92	327.56	0.37	351.19	-0.060



Variable	Health Pathway (n = 215)	Traditional High School (n = 846)		Traditional High School (n = 846)	
Math CST z-score	-0.30	-0.59	0.31	-0.28	-0.035
9th grade GPA	2.94	2.28	0.60	2.96	-0.036
9th grade a-g on track	6.43	5.43	0.81	6.46	-0.043

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit A6. Imputed Demographic and Prior Achievement Variables for Health Pathway and Traditional High School Students Before and After Propensity Score Weighting, College Enrollment Outcome*

Variable	Health Pathway (n = 192)	Traditional High School (n = 579)		Traditional High School (n = 579)	
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.57	0.47	0.21	0.58	-0.023
African American	0.18	0.31	-0.30	0.19	-0.032
Asian	0.20	0.16	0.11	0.20	-0.010
White	0.14	0.10	0.15	0.14	-0.012
Multiple race/ethnicities	0.04	0.01	0.18	0.04	-0.037
Other race/ethnicity	0.02	0.03	-0.07	0.02	0.002
GATE	0.22	0.15	0.18	0.23	-0.046
ELL	0.14	0.18	-0.13	0.13	0.029
SP ED	0.11	0.15	-0.13	0.10	0.009
ELA CST	351.87	336.33	0.27	354.49	-0.064
Math CST z-score	-0.23	-0.45	0.24	-0.21	-0.040
9th grade GPA	3.10	2.60	0.51	3.12	-0.033
9th grade a-g on track	6.62	5.76	0.74	6.64	-0.036

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit A7. Imputed Demographic and Prior Achievement Variables for Health Pathway and Traditional High School Students Before and After Propensity Score Weighting, 4-Year College Enrollment Outcome*

Variable	Health Pathway (n = 135 )	Traditional High School (n = 323)	Traditional High School (n = 323)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.61	0.54	0.14	0.61	-0.010
African American	0.13	0.32	-0.45	0.13	0.001
Asian	0.25	0.19	0.16	0.26	-0.018
White	0.19	0.11	0.26	0.20	-0.034
Multiple race/ ethnicities	0.04	0.01	0.22	0.04	0.016
Other race/ ethnicity	0.02	0.03	-0.05	0.02	0.013
GATE	0.28	0.22	0.14	0.30	-0.052
ELL	0.09	0.13	-0.12	0.08	0.023
SP ED	0.08	0.07	0.01	0.06	0.066
ELA CST	365.42	349.40	0.28	368.91	-0.080
Math CST z-score	-0.03	-0.24	0.23	0.00	-0.040
9th grade GPA	3.24	2.85	0.43	3.24	-0.004
9th grade a-g on track	6.76	6.12	0.63	6.79	-0.051

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

## Appendix B – Imputed Demographic and Prior Achievement Variables for Health Pathway and Other Pathway Students Before and After Propensity Score Weighting

*Exhibit B1. Imputed Demographic and Prior Achievement Variables for Health Pathway and Other Pathway Students Before and After Propensity Score Weighting, SBAC Math Outcome*

Variable	Health Pathway (n = 201 )	Other Pathway (n = 789)	Other Pathway (n = 789)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.56	0.50	0.11	0.56	-0.010
African American	0.18	0.27	-0.20	0.18	-0.007
Asian	0.19	0.21	-0.04	0.19	-0.006
White	0.13	0.08	0.19	0.13	-0.004
Multiple race/ethnicities	0.04	0.01	0.20	0.04	-0.007
Other race/ethnicity	0.03	0.04	-0.05	0.03	-0.004
GATE	0.22	0.20	0.05	0.22	-0.019
ELL	0.14	0.17	-0.09	0.13	0.017
SP ED	0.10	0.09	0.02	0.10	-0.006
ELA CST	349.69	343.90	0.10	350.53	-0.022
Math CST z-score	-0.27	-0.30	0.03	-0.27	-0.002
9th grade GPA	2.99	2.83	0.17	2.99	0.004
9th grade a-g on track	6.48	6.13	0.32	6.48	0.003

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit B2. Imputed Demographic and Prior Achievement Variables for Health Pathway and Other Pathway Students Before and After Propensity Score Weighting, Credits Earned Outcome*

Variable	Health Pathway (n = 200 )	Other Pathway (n = 916)	Other Pathway (n = 916)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.57	0.50	0.14	0.57	-0.0006
African American	0.18	0.30	-0.26	0.18	-0.0086
Asian	0.19	0.19	0.01	0.19	-0.0078
White	0.14	0.07	0.22	0.14	-0.0052
Multiple race/ethnicities	0.04	0.01	0.18	0.04	-0.0086
Other race/ethnicity	0.03	0.04	-0.08	0.03	-0.0045
GATE	0.21	0.19	0.05	0.21	-0.0041

Variable	Health Pathway (n = 200 )	Other Pathway (n = 916)	Other Pathway (n = 916)		
ELL	0.14	0.17	-0.07	0.14	0.0120
SP ED	0.11	0.12	-0.01	0.11	-0.0111
ELA CST	351.65	341.96	0.16	352.33	-0.0192
Math CST z-score	-0.25	-0.34	0.09	-0.25	-0.0022
9th grade GPA	3.03	2.76	0.28	3.03	0.0076
9th grade a-g on track	6.53	6.08	0.40	6.53	0.0010

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit B3. Imputed Demographic and Prior Achievement Variables for Health Pathway and Other Pathway Students Before and After Propensity Score Weighting, A-G Status and Number of Requirements Met Outcomes*

Variable	Health Pathway (n = 190 )	Other Pathway (n = 836)	Other Pathway (n = 836)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.56	0.50	0.12	0.56	-0.001
African American	0.17	0.29	-0.27	0.17	-0.016
Asian	0.20	0.20	0.00	0.20	-0.010
White	0.13	0.08	0.19	0.13	0.008
Multiple race/ethnicities	0.03	0.01	0.16	0.03	-0.006
Other race/ethnicity	0.02	0.04	-0.11	0.02	-0.001
GATE	0.21	0.20	0.04	0.22	-0.008
ELL	0.14	0.16	-0.06	0.14	0.010
SP ED	0.11	0.12	-0.01	0.11	0.005
ELA CST	351.11	345.00	0.10	351.81	-0.019
Math CST z-score	-0.24	-0.30	0.07	-0.23	-0.007
9th grade GPA	3.08	2.85	0.25	3.07	0.016
9th grade a-g on track	6.56	6.18	0.36	6.56	0.014

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit B4. Imputed Demographic and Prior Achievement Variables for Health Pathway and Other Pathway Students Before and After Propensity Score Weighting, Dropout Outcome*

Variable	Health Pathway (n = 215)	Other Pathway (n = 1,052)	Other Pathway (n = 1,052)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.55	0.49	0.12	0.55	-0.004
African American	0.19	0.30	-0.26	0.19	-0.012
Asian	0.18	0.17	0.03	0.19	-0.005
White	0.13	0.07	0.21	0.13	-0.002
Multiple race/ethnicities	0.04	0.01	0.22	0.04	-0.015
Other race/ethnicity	0.02	0.04	-0.07	0.02	0.001
GATE	0.22	0.17	0.12	0.22	-0.015
ELL	0.15	0.20	-0.12	0.15	0.013
SP ED	0.10	0.12	-0.05	0.11	-0.011
ELA CST	348.95	336.63	0.20	349.80	-0.024
Math CST z-score	-0.30	-0.43	0.13	-0.30	-0.004
9th grade GPA	2.94	2.64	0.30	2.94	0.004
9th grade a-g on track	6.43	5.94	0.42	6.43	-0.002

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit B5. Imputed Demographic and Prior Achievement Variables for Health Pathway and Other Pathway Students Before and After Propensity Score Weighting, High School Graduation Outcome*

Variable	Health Pathway (n = 215)	Other Pathway (n = 1,052)	Other Pathway (n = 1,052)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.55	0.49	0.12	0.55	-0.004
African American	0.19	0.30	-0.26	0.19	-0.013
Asian	0.18	0.17	0.03	0.19	-0.005
White	0.13	0.07	0.21	0.13	-0.002
Multiple race/ethnicities	0.04	0.01	0.22	0.04	-0.016
Other race/ethnicity	0.02	0.04	-0.07	0.02	0.002
GATE	0.22	0.17	0.12	0.22	-0.016
ELL	0.15	0.20	-0.12	0.15	0.013
SP ED	0.10	0.12	-0.05	0.11	-0.011
ELA CST	348.92	336.52	0.20	349.77	-0.024
Math CST z-score	-0.30	-0.43	0.13	-0.30	-0.003
9th grade GPA	2.94	2.63	0.30	2.94	0.004

Variable	Health Pathway (n = 215)	Other Pathway (n = 1,052)	Other Pathway (n = 1,052)		
9th grade a-g on track	6.43	5.93	0.42	6.43	-0.001

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit B6. Imputed Demographic and Prior Achievement Variables for Health Pathway and Other Pathway Students Before and After Propensity Score Weighting, College Enrollment Outcome*

Variable	Health Pathway (n = 192)	Other Pathway (n = 842)	Other Pathway (n = 842)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.57	0.51	0.12	0.57	0.006
African American	0.18	0.29	-0.25	0.18	-0.016
Asian	0.20	0.20	-0.01	0.20	-0.009
White	0.14	0.08	0.23	0.14	-0.006
Multiple race/ethnicities	0.04	0.01	0.21	0.04	-0.020
Other race/ethnicity	0.02	0.04	-0.10	0.02	0.000
GATE	0.22	0.20	0.04	0.22	-0.007
ELL	0.14	0.17	-0.08	0.13	0.012
SP ED	0.11	0.12	-0.03	0.11	-0.005
ELA CST	351.87	344.95	0.12	352.62	-0.021
Math CST z-score	-0.23	-0.29	0.06	-0.23	-0.004
9th grade GPA	3.10	2.86	0.27	3.10	-0.003
9th grade a-g on track	6.62	6.18	0.41	6.62	-0.009

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit B7. Imputed Demographic and Prior Achievement Variables for Health Pathway and Other Pathway Students Before and After Propensity Score Weighting, 4-Year College Enrollment Outcome*

Variable	Health Pathway (n = 135)	Other Pathway (n = 520)	Other Pathway (n = 520)		
	Imputed Mean	Imputed Mean	Before PSW d	PSW Mean	After PSW d
Female	0.61	0.53	0.16	0.59	0.044
African American	0.13	0.26	-0.32	0.13	-0.008
Asian	0.25	0.26	-0.01	0.26	-0.029
White	0.19	0.09	0.33	0.19	0.007

Variable	Health Pathway ( <i>n</i> = 135)	Other Pathway ( <i>n</i> = 520)	Other Pathway ( <i>n</i> = 520)		
Multiple race/ ethnicities	0.04	0.01	0.25	0.03	0.067
Other race/ ethnicity	0.02	0.03	-0.05	0.02	0.000
GATE	0.28	0.26	0.05	0.29	-0.035
ELL	0.09	0.13	-0.12	0.08	0.021
SP ED	0.08	0.09	-0.04	0.07	0.041
ELA CST	365.42	356.84	0.15	367.56	-0.058
Math CST	-0.03	-0.09	0.06	0.00	-0.044
9th grade GPA	3.24	3.13	0.14	3.24	0.003
9th grade a-g on track	6.76	6.45	0.35	6.76	-0.005

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

## Appendix C – Full HLM Results Comparing Health Pathway with Traditional High School Students

*Exhibit C1. Propensity Score Weighted HLM Results Comparing Health Pathway with Traditional High School Students, ELA SBAC Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	2535.57	6.86	369.55	<.0001
Treatment	-1.63	6.74	-0.24	0.8088
Female	11.28	6.61	1.71	0.0884
African American	-9.39	10.35	-0.91	0.3654
Asian	26.67	9.76	2.73	0.0066
White	-16.79	10.33	-1.63	0.1041
Multiple race/ethnicities	8.40	20.41	0.41	0.6818
Other race/ethnicity	3.44	20.04	0.17	0.864
GATE	-7.44	8.77	-0.85	0.3963
ELL	-18.65	11.39	-1.64	0.102
SP ED	-60.27	13.99	-4.31	<.0001
ELA CST	0.68	0.10	7.12	<.0001
Math CST z-score	18.84	6.40	2.94	0.0039
9th grade GPA	16.45	6.74	2.44	0.0165
9th grade a-g on track	19.05	5.15	3.7	0.0002

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit C2. Propensity Score Weighted HLM Results Comparing Health Pathway with Traditional High School Students, Math SBAC Outcome*

Model Parameters	Coeff	SE	t	P
<b>Fixed Effect</b>				
Intercept	2477.49	9.73	254.68	<.0001
Treatment	-2.29	8.86	-0.26	0.7964
Female	-3.12	6.70	-0.47	0.6412
African American	4.02	10.63	0.38	0.7052
Asian	48.48	10.87	4.46	<.0001
White	-1.92	11.87	-0.16	0.8715
Multiple race/ethnicities	-9.93	19.64	-0.51	0.6135
Other race/ethnicity	16.01	20.43	0.78	0.4334
Gifted and Talented	7.63	10.05	0.76	0.4487
English Language Learner	-4.72	12.14	-0.39	0.6973
Special education	-47.62	15.53	-3.07	0.0037
ELA CST	0.16	0.11	1.41	0.1624
Math CST z-score	55.17	6.09	9.07	<.0001



Model Parameters	Coeff	SE	t	P
9th grade GPA	24.69	6.76	3.65	0.0004
9th grade a-g on track	9.89	6.11	1.62	0.1098

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit C3. Propensity Score Weighted HLM Results Comparing Health Pathway with Traditional High School Students, Credits Earned Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	197.50	5.96	33.13	<.0001
Treatment	7.82	2.91	2.69	0.0072
Female	2.36	2.15	1.1	0.2716
African American	5.66	3.44	1.64	0.1006
Asian	0.32	3.52	0.09	0.9277
White	-7.03	3.75	-1.87	0.0612
Multiple race/ethnicities	-8.43	6.36	-1.33	0.1859
Other race/ethnicity	-12.31	6.74	-1.83	0.0676
GATE	-1.06	3.14	-0.34	0.7358
ELL	-7.52	3.93	-1.91	0.0564
SP ED	-6.29	3.79	-1.66	0.0976
ELA CST	-0.01	0.04	-0.16	0.871
Math CST z-score	0.90	2.53	0.36	0.7235
9th grade GPA	20.22	2.15	9.39	<.0001
9th grade a-g on track	-1.20	1.68	-0.72	0.4743

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit C4. Propensity Score Weighted HLM Results Comparing Health Pathway with Traditional High School Students, A-G Status Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	-0.98	0.55	-1.77	0.0762
Treatment	0.43	0.41	1.05	0.2943
Female	0.02	0.31	0.07	0.9409
African American	0.46	0.46	0.99	0.3219
Asian	0.67	0.48	1.39	0.1635
White	0.60	0.55	1.1	0.2705
Multiple race/ethnicities	-0.03	0.86	-0.03	0.9726
Other race/ethnicity	0.91	1.12	0.81	0.4188
GATE	-0.21	0.44	-0.48	0.6326
ELL	-0.60	0.55	-1.09	0.2752
SP ED	-1.26	0.54	-2.34	0.0194
ELA CST	0.00	0.01	-0.64	0.521

Model Parameters	Coeff	SE	t	p
Math CST z-score	0.41	0.34	1.2	0.2346
9th grade GPA	0.88	0.30	2.94	0.0034
9th grade a-g on track	1.35	0.30	4.54	<.0001

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit C5. Propensity Score Weighted HLM Results Comparing Health Pathway with Traditional High School Students, Number of A-G Requirements Met Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	5.24	0.12	44.05	<.0001
Treatment	0.21	0.10	2.02	0.0438
Female	0.07	0.08	0.83	0.4061
African American	0.07	0.12	0.59	0.5553
Asian	0.06	0.13	0.45	0.6552
White	0.10	0.14	0.73	0.4648
Multiple race/ethnicities	0.00	0.26	0	0.9984
Other race/ethnicity	0.17	0.27	0.63	0.5273
GATE	-0.02	0.11	-0.2	0.8394
ELL	-0.19	0.14	-1.31	0.1902
SP ED	-1.08	0.15	-7	<.0001
ELA CST	0.00	0.00	0.59	0.5605
Math CST z-score	0.07	0.09	0.71	0.481
9th grade GPA	0.17	0.07	2.27	0.0235
9th grade a-g on track	0.92	0.06	14.97	<.0001

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit C6. Propensity Score Weighted HLM Results Comparing Health Pathway with Traditional High School Students, Dropout Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	-1.85	0.34	-5.44	<.0001
Treatment	-0.26	0.43	-0.62	0.5371
Female	-0.52	0.37	-1.39	0.1632
African American	-0.33	0.52	-0.64	0.5244
Asian	-1.26	0.85	-1.49	0.1373
White	-0.38	0.73	-0.52	0.6045
Multiple race/ethnicities	-0.09	0.99	-0.09	0.9248
Other race/ethnicity	0.53	1.00	0.54	0.5925
GATE	0.35	0.57	0.61	0.5428
ELL	0.43	0.59	0.74	0.4605
SP ED	-0.41	0.66	-0.62	0.5334
ELA CST	0.01	0.01	1.1	0.2743
Math CST z-score	-0.19	0.40	-0.48	0.6309
9th grade GPA	-0.44	0.30	-1.46	0.1436
9th grade a-g on track	-0.57	0.25	-2.27	0.023

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit C7. Propensity Score Weighted HLM Results Comparing Health Pathway with Traditional High School Students, High School Graduation Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	1.02	0.25	4.14	<.0001
Treatment	0.78	0.34	2.33	0.0196
Female	0.55	0.34	1.62	0.1057
African American	0.59	0.48	1.21	0.2269
Asian	1.13	0.68	1.65	0.1006
White	0.34	0.59	0.57	0.5661
Multiple race/ethnicities	0.32	0.95	0.33	0.7394
Other race/ethnicity	-0.23	1.02	-0.22	0.8223
GATE	-0.06	0.53	-0.11	0.9158
ELL	-0.45	0.50	-0.88	0.3766
SP ED	-1.15	0.49	-2.34	0.0195
ELA CST	0.00	0.01	-0.43	0.6662
Math CST z-score	0.00	0.37	0.01	0.9898
9th grade GPA	0.36	0.26	1.37	0.1699
9th grade a-g on track	0.87	0.22	3.96	<.0001

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit C8. Propensity Score Weighted HLM Results Comparing Health Pathway with Traditional High School Students, College Enrollment Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	-0.24	0.39	-0.6	0.5458
Treatment	1.07	0.40	2.66	0.008
Female	0.69	0.27	2.53	0.0115
African American	-0.01	0.40	-0.02	0.9803
Asian	0.51	0.45	1.15	0.2487
White	0.01	0.50	0.02	0.9872
Multiple race/ethnicities	-1.20	0.71	-1.69	0.092
Other race/ethnicity	0.28	0.98	0.29	0.774
GATE	0.87	0.44	2	0.0461
ELL	-0.18	0.45	-0.4	0.6866
SP ED	-0.97	0.44	-2.22	0.0267
ELA CST	0.00	0.00	0.79	0.4304
Math CST z-score	-0.20	0.26	-0.75	0.4566
9th grade GPA	0.64	0.24	2.62	0.0089
9th grade a-g on track	0.16	0.21	0.77	0.4403

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit C9. Propensity Score Weighted HLM Results Comparing Health Pathway with Traditional High School Students, 4-Year College Enrollment Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	-0.83	0.49	-1.7	0.0891
Treatment	-0.72	0.42	-1.71	0.0868
Female	0.03	0.34	0.08	0.9327
African American	0.18	0.54	0.34	0.7353
Asian	-0.11	0.47	-0.23	0.8217
White	1.19	0.58	2.04	0.0417
Multiple race/ethnicities	0.73	1.01	0.72	0.472
Other race/ethnicity	-1.18	1.02	-1.15	0.2507
GATE	-0.03	0.46	-0.07	0.9472
ELL	-0.16	0.71	-0.23	0.8201
SP ED	-1.77	0.70	-2.53	0.0113
ELA CST	0.00	0.01	0.85	0.3942
Math CST z-score	-0.16	0.31	-0.5	0.6158
9th grade GPA	1.63	0.34	4.74	<.0001
9th grade a-g on track	0.17	0.36	0.47	0.6409

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

## Appendix D – Full HLM Results Comparing Health Pathway with Other Pathway Students

*Exhibit D1. Propensity Score Weighted HLM Results Comparing Health Pathway with Other Pathway Students, ELA SBAC Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	2528.78	7.23	349.62	<.0001
Treatment	2.38	6.33	0.38	0.7072
Female	6.65	5.40	1.23	0.219
African American	7.65	8.41	0.91	0.3635
Asian	26.19	8.22	3.18	0.0015
White	-8.85	9.74	-0.91	0.3638
Multiple race/ethnicities	18.52	15.03	1.23	0.2187
Other race/ethnicity	-6.96	15.39	-0.45	0.6513
GATE	-0.53	7.39	-0.07	0.9429
ELL	-9.96	10.10	-0.99	0.3257
SP ED	-56.73	11.65	-4.87	<.0001
ELA CST	0.70	0.08	9.22	<.0001
Math CST z-score	17.57	4.86	3.62	0.0004
9th grade GPA	24.66	5.44	4.53	<.0001
9th grade a-g on track	11.15	4.28	2.61	0.0094

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit D2. Propensity Score Weighted HLM Results Comparing Health Pathway with Other Pathway Students, Math SBAC Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	2479.80	8.96	276.78	<.0001
Treatment	-12.49	7.32	-1.71	0.0896
Female	-1.24	5.76	-0.21	0.83
African American	15.81	8.96	1.76	0.0782
Asian	39.35	9.11	4.32	<.0001
White	11.52	10.47	1.1	0.2715
Multiple race/ethnicities	-4.90	16.05	-0.31	0.7604
Other race/ethnicity	8.37	16.95	0.49	0.6217
GATE	3.34	8.55	0.39	0.6964
ELL	3.52	9.84	0.36	0.7205
SP ED	-57.51	14.82	-3.88	0.0006
ELA CST	0.26	0.09	3.1	0.0023
Math CST z-score	53.00	5.20	10.19	<.0001
9th grade GPA	31.09	5.99	5.19	<.0001

Model Parameters	Coeff	SE	t	p
9th grade a-g on track	2.56	5.25	0.49	0.6265

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit D3. Propensity Score Weighted HLM Results Comparing Health Pathway with Other Pathway Students, Credits Earned Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	206.81	5.82	35.53	<.0001
Treatment	1.83	2.32	0.79	0.4299
Female	1.48	1.78	0.83	0.4059
African American	2.88	2.90	1	0.3193
Asian	1.44	2.91	0.49	0.6215
White	-10.90	3.37	-3.23	0.0013
Multiple race/ethnicities	-12.84	5.11	-2.51	0.012
Other race/ethnicity	-10.42	5.64	-1.85	0.0649
GATE	-4.37	2.88	-1.52	0.1318
ELL	-7.18	3.09	-2.32	0.0204
SP ED	-11.40	3.02	-3.78	0.0002
ELA CST	0.00	0.03	-0.15	0.8851
Math CST z-score	0.17	2.01	0.08	0.9343
9th grade GPA	18.85	2.07	9.1	<.0001
9th grade a-g on track	0.27	1.60	0.17	0.8664

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit D4. Propensity Score Weighted HLM Results Comparing Health Pathway with Other Pathway Students, A-G Status Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	-0.51	0.53	-0.97	0.3306
Treatment	-0.09	0.40	-0.21	0.8327
Female	0.27	0.31	0.86	0.3896
African American	0.11	0.46	0.24	0.812
Asian	0.45	0.49	0.9	0.3681
White	0.18	0.58	0.31	0.7587
Multiple race/ethnicities	-0.91	0.81	-1.11	0.2661
Other race/ethnicity	0.21	1.07	0.2	0.8425
GATE	0.08	0.45	0.18	0.86
ELL	0.04	0.51	0.07	0.9451
SP ED	-0.66	0.49	-1.33	0.1832
ELA CST	0.00	0.01	0.12	0.9039
Math CST z-score	0.27	0.31	0.87	0.3873
9th grade GPA	1.00	0.30	3.32	0.0009

Model Parameters	Coeff	SE	t	p
9th grade a-g on track	1.27	0.28	4.5	<.0001

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit D5. Propensity Score Weighted HLM Results Comparing Health Pathway with Other Pathway Students, Number of A-G Requirements Met Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	5.55	0.15	35.85	<.0001
Treatment	0.03	0.08	0.43	0.6689
Female	0.11	0.06	1.8	0.0724
African American	0.03	0.10	0.29	0.7694
Asian	0.06	0.10	0.65	0.5128
White	-0.01	0.11	-0.09	0.9244
Multiple race/ ethnicities	-0.30	0.18	-1.66	0.0973
Other race/ ethnicity	-0.01	0.20	-0.06	0.9501
GATE	-0.06	0.09	-0.64	0.5215
ELL	0.04	0.11	0.39	0.6983
SP ED	-0.68	0.10	-6.65	<.0001
ELA CST	0.00	0.00	0.68	0.501
Math CST z-score	0.05	0.07	0.65	0.519
9th grade GPA	0.29	0.06	4.98	<.0001
9th grade a-g on track	0.86	0.05	17.53	<.0001

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit D6. Propensity Score Weighted HLM Results Comparing Health Pathway with Other Pathway Students, Dropout Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	-2.23	0.30	-2.23	0.30
Treatment	-0.13	0.39	-0.13	0.39
Female	-0.51	0.40	-0.51	0.40
African American	-0.15	0.55	-0.15	0.55
Asian	-0.46	0.75	-0.46	0.75
White	-0.57	0.83	-0.57	0.83
Multiple race/ ethnicities	-0.79	1.12	-0.79	1.12
Other race/ ethnicity	0.21	1.24	0.21	1.24
GATE	0.47	0.60	0.47	0.60
ELL	0.69	0.59	0.69	0.59
SP ED	-0.46	0.66	-0.46	0.66
ELA CST	0.01	0.01	0.01	0.01
Math CST z-score	-0.43	0.42	-0.43	0.42
9th grade GPA	-0.60	0.35	-0.60	0.35

Model Parameters	Coeff	SE	t	p
9th grade a-g on track	-0.57	0.27	-0.57	0.27

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit D7. Propensity Score Weighted HLM Results Comparing Health Pathway with Other Pathway Students, High School Graduation Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	1.62	0.25	6.56	<.0001
Treatment	0.23	0.33	0.68	0.4959
Female	0.26	0.35	0.74	0.4584
African American	0.66	0.49	1.35	0.1786
Asian	0.62	0.67	0.93	0.3501
White	0.25	0.64	0.39	0.6999
Multiple race/ ethnicities	0.53	0.87	0.61	0.5411
Other race/ ethnicity	0.11	1.18	0.1	0.9234
GATE	-0.33	0.53	-0.61	0.54
ELL	-0.30	0.53	-0.57	0.571
SP ED	-0.33	0.52	-0.63	0.5283
9th Grade GPA	0.71	0.30	2.35	0.019
ELA CST	-0.01	0.01	-1.1	0.2736
9th grade GPA	0.32	0.34	0.93	0.3546
9th grade a-g on track	0.67	0.23	2.97	0.003

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit D8. Propensity Score Weighted HLM Results Comparing Health Pathway with Other Pathway Students, College Enrollment Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	0.10	0.29	0.33	0.7383
Treatment	0.49	0.31	1.55	0.1208
Female	0.23	0.25	0.91	0.3622
African American	-0.17	0.38	-0.45	0.6531
Asian	0.68	0.43	3.18	0.1142
White	-0.05	0.49	-0.10	0.9208
Multiple race/ ethnicities	-1.21	0.66	-1.83	0.0672
Other race/ ethnicity	-0.13	0.86	-0.16	0.8762
GATE	0.56	0.41	1.37	0.1711
ELL	-0.30	0.41	-0.73	0.4644
SP ED	-0.22	0.40	-0.55	0.5836
ELA CST	0.003	0.004	0.74	0.4604
Math CST z-score	-0.04	0.23	-0.17	0.8650
9th grade GPA	0.58	0.24	2.46	0.0138



Model Parameters	Coeff	SE	t	p
9th grade a-g on track	0.14	0.20	0.71	0.4796

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.

*Exhibit D9. Propensity Score Weighted HLM Results Comparing Health Pathway with Other Pathway Students, 4-year College Enrollment Outcome*

Model Parameters	Coeff	SE	t	p
<b>Fixed Effect</b>				
Intercept	-0.39	0.45	-0.86	0.3898
Treatment	-0.55	0.36	-1.52	0.1285
Female	0.05	0.32	0.15	0.881
African American	0.05	0.54	0.09	0.9317
Asian	-0.13	0.48	-0.27	0.7885
White	0.60	0.59	1.02	0.3087
Multiple race/ ethnicities	-0.82	0.86	-0.95	0.3417
Other race/ ethnicity	-0.76	0.97	-0.78	0.4352
GATE	-0.11	0.44	-0.25	0.8001
ELL	-0.52	0.63	-0.84	0.4012
SP ED	-1.19	0.61	-1.94	0.0523
ELA CST	0.01	0.00	1.28	0.2028
Math CST z-score	-0.18	0.27	-0.65	0.5174
9th grade GPA	1.33	0.36	3.7	0.0003
9th grade a-g on track	0.18	0.35	0.51	0.6088

Note. GATE= Gifted and Talented; ELL = English Language Learner; SP ED = special education.