

Gaining Early Awareness and Readiness for Undergraduate Programs-North Carolina (GEAR UP NC) Impact Analysis

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This EPIC-led analysis examines the impact that having a GEAR UP NC program in a school has on intermediate outcomes that may predict success in college as well as college enrollment and retention for students in grades served by GEAR UP NC. GEAR UP NC provides a wide range of services to students, including counseling, mentoring, college advising, college visits, and tutoring. Many of these services are provided by GEAR UP staff located at the schools who reach out to and provide support for all students in the grades being served by GEAR UP. In addition, GEAR UP NC provides professional development to school and district staff. Because GEAR UP NC services are offered to all students at GEAR UP schools in the grade levels being served and school personnel can impact many students across the school, all students in GEAR UP NC schools and grades should be thought of as being affected by GEAR UP.

From 2012-13 to 2016-17, GEAR UP NC has served students under two distinct intervention models. The Cohort Model follows groups of students starting in 7th grade and provides appropriate services as these students progress through middle and high school. The Priority Model serves 12th graders who have not previously been served by GEAR UP NC in their final year of high school as they prepare to make the transition to college.

This analysis includes students served through the cohort model in 7th grade from 2012-13 to 2015-16, 8th grade from 2013-14 to 2015-16, 9th grade from 2014-15 to 2015-16, and 10th grade during 2015-16. Outcomes from these students include standardized test scores¹ in 7th and 8th grade, standardized test scores in three high school subjects, suspensions, absences, GPA, and course taking. The analysis also includes students served through the priority model in 12th and 13th grade from 2012-13 to 2013-14.² Outcomes for these students include enrollment in the North Carolina Community College System (NCCCS) and the University of North Carolina (UNC) system as well as one-year retention rates in both systems.

Methods: Students in GEAR UP NC schools and grades are compared to two groups of comparison students in the same grades – students attending a matched set of comparison schools³ and all other students in the state. For each outcome, descriptive statistics (displayed as graphs) were produced for GEAR UP NC students and each of the comparison groups to display how the outcome has changed overtime from pretreatment years (2010-11 and 2011-12) to the present. To estimate the impact of GEAR UP NC on each outcome, difference-in-difference regression models were run comparing the change in outcome of GEAR UP NC students to the change in outcome for comparison students. Difference-in-difference models make use of data on students in treatment and comparison schools before the implementation of the GEAR UP program in order to determine if outcomes in GEAR UP NC schools improve above and beyond any improvement in similar schools. This helps to isolate the impact of GEAR UP NC from other educational changes occurring simultaneously in the state.

A difference-in-difference analysis is intended to provide a quasi-experimental estimate of the impact of the presence of GEAR UP NC on all students in schools and grades served by GEAR UP NC, irrespective of whether a particular student actually participated in any GEAR UP NC services. The comparison of

¹ All test scores in this report are standardized by test and year to have a mean of 0 and a standard deviation of 1. This allows for comparisons across time even when there are changes in the test. Changes in these test scores should be interpreted in standard deviation units.

² College enrollment outcome data was only available through spring of 2015, so the 2014-15 and 2015-16 cohorts of priority students could not be included in this analysis.

³ Comparison schools were matched based on rural locale, similar demographics, and similar performance during the 2011-12 school year (pretreatment) using 3 to 1 propensity score matching.

students in similar schools is particularly important to consider in the context of the difference-in-difference analysis because one assumption underlying the analysis is that students in the treatment and comparison groups are generally following the same trend in outcomes pretreatment. The descriptive figures illustrate that GEAR UP NC students can best be compared to other rural schools with students with similar demographics. Table 1 shows the average demographics of students in GEAR UP NC schools, similar schools, and all other schools in the state. The largest difference can be seen in the percent of students who are economically disadvantaged.

Table 1. Demographics of GEAR UP NC Students and Comparison Students

	GEAR UP NC Schools	Similar Schools	All Other Schools
White	47.7%	49.0%	53.8%
Black	33.4%	30.0%	26.5%
Hispanic	12.2%	13.6%	12.1%
Economically Disadvantaged	64.1%	61.9%	46.5%
Limited English Proficiency	3.6%	4.0%	3.9%
Identified Disability	14.5%	13.5%	12.9%
Academically and Intellectually Gifted	16.5%	12.8%	15.7%

Findings:

Test Scores

The descriptive analysis of middle school test scores (shown in Figures 1 to 5) show that test scores in GEAR UP NC schools are similar to those in similar schools but significantly lower than those in all other schools. The graphs also show some decrease in test scores in 7th grade math and reading in GEAR UP NC schools compared to other schools in the time period after the implementation of GEAR UP.

Figure 1. 7th Grade Math Scores Over Time

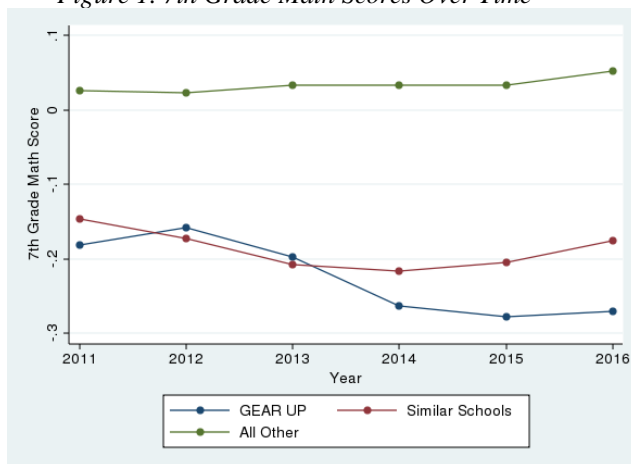


Figure 2. 7th Grade Reading Scores Over Time

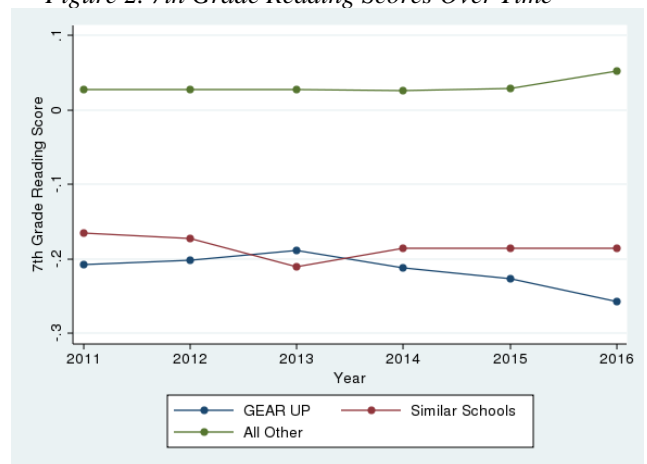


Figure 3. 8th Grade Math Over Time

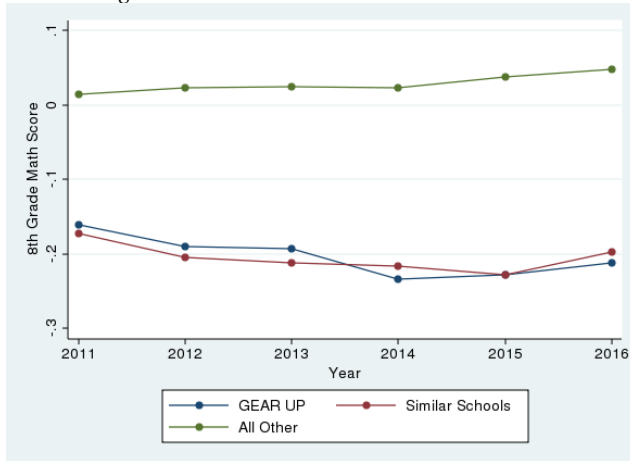


Figure 4. 8th Grade Reading Over Time

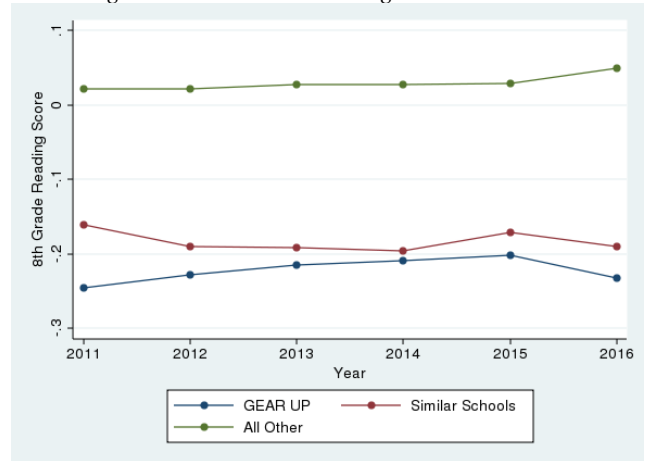
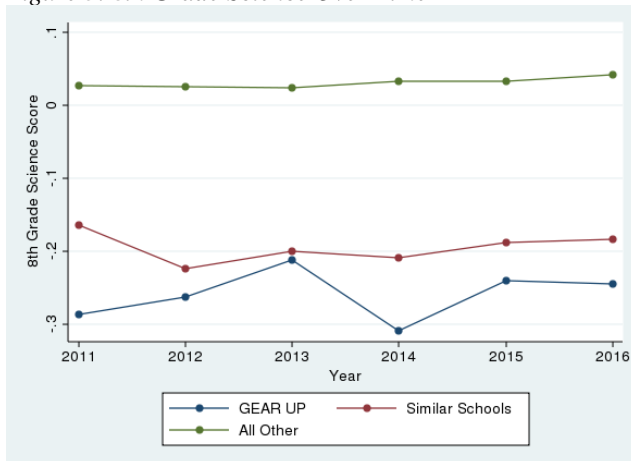


Figure 5. 8th Grade Science Over Time



Difference-in-difference analysis (Table 2) confirm the descriptive analysis by showing that the change in test scores in GEAR UP NC schools following the introduction in GEAR UP NC was not significantly different from similar schools and only different from all other schools in 7th grade math. The coefficients of interest in the difference-in-difference analysis (shown below) should be interpreted as the change in outcomes in GEAR UP NC schools after the implementation of GEAR UP beyond what would be expected based on general trends (as estimated using the comparison schools). Therefore a statistically significant coefficient indicates that the outcome in GEAR UP NC schools changed in a way that was significantly different from schools that did not receive the GEAR UP treatment. All difference-in-difference models also include controls for student demographics and have standard errors clustered at the school level.⁴

⁴ Controls in difference-in-difference models include gender, ethnicity, limited English proficiency, giftedness, disability status, economic disadvantage, and indicators for year and grade.

Table 2. Impact of GEAR UP NC on Middle School Test Scores

	7 th Grade Math	7 th Grade Reading	8 th Grade Math	8 th Grade Reading	8 th Grade Science
Compared to All Others	-0.084* (0.042)	-0.013 (0.022)	-0.042 (0.028)	0.016 (0.022)	-0.014 (0.047)
Compared to Similar Schools	-0.049 (0.048)	-0.000 (0.025)	-0.035 (0.036)	0.006 (0.027)	-0.031 (0.056)

* p-value < .05

The descriptive analysis of high school subject exams in Math I, English II, and Biology (shown in Figures 6 to 8) show that students in GEAR UP NC schools generally perform below students in other schools, but as with the middle school test scores, all student groups follow the same general trajectory.

Figure 6. Math I EOC Over Time

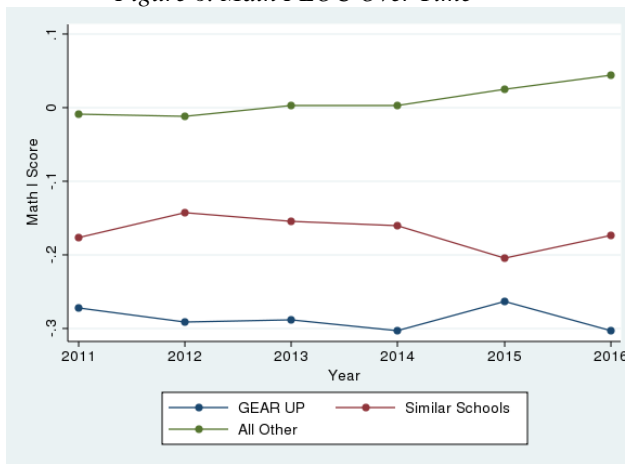


Figure 7. English II EOC Over Time

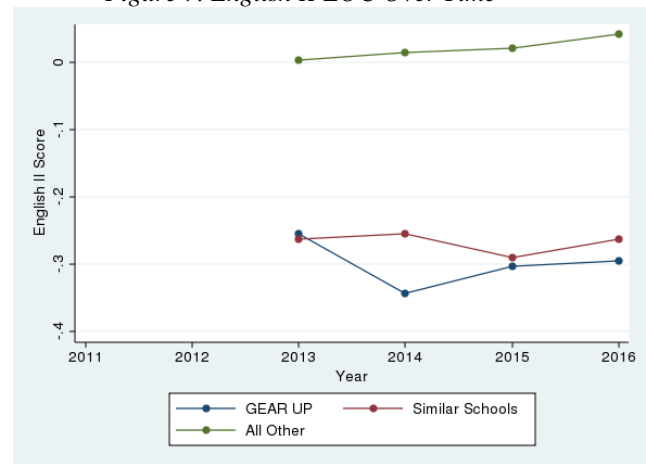
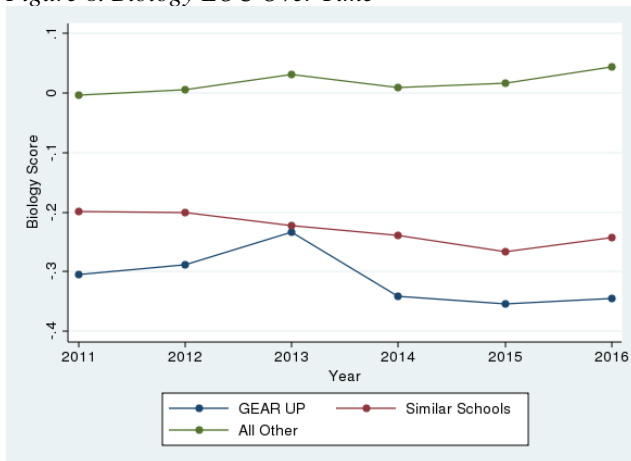


Figure 8. Biology EOC Over Time



The difference-in-difference analysis of high school subject exams (Table 3) shows that GEAR UP NC students improve at the same rate as students in similar schools in biology and English II, but lose ground

in Math I. They also lose ground relative to students in all other schools in biology following the introduction of the GEAR UP NC program.

Table 3. Impact of GEAR UP NC on High School Test Scores

	Math I	English II	Biology
Compared to All Others	-0.053	-0.031	-0.106*
	(0.028)	(0.019)	(0.052)
Compared to Similar Schools	-0.066*	-0.003	-0.042
	(0.027)	(0.028)	(0.060)

* p-value<.05

School Engagement

The descriptive analysis of school engagement outcomes – absences and suspensions (shown in Figures 9 and 10) – suggest that students in GEAR UP NC schools have more absences and are more likely to be suspended than students in other schools. However, the differences are not large and there is some evidence that the gap between GEAR UP NC schools and other schools in the number of days absent has reduced in size.

Figure 9. Number of Absences Over Time

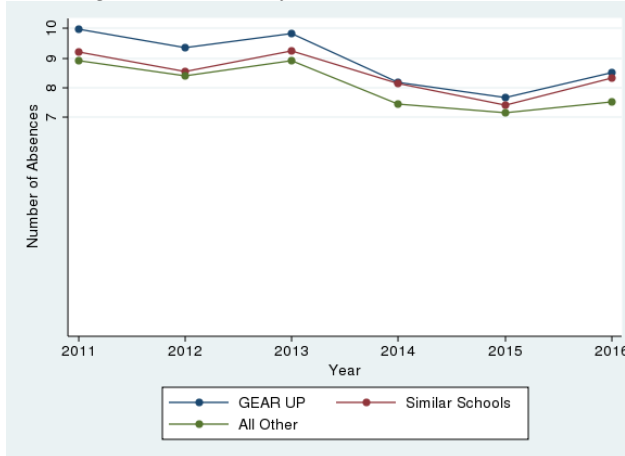
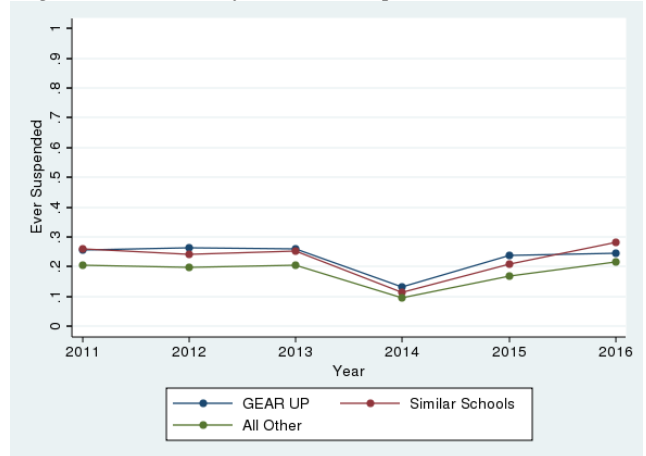


Figure 10. Percent of Students Suspended Over Time



The difference-in-difference analysis of engagement outcomes shows that the percent of students suspended has not changed between GEAR UP NC schools and other schools. However, there has been a reduction in the number of absences in GEAR UP NC schools relative to other schools, but the size of the reduction in absences is extremely small.

Table 4. Impact of GEAR UP NC on Suspensions and Absences

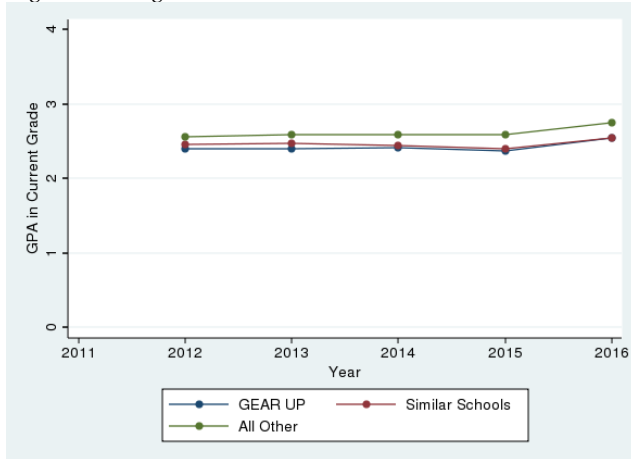
	Suspended	Days Absent
Compared to All Others	0.001	-0.000*
	(0.008)	(0.000)
Compared to Similar Schools	0.001	-0.000***
	(0.008)	(0.000)

* p-value<.05, *** p-value<.001

Grades and Course Taking

Figure 11 illustrates the change in GPA in GEAR UP NC schools relative to other groups of schools. GEAR UP NC schools and similar schools fall somewhat relative to all other schools but remain very similar to each other.

Figure 11. High School GPA Over Time



Figures 12 to 15 show passing rates in Math I and English I in 9th grade and Math II and English II in 10th grade. These specific courses were selected as key measures of whether students were on track for a college prep curriculum. The descriptive results show that the percent of students taking and passing these key courses are very similar for all three groups of schools over time.

Figure 12. Percent Passing Math I in 9th Grade.

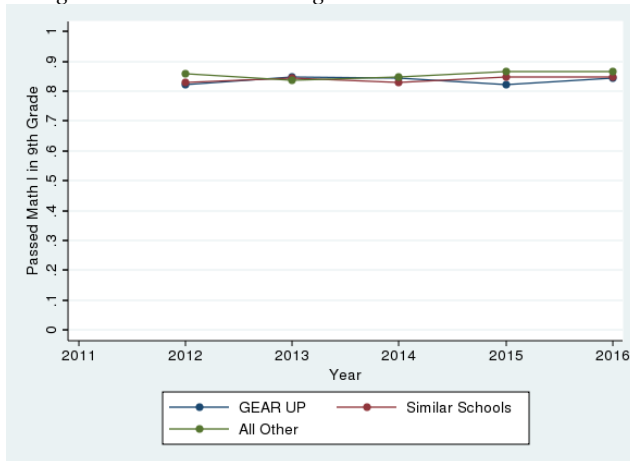


Figure 13. Percent Passing English I in 9th Grade

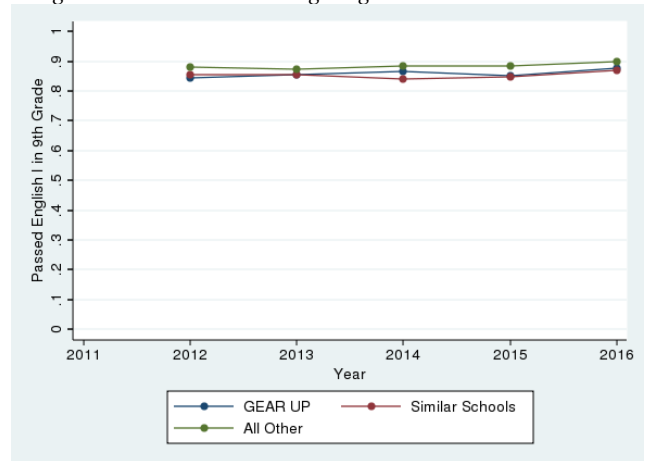


Figure 14. Percent Passing Math II in 10th Grade

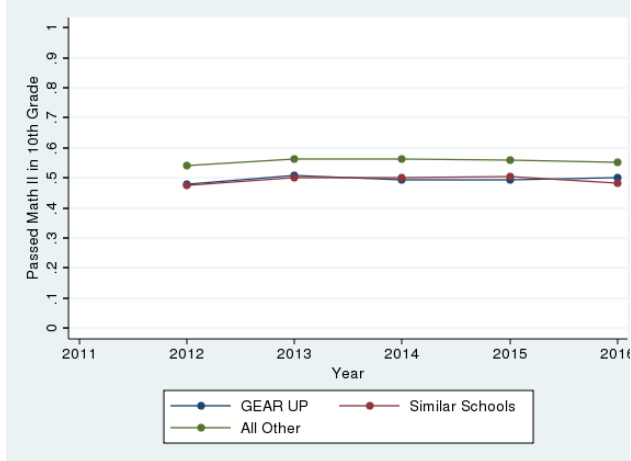
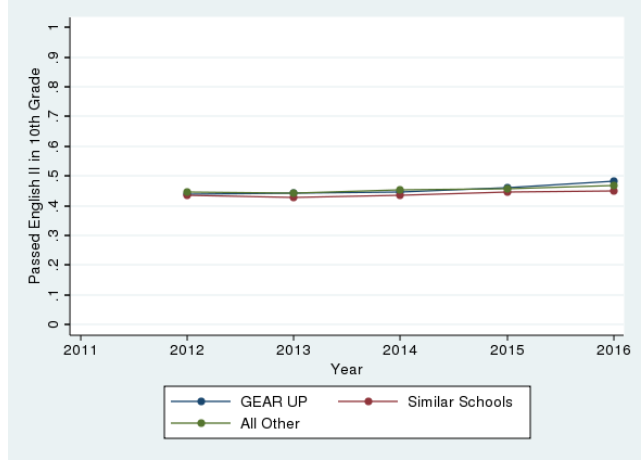


Figure 15. Percent Passing English II in 10th Grade



Difference-in-difference analysis of GPA and passing on track math and English courses (shown in Table 5) suggest that these outcomes have not changed significantly for GEAR UP NC students relative to students in similar schools. There have been small changes in the percent of GEAR UP NC students passing Math I and English II relative to students in all other schools, but these differences are in opposite directions, so it is difficult to draw overarching conclusions about changes in the likelihood of being on track.

Table 5. Impact of GEAR UP NC on GPA and Passing Key Courses

	GPA	Passed Math I in 9 th Grade	Passed English I in 9 th Grade	Passed Math II in 10 th Grade	Passed English II in 10 th Grade
Compared to All Others	-0.027	-0.028*	0.002	-0.005	0.025*
	(0.028)	(0.013)	(0.008)	(0.010)	(0.012)
Compared to Similar Schools	0.030	-0.012	0.010	0.016	0.015
	(0.033)	(0.016)	(0.012)	(0.015)	(0.015)

* p-value<.05

Figures 16 and 17 show the percentage of students in different schools who were enrolled in advanced math courses (beyond the requirement to be on track) in 9th and 10th grade.

Table 6 shows the results of difference-in-difference analyses of advanced math taking in 9th and 10th grade. The results suggest that advanced math taking in both grades in GEAR UP NC schools has remained relatively stable compared to other groups of schools.

Table 6. Impact of GEAR UP NC on Advanced Math Enrollment

	Taking Advanced Math in 9 th Grade	Taking Advanced Math in 10 th Grade
Compared to All Others	-0.013	0.020
	(0.012)	(0.013)
Compared to Similar Schools	0.008	0.019
	(0.015)	(0.017)

* p-value<.05

College Enrollment and Retention

The final measures examined in this impact analysis are college enrollment and retention measures for in-state public institutions. These measures are the ultimate outcomes of interest but are available only for students who were served in 12th grade through the priority model.

Figures 16 to 18 show that the enrollment rates of graduates from GEAR UP NC schools and similar schools are somewhat lower for UNC system institutions but overall very similar to all other schools, and the enrollment rates for all groups of schools are very stable over time.

Figure 16. Enrollment in Public Colleges Over Time

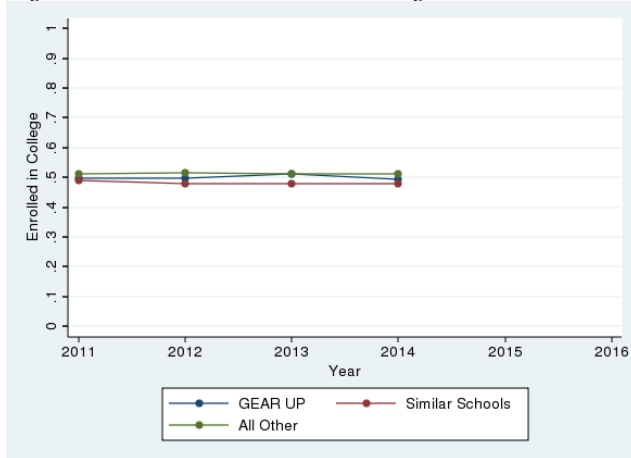


Figure 17. Enrollment in NCCCS Institutions Over Time

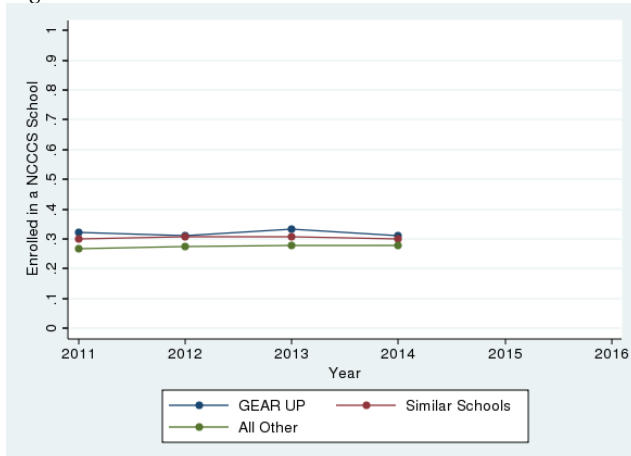
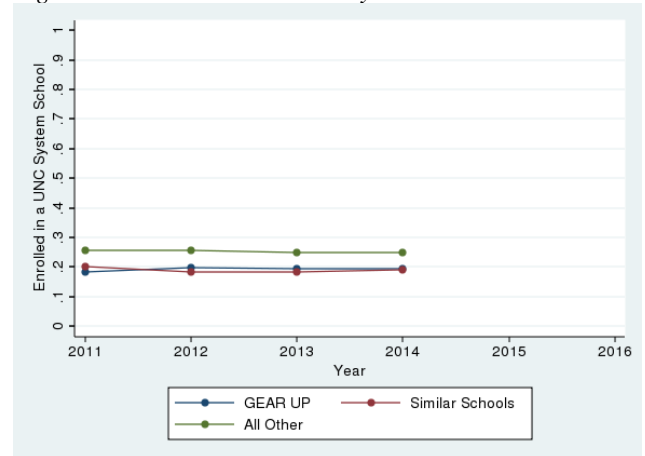


Figure 18. Enrollment in UNC System Institutions Over Time



Difference-in-difference analysis of the percentage of students enrolling in NCCCS and UNC system schools (shown in Table 7) show that the percentage of GEAR UP NC students enrolling at these institutions has not changed relative to students in the same years attending other public high schools.

Table 7. Impact of GEAR UP NC on College Enrollment

	Enrolled in Public College	Enrolled in NCCCS Institution	Enrolled in UNC System Institution
Compared to All Others	0.002 (0.009)	0.005 (0.009)	-0.001 (0.007)
Compared to Similar Schools	-0.003 (0.011)	0.006 (0.011)	-0.007 (0.008)

* p-value<.05

Figures 19 to 21 show that the retention rates of students in NC public colleges remain stable for all three groups of students over time, although the retention rates are somewhat lower for students from GEAR UP NC schools and similar schools compared to all other schools.

Figure 19. Retention in NC Public Colleges Over Time

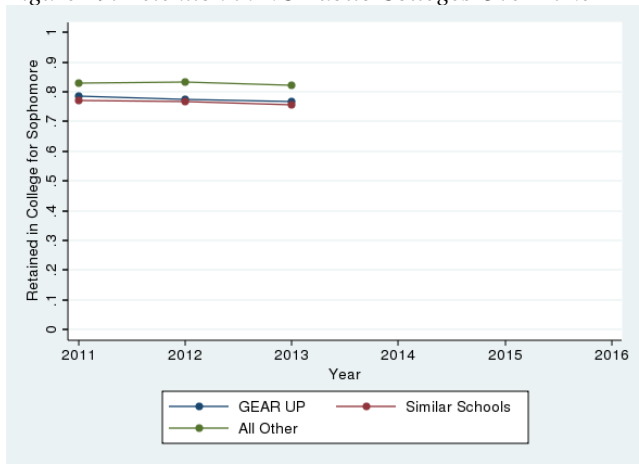


Figure 20. Retention in NCCCS Institutions Over Time

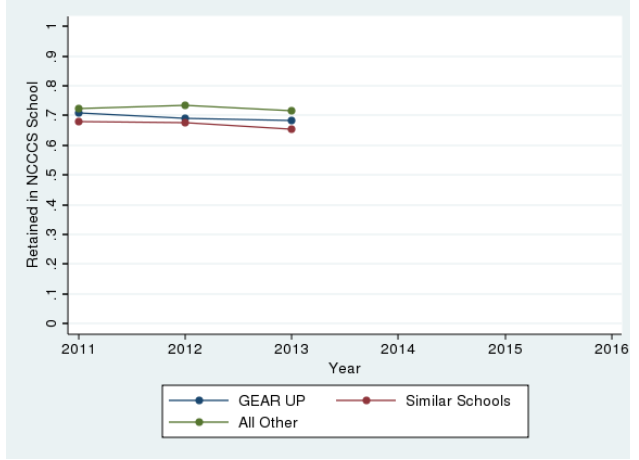


Figure 21. Retention in UNC System Institutions Over Time

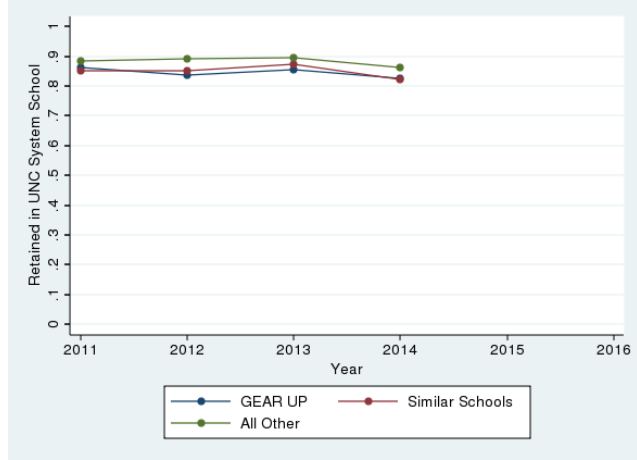


Table 8 shows that the percent of entering college students who are retained in public post-secondary institutions in North Carolina has not changed for GEAR UP NC students relative to students who attended other public high schools in North Carolina.

Table 8. Impact of GEAR UP NC on College Retention

	Retained in Public College	Retained in NCCCS Institution	Retained in UNC System Institution
Compared to All Others	-0.015	-0.006	-0.007
	(0.014)	(0.019)	(0.013)
Compared to Similar Schools	-0.013	0.004	-0.012
	(0.016)	(0.023)	(0.016)

* p-value<.05