

# High School Closures in New York City

## Impacts on Students' Academic Outcomes, Attendance, and Mobility



James J. Kemple

November 2015

## APPENDIX A: SUPPLEMENTAL TABLES

**Table A-1: Additional Attendance and Performance Outcomes for Pre-Phaseout Cohorts: Closure, Comparison, and Other NYC High Schools**

	Closure Schools	Comparison Schools	Other NYC High Schools
<b>9th Grade Outcomes</b>			
Attendance Rate	79.8	78.2	88.1 *
Chronic Absentee (%)	49.0	51.4	30.3 *
Credits Earned	7.2	7.4	10.4 *
On Track (%)	11.6	13.3	34.3 *
<b>10th Grade Outcomes</b>			
Attendance Rate	74.6	74.0	84.5 *
Credits Earned	6.4	6.5	9.3 *
On Track (%)	15.5	17.5	39.3 *
<b>11th Grade Outcomes</b>			
Attendance Rate	72.1	71.1	81.5 *
Credits Earned	6.2	6.1	8.7 *
On Track (%)	18.5	20.4	40.6 *
<b>Cumulative Outcomes (Grades 9-12)</b>			
Cumulative Attendance Rate	76.3	75.7	84.1 *
Cumulative Credits Earned	25.7	25.8	34.2 *
Regents Exams Passed at 65% or Higher	1.9	2.1	3.3 *
Graduation Rate (%)	38.7	36.8	60.6 *
<b>Diploma Type</b>			
Regents Diploma (%)	16.8	19.1	38.4 *
Local Diploma (%)	22.6	19.8	24.1
<b>Mobility through End of Grade 12 (%)</b>			
Still in 9th Grade School	45.9	42.1	58.6 *
Transferred Within NYC	12.9	15.0	11.5
Transferred Outside of NYC	20.9	20.2	17.0 *
Dropped Out	20.2	22.3	12.7 *
<b>Number of schools per closure decision year</b>	2-8	3-9	153-290
<b>Number of students per closure decision year</b>	3,378-12,692	7,799-19,514	150,000-256,687

Notes: See page 11.

**Table A-2: Adjusted Attendance and Performance Outcomes for Pre-Phaseout Cohorts: Closure, Comparison, and Other NYC High Schools**

	Closure Schools	Comparison Schools	Other NYC High Schools
<b>9th Grade Outcomes</b>			
Attendance Rate	79.8	78.2 *	84.0 *
Chronic Absentee (%)	49.0	51.3	39.5 *
Credits Earned	7.2	7.2	8.7 *
On Track (%)	11.6	11.6	21.5 *
<b>10th Grade Outcomes</b>			
Attendance Rate	74.6	73.7	79.5 *
Credits Earned	6.4	6.4	7.8 *
On Track (%)	15.5	15.7	25.8 *
<b>11th Grade Outcomes</b>			
Attendance Rate	72.1	70.8	76.4 *
Credits Earned	6.2	5.9	7.3 *
On Track (%)	18.5	18.4	27.8 *
<b>Cumulative Outcomes (Grades 9-12)</b>			
Average Attendance Rate	76.3	75.2	79.7 *
Credits Earned	31.7	31.2	34.8
Regents Exams Passed at 65% or Higher	1.9	1.9	2.4 *
Graduation Rate (%)	38.7	35.6	48.8 *
<b>Diploma Type</b>			
Regents Diploma (%)	16.8	16.7	26.3 *
Local Diploma (%)	22.6	20.2	24.4
<b>Mobility through End of Grade 12 (%)</b>			
Still in 9th Grade School	45.9	41.0	51.0 *
Transferred Within NYC	12.9	15.2	12.0
Transferred Outside of NYC	20.9	20.5	19.2 *
Dropped Out	20.2	22.8 *	17.7 *
<b>Number of schools per closure decision year</b>	2-8	3-9	153-290
<b>Number of students per closure decision year</b>	3,378-12,692	7,799-19,514	150,000-256,687

Notes: See page 11.

**Table A-3: Additional Impacts on Student Performance, Attendance, and Mobility:  
Phaseout Cohort**

	Baseline Projection	Phaseout School Change	Comparison School Change	Estimated Impact
<b>9th Grade Outcomes</b>				
Attendance Rate	80.2	-0.4	-0.6	0.2
Chronic Absentee (%)	50.4	-0.3	-0.7	0.5
Credits Earned	7.3	0.3	0.1	0.2
On Track (%)	13.7	2.7	2.9	-0.2
<b>10th Grade Outcomes</b>				
Attendance Rate	75.0	-0.2	0.5	-0.6
Credits Earned	7.2	0.3	0.3	0.0
On Track (%)	16.8	4.8 *	5.2 *	-0.4
<b>11th Grade Outcomes</b>				
Attendance Rate	70.0	2.4	2.8 *	-0.4
Credits Earned	7.1	0.1	0.2	0.0
On Track (%)	21.7	5.6 *	7.5 *	-1.9
<b>Cumulative Outcomes (Grades 9-12)</b>				
Average Attendance Rate (%)	71.9	2.7 *	3.2 *	-0.5
Credits Earned	28.1	0.6	3.1 *	-2.5
Regents Exams Passed at 65% or Higher	2.1	0.4 *	0.6 *	-0.2
Graduation Rate (%)	39.2	6.5 *	1.4	5.0
<b>Diploma Type</b>				
Regents Diploma (%)	14.6	19.1 *	10.6 *	8.5
Local Diploma (%)	25.5	-9.4 *	-7.4 *	-2.0
<b>Mobility through End of Grade 12 (%)</b>				
Still in 9th Grade School	41.9	-6.9	2.6	-9.5 *
Transferred Within NYC	17.0	8.6 *	-0.9	9.5 *
Transferred Outside of NYC	24.7	-5.0 *	-6.0 *	0.9
Dropped Out	19.5	0.1	0.1	0.0
<b>Number of schools per closure decision year</b>				
	5-17	2-8	3-9	
<b>Number of students per closure decision year</b>				
	11,379- 26,795	547-3,740	1,579-5,104	

Notes: See page 11.

**Table A-4: Changes in Characteristics of Non-Mobile Students in the Phaseout Cohort**

	Baseline Projection	Phaseout School Change	Comparison School Change	Estimated Impact
<b>Gender (%)</b>				
Female	48.4	-1.0	-1.4	0.4
Male	51.6	1.0	1.4	-0.4
<b>Ethnicity (%)</b>				
Latino	39.2	0.9	0.0	0.9
Black	53.3	-0.8	-0.7	0.0
White	1.6	0.4	0.2	0.2
Asian	5.1	-0.8	0.7	-1.4
Other	0.9	0.2	-0.1	0.3
<b>Home Language is Not English (%)</b>	43.3	-0.9	0.9	-1.8
<b>School Services (%)</b>				
Eligible for Free or Reduced Price Lunch	59.4	2.9	1.7	1.2
Received English Language Learning Services	11.7	0.0	-0.5	0.5
Received Special Education Services	9.2	-0.4	0.2	-0.5
<b>Enrolled in a NYC School in Grade 8</b>	79.4	1.2	-1.3	2.4
<b>Grade 8 Attendance</b>				
Data Missing (%)	20.4	-0.3	1.0	-1.3
Attendance Rate	86.4	-0.7	-0.1	-0.5
Chronic Absentee (%)	43.3	-1.1	0.5	-1.6
<b>Grade 8 City-Wide ELA/Math Performance Group (%)</b>				
Data Missing	24.2	0.8	1.3	-0.5
ELA or Math in Bottom 20%	42.2	0.0	0.6	-0.7
ELA and Math in Middle 60%	52.8	-0.7	-1.1	0.3
ELA or Math in Top 20%	4.7	1.0	0.5	0.5
<b>Overage for Grade 9 (%)</b>	47.8	-0.9	0.9	-1.8
<b>Number of schools per closure decision year</b>	5-17	2-8	3-9	
<b>Number of students per closure decision year</b>	5,932-14,177	240-1,643	801-2,696	

Notes: See page 11.

**Table A-5: Additional Impacts on Student Performance and Attendance:  
Non-Mobile Students in the Phaseout Cohort**

	Baseline Projection	Phaseout School Change	Comparison School Change	Estimated Impact
<b>9th Grade Outcomes</b>				
Attendance Rate	83.8	-1.4	-0.4	-1.0
Chronic Absentee	41.4	0.8	0.3	0.5
Credits Earned	8.5	0.3	0.0	0.3
On Track	17.1	3.2	3.0	0.2
<b>10th Grade Outcomes</b>				
Attendance Rate	79.5	-0.9	0.9	-1.8
Credits Earned	9.0	0.2	0.0	0.2
On Track	23.9	6.1 *	5.6 *	0.5
<b>11th Grade Outcomes</b>				
Attendance Rate	74.7	2.2	2.1	0.2
Credits Earned	9.4	0.1	-0.3	0.4
On Track	32.1	7.5	8.3 *	-0.8
<b>Cumulative Outcomes (Grades 9-12)</b>				
Average Attendance Rate (%)	73.4	3.2	4.2 *	-1.0
Credits Earned	35.2	-0.1	2.1	-2.1
Regents Exams Passed at 65% or Higher	2.8	0.4	0.6 *	-0.2
Graduation Rate (%)	42.0	11.4 *	0.0	11.4 *
<b>Diploma Type</b>				
Regents Diploma (%)	15.1	23.1 *	14.9 *	8.1
Local Diploma (%)	28.2	-9.4	-10.0 *	0.7
Dropped out (%)	26.3	0.8	-2.0	2.8
<b>Number of schools per closure decision year</b>				
	5-17	2-8	3-9	
<b>Number of students per closure decision year</b>				
	5,932-14,177	240-1,643	801-2,696	

Notes: See [page 11](#).

**Table A-6: Changes in Characteristics of Mobile Students in the Phaseout Cohort**

	Baseline Projection	Phaseout School Change	Comparison School Change	Estimated Impact
<b>Gender (%)</b>				
Female	51.0	-2.5	-0.1	-2.4
Male	49.0	2.5	0.1	2.4
<b>Ethnicity (%)</b>				
Latino	35.3	1.1	1.5	-0.4
Black	57.6	-1.2	-2.0	0.8
White	0.6	1.2 *	0.0	1.2
Asian	5.7	-0.9	0.5	-1.4
Other	0.7	-0.1	0.1	-0.1
<b>Home Language is Not English (%)</b>	35.3	1.3	1.6	-0.3
<b>School Services (%)</b>				
Eligible for Free or Reduced Price Lunch	62.7	4.8 *	1.3	3.5
Received English Language Learning Services	8.4	1.9	0.1	1.8
Received Special Education Services	10.5	-0.7	0.0	-0.6
<b>Enrolled in a NYC School in Grade 8</b>	85.1	3.0	-1.0	4.0 *
<b>Grade 8 Attendance</b>				
Data Missing (%)	15.0	-2.8 *	0.8	-3.5
Attendance Rate	84.8	0.5	-0.6	1.1
Chronic Absentee (%)	49.5	-0.2	0.4	-0.7
<b>Grade 8 City-Wide ELA/Math Performance Group (%)</b>				
Data Missing	18.5	-2.0	0.5	-2.5
ELA or Math in Bottom 20%	45.4	-1.8	-0.4	-1.3
ELA and Math in Middle 60%	49.9	1.8	0.0	1.7
ELA or Math in Top 20%	4.7	0.0	0.2	-0.2
<b>Overage for Grade 9 (%)</b>	41.9	0.3	1.0	-0.7
<b>Number of schools per closure decision year</b>	5-17	2-8	3-9	
<b>Number of students per closure decision year</b>	2,855-6,871	189-1,291	342-1,259	

Notes: See page 11.

**Table A-7: Additional Impacts on Student Performance and Attendance:  
Mobile Students in the Phaseout Cohort**

	<b>Baseline Projection</b>	<b>Phaseout School Change</b>	<b>Comparison School Change</b>	<b>Estimated Impact</b>
<b>9th Grade Outcomes</b>				
Attendance Rate	78.6	-0.2	-1.5	1.4
Chronic Absentee	57.9	-1.4	-0.7	-0.8
Credits Earned	6.8	0.3	0.1	0.1
On Track	11.2	3.4	2.0	1.4
<b>10th Grade Outcomes</b>				
Attendance Rate	71.8	1.2	-0.7	1.9
Credits Earned	7.2	-0.1	0.0	-0.1
On Track	13.5	3.5	4.5 *	-1.1
<b>11th Grade Outcomes</b>				
Attendance Rate	65.2	4.5 *	3.1	1.5
Credits Earned	7.9	-0.6	-0.1	-0.5
On Track	17.3	5.2	4.4	0.9
<b>Cumulative Outcomes (Grades 9-12)</b>				
Average Attendance Rate (%)	67.6	3.5	2.8	0.7
Credits Earned	30.2	-1.3	1.1	-2.4
Regents Exams Passed at 65% or Higher	2.1	0.5 *	0.5 *	0.0
Graduation Rate (%)	28.4	4.9	6.5 *	-1.6
<b>Diploma Type</b>				
Regents Diploma (%)	12.1	15.0 *	7.8 *	7.1
Local Diploma (%)	18.0	-6.2 *	-2.4	-3.7
Dropped out (%)	23.1	-0.6	-2.2	1.6
<b>Number of schools per closure decision year</b>				
	5-17	2-8	3-9	
<b>Number of students per closure decision year</b>				
	2,855-6,871	189-1,291	342-1,259	

Notes: See page 11.



**Table A-8: Background Characteristics of Students in the Pre-Phaseout and Post-Closure Cohorts**

	Pre-Phaseout Cohort	Post-Closure Cohort	Difference	
<b>Gender (%)</b>				
Female	48.0	46.9	1.1	
Male	52.0	53.1	-1.1	
<b>Ethnicity (%)</b>				
Latino	39.5	40.3	-0.8	
Black	53.3	53.2	0.1	
White	1.8	1.8	-0.1	
Asian	4.7	4.2	0.5	
Other	0.7	0.5	0.3	
<b>Home Language is Not English (%)</b>	40.8	41.4	-0.6	
<b>School Services (%)</b>				
Eligible for Free or Reduced Price Lunch	64.6	63.6	1.1	
Received English Language Learning Services	11.1	11.9	-0.8	
Received Special Education Services	10.3	10.7	-0.4	
<b>Enrolled in a NYC School in Grade 8</b>	82.5	82.5	0.0	
<b>Grade 8 Attendance</b>				
Data Missing (%)	18.4	18.6	-0.2	
Attendance Rate	85.7	87.0	-1.3	*
Chronic Absentee (%)	46.4	39.9	6.5	*
<b>Grade 8 City-Wide ELA/Math Performance Group (%)</b>				
Data Missing	22.9	21.4	1.5	*
ELA or Math in Bottom 20%	44.7	44.0	0.7	
ELA and Math in Middle 60%	50.2	48.3	1.9	
ELA or Math in Top 20%	5.0	7.7	-2.7	*
<b>Overage for Grade 9 (%)</b>	45.2	45.7	-0.6	
<b>Average Number of Students per Cohort</b>	11,460	11,460		

Notes: See page 11.

**Table A-9: Background Characteristics and 8<sup>th</sup> Grade Outcomes:  
Closed Schools and Schools Attended by Post-Closure Cohorts**

	Closed Schools	Schools Attended by Post-Closure Cohort
<b>Average Number of First-Time 9th Graders</b>	464	371
<b>Gender (%)</b>		
Female	47.7	50.8
Male	52.3	49.2
<b>Ethnicity (%)</b>		
Latino	38.4	40.7
Black	53.8	44.4
White	1.8	6.3
Asian	5.2	7.5
Other	0.8	1.1
<b>Home Language is Not English (%)</b>	41.4	43.6
<b>School Services (%)</b>		
Eligible for Free or Reduced Price Lunch	65.1	65.4
Received English Language Learning Services	11.2	10.5
Received Special Education Services	10.0	9.6
<b>Enrolled in a NYC School in Grade 8</b>	82.3	89.8
<b>Grade 8 Attendance</b>		
Data Missing (%)	18.4	12.8
Attendance Rate	85.6	89.4
Chronic Absentee (%)	46.0	33.1
<b>Grade 8 City-Wide ELA/Math Performance Group (%)</b>		
Data Missing	23.7	15.4
ELA or Math in Bottom 20%	43.9	31.9
ELA and Math in Middle 60%	51.0	53.8
ELA or Math in Top 20%	5.1	14.3
<b>Overage for Grade 9 (%)</b>	44.8	33.1
<b>Number of Schools</b>	29	374

Notes: See page 11.

**Table A-10: Additional Impacts on Performance, Attendance and Mobility: Post-Closure Cohort**

	Baseline Projection	Post- Closure Change	Comparison Change	Estimated Impact
<b>9th Grade Outcomes</b>				
Attendance Rate	82.0	1.8	-1.6	3.4 *
Chronic Absentee (%)	48.6	-6.8 *	0.7	-7.5 *
Credits Earned	7.6	2.1 *	0.1	2.0 *
On Track (%)	14.8	10.8 *	5.9 *	4.9
<b>10th Grade Outcomes</b>				
Attendance Rate	76.3	3.5 *	-0.5	3.9 *
Credits Earned	7.6	1.4 *	0.3	1.1 *
On Track (%)	17.5	14.7 *	7.6 *	7.1 *
<b>11th Grade Outcomes</b>				
Attendance Rate	70.1	7.4 *	3.6 *	3.8
Credits Earned	7.6	0.9	-0.1	1.0
On Track (%)	22.5	14.7 *	8.8 *	5.9
<b>Cumulative Outcomes (Grades 9-12)</b>				
Average Attendance Rate (%)	72.6	6.3 *	4.1 *	2.2
Credits Earned	29.5	5.1 *	3.0 *	2.1
Regents Exams Passed at 65% or Higher	2.2	1.0 *	0.8 *	0.2
Graduation Rate (%)	40.4	15.5 *	0.4	15.1 *
<b>Diploma Type</b>				
Regents Diploma (%)	12.0	33.7 *	16.3 *	17.4 *
Local Diploma (%)	26.8	-16.4 *	-14.6 *	-1.9
<b>Mobility through End of Grade 12 (%)</b>				
Still in 9th Grade School	43.5	10.5 *	4.0	6.5
Transferred Within NYC	18.2	-5.3 *	-2.9	-2.4
Transferred Outside of NYC	25.7	-9.9 *	-9.0 *	-0.9
Dropped Out	17.8	-3.7	-0.7	-2.9
<b>Number of schools per closure decision year</b>	5-17	2-8	3-9	
<b>Number of students per closure decision year</b>	11,379-26,795	568-5,303	1,184-5,303	

Notes: See page 11.

## Table Notes

### General Table and Figure Notes

#### Source:

Research Alliance calculations using NYC Department of Education administrative records from the 1999-2000 to the 2012-2013 school years.

#### Sample Information:

See Appendix B.

#### Variable Definitions and Notes:

Attendance rate: The number of days a student was present divided by the number of days that a student was enrolled in a New York City public school times 100.

Chronic absentee: An attendance rate of less than 89 percent (equivalent to being absent for about one month of a full nine-month school year).

Credits earned: Calculated for all students through the point at which they graduated, dropped out or transferred outside of New York City.

Dropped out: Students who left the NYC public school system with no record of re-enrollment in another school, in or out of the NYC public school system.

Eligible for Free or Reduced Price Lunch: Includes students who: (1) have records documenting eligibility for free or reduced price lunch in grade 8 or 9, (2) provided documentation to the DOE of eligibility for federal public assistance, or (3) attended a school in which all students were provided with the option for free or reduced price lunch.

#### Grade 8 City-Wide ELA/Math Performance Group:

- *ELA or math in bottom 20%*: Student's grade 8 ELA or math assessment scaled score was in the bottom 20<sup>th</sup> percentile of scores of first-time 9<sup>th</sup> graders from that cohort *and* the other grade 8 state test scaled score (math or ELA) was not above the 50<sup>th</sup> percentile of scores of first-time 9<sup>th</sup> graders from that cohort.
- *ELA and math in middle 60%*: Student's grade 8 ELA and math assessment scaled scores were both between the bottom 20<sup>th</sup> percentile and the top 20<sup>th</sup> percentile of scores of first-time 9<sup>th</sup> graders in that cohort. Or, student was in top 20<sup>th</sup> percentile for either ELA or math and in the bottom 20<sup>th</sup> percentile for the other.
- *ELA or math in top 20%*: Student's grade 8 ELA or math assessment scale score was in the top 20<sup>th</sup> percentile of scores of 9<sup>th</sup> graders from that cohort *and* the other grade 8 state test scaled score (math or ELA) was not below the 50<sup>th</sup> percentile of scores of first-time 9<sup>th</sup> graders from that cohort.

Graduation rates: Calculated using criteria consistent with the New York State Education Department and the New York City Department of Education. Graduates include those who earned a local diploma or a New York State Regents Diploma. Like the NYSED and NYC DOE calculations, graduates include those who earned a diploma over the summer following the scheduled 12th grade year. Students who transferred outside of the New York City school system are not included in the calculation of graduation rates. See Regents and local diploma requirements at <http://schools.nyc.gov/RulesPolicies/GraduationRequirements/default.htm>.

On track (9<sup>th</sup> grade): Earned 10 or more course credits and passed at least one Regents Examination with a 65 or higher during the first year of high school.

On track (10<sup>th</sup> grade): Earned 22 or more course credits and passed at least two Regents Examinations with a 65 or higher during the two years of high school.

On track (11<sup>th</sup> grade): Earned 33 or more course credits and passed at least three Regents Examinations with a 65 or higher during the first three years of high school.

Overage for grade 9: Student was age 15 or older as of December 31 of the year in which the student first entered 9<sup>th</sup> grade. While some of these students may have entered school late (e.g., at age 6 or older in kindergarten), more than 95 percent had been retained in at least one grade prior to enrolling in high school.

Received English Language Learning Services: Student's school records indicate a referral for any English language learning services in grade 8 or 9. (Used 9<sup>th</sup> grade data if student was not enrolled in a NYC public school in 8<sup>th</sup> grade).

Received Special Education Services: Student school records include Individual Education Plans (IEPs) for learning or behavioral disabilities that can be accommodated in regular education classrooms. (Used 9<sup>th</sup> grade data if student was not enrolled in a NYC public school in 8<sup>th</sup> grade).

Regents examinations passed at 65% or higher: Calculated for all students through the point at which they graduated, dropped out or transferred outside of New York City.

### **Table Notes:**

Table A-1: Averages are calculated across schools for each year, up to four years prior to each closure decision year. These are then averaged across the closure decision years from 2002 through 2008.

Sample sizes are presented as ranges based on the number of schools in each closure decision year (see Table 1 in the full report).

A two-tailed t-test was applied to differences between closure schools and comparison schools and between closure schools and other schools. The statistical significance level is indicated as \* =  $p \leq .05$ .

Table A-2: Differences in outcomes between closure schools and comparison schools and between closure schools and other schools have been regression adjusted to account for differences in background characteristics and prior performance including: race/ethnicity, gender, home language, eligibility of free or reduced price lunch, receipt of English language learning and special education services, grade 8 attendance rates, grade 8 math and English language arts test scores, and whether the student was over age for grade at the start of 9<sup>th</sup> grade.

A two-tailed t-test was applied to difference between closure schools and comparison schools and between closure schools and other schools. The statistical significance level is indicated as \* =  $p\text{-value} \leq .05$ .

Tables A-3, A-5, and A-7: Baseline trends were estimated for outcomes that were observed over two to four years prior to the closure decision. The baseline projections are estimates of the extension of these trends for up to three years following the closure decision. The baseline projection estimates in the table correspond to the year in which the last cohort of 9<sup>th</sup> graders to enroll in the closure schools reached the relevant grade level. Therefore, baseline projection estimates for Grade 9 outcomes are presented for the first year following the closure decision. Baseline projection estimates for Grade 10 outcomes are presented for the second year following the closure decision. Baseline projection estimates for Grade 11, 12, and cumulative outcomes are presented for the third year following the closure decision.

The baseline projections in the table have been regression adjusted to account for differences between closure schools and comparison schools in their respective trends during the pre-phaseout period. They are also adjusted for differences over time and between schools in student demographic and prior performance characteristics. For ease of comparison, the baseline projections are centered on the characteristics and trends of the schools designated for closure.

Sample sizes are presented as ranges based on the number of schools in each closure decision year (see Table 1 in the full report).

A two-tailed t-test was applied to the phaseout school changes (relative to the baseline projection), to the comparison school change (relative to the baseline projection), and to the estimated impact (the difference between the phaseout and comparison school changes). The statistical significance level is indicated as \* =  $p \leq .05$ .

Due to data limitations, impacts on cumulative outcomes are only available for schools that faced a closure decision between 2003 and 2008. Due to data limitations, impacts on Regents and Local diploma receipt rates are only available for schools that faced a closure decision between 2005 and 2008.

Tables A-4 and A-5: Non-mobile students include those who remained enrolled in their original 9<sup>th</sup> grade high school through graduation, the end of their 12<sup>th</sup> grade year, or the year in which they dropped out of high school.

Tables A-6 and A-7: Mobile students include those who transferred from their original 9<sup>th</sup> grade high school to another New York City high school prior to graduation, the end of their 12<sup>th</sup> grade year, or dropping out. Mobile students do not include students who transferred to a high school outside of New York City.

Tables A-4 and A-6: Baseline trends were estimated for outcomes that were observed over two to four years prior to the closure decision. The baseline projection estimates in the table correspond to the year in which the last cohort of 9<sup>th</sup> graders to enroll in the closure schools reached the relevant grade level. Therefore, baseline projection estimates for Grade 8 outcomes are presented for the year prior to the closure decision.

The baseline projections in the table have been regression adjusted to account for differences between closure schools and comparison schools in their respective trends during the pre-phaseout period. They are also adjusted for differences over time and between schools in student demographic and prior performance characteristics. For ease of comparison, the baseline projections are centered on the characteristics and trends of the schools designated for closure.

Sample sizes are presented as ranges based on the number of schools in each closure decision year (see Table 1 in the full report).

A two-tailed t-test was applied to the phaseout school changes (relative to the baseline projection), to the comparison school change (relative to the baseline projection), and to the estimated impact (the difference between the phaseout and comparison school changes). The statistical significance level is indicated as \* =  $p \leq .05$ .

Table A-8: The pre-phaseout cohort includes first-time 9<sup>th</sup> graders who enrolled in a closure school in the year prior to the closure decision. The post-closure cohort was identified through a matching process described on page 41 of the full report.

A two-tailed t-test was applied to differences between the pre-phaseout and post-closure cohorts. The statistical significance level is indicated as \* =  $p\text{-value} \leq .05$ .

Table A-9: Characteristics of the closed schools are taken from Table 3 in the full report. Characteristics for the schools attended by the post-closure high schools are based on those for students who enrolled in those schools in the year prior to the enrollment of the post-closure cohort. Averages are weighted by the number of post-closure cohort students in each school. This means that outcomes for schools which enrolled a large number of students from the post-closure cohort are given more weight than those for schools with only a few students from the post-closure cohort.

Tests of statistical significance were not performed for the comparison between the closed schools and the schools attended by the post-closure cohort.

Table A-10: Baseline trends were estimated for outcomes at each expected grade level over two to four years prior to each closure decision year. The baseline projections are estimates of the extension of these trends for up

to four years following the closure decision. The baseline projection estimates presented in the table correspond to the year in which the post-closure cohort reached the relevant grade level. Baseline projection estimates for Grade 9 outcomes are presented for the second year following the closure decision. Baseline projection estimates for Grade 10 outcomes are presented for the third year following the closure decision. Baseline projection estimates for Grade 11, 12, and cumulative outcomes are presented for the fourth year following the closure decision.

The baseline projections presented in the table have been regression adjusted to account for differences between closing schools and comparison schools in their respective trends during the pre-phaseout period. They are also adjusted for differences over time and between schools in student demographic characteristics and prior performance. For ease of comparison, the baseline projections are centered on the characteristics and trends of the schools designated for closure.

Sample sizes are presented as ranges based on the number of schools in each closure decision year (see Table 1 in the full report). Students in the post-closure cohort are considered to be clustered based on the closed high schools on which the matched comparison was based. The sample sizes for the post-closure cohort reflect this clustering approach.

A two-tailed t-test was applied to the post-closure change (relative to the baseline projection), to the comparison change (relative to the baseline projection), and to the estimated impact (the difference between the post-closure and comparison school changes). The statistical significance level is indicated as \* =  $p \leq .05$ .

Due to data limitations, impacts on cumulative outcomes are only available for schools that were designated for closure between 2003 and 2008. Due to data limitations, impact on Regents and Local diploma receipt cumulative outcomes are only available for schools that were designated for closure between 2005 and 2008.

## APPENDIX B: SAMPLE DEFINITION

The sample for this report includes students who enrolled in 9<sup>th</sup> grade in a New York City high school for the first time between 1999 and 2009. The data include information on these students through the end of their 12<sup>th</sup> grade year (including scheduled graduation), the year in which they dropped out of high school, or the year in which they transferred outside of the New York City public schools. However, Regents and Local diploma attainment data are incomplete for students who entered high school prior to 2001.

With the following exceptions, the sample includes all schools that enrolled first-time 9<sup>th</sup> grade students between 1999 and 2009. The sample does not include: (1) High schools that were scheduled for closure prior to 2002, because our database does not include sufficient historical information on these schools. (2) New schools that had not yet enrolled at least two cohorts of incoming 9<sup>th</sup> graders between 2000 and 2008. This is because the primary analytic methods used in the study are based on trends in student outcomes over several years prior to a decision to close a school. (3) NYC's nine specialized high schools, because we determined that these highly selective high schools do not provide relevant comparisons with the low-performing schools that serve as the main focus of this study. (4) Schools designated exclusively for students requiring full-time special education services (i.e., District 75 schools), which include ungraded students for whom it is not possible to identify a 9<sup>th</sup>-grade year.

Averages and trends for the periods prior to a closure decision are calculated based the expected grade levels of first-time 9<sup>th</sup> graders who enrolled in the schools prior to the closure decision year. For example, pre-phaseout Grade 9 outcomes for the 2006 closure decision year are based on students who were in Grade 9 in 2002, 2003, 2004, or 2005. Pre-phaseout Grade 10 outcomes for the 2006 closure decision year are based on students who were scheduled to be in Grade 10 in 2002, 2003, 2004, or 2005 (i.e., first-time 9<sup>th</sup> graders in 2001, 2002, 2003, or 2004, respectively). Because data are available for first-time 9<sup>th</sup> graders starting in 1999, the number of pre-phaseout cohorts for each expected grade level differs by the closure decision year as follows:

### **8<sup>th</sup> grade outcomes and demographic characteristics:**

- Closure Decision Year 2002: 3 pre-phaseout cohorts
- Closure Decision Years 2003-2008: 4 pre-phaseout cohorts

### **9<sup>th</sup> grade outcomes:**

- Closure Decision Year 2002: 3 pre-phaseout cohorts
- Closure Decision Years 2003-2008: 4 pre-phaseout cohorts

### **10<sup>th</sup> grade outcomes:**

- Closure Decision Year 2002: 2 pre-phaseout cohorts
- Closure Decision Year 2003: 3 pre-phaseout cohorts
- Closure Decision Years 2004-2008: 4 pre-phaseout cohorts

### **11<sup>th</sup>, 12, and Cumulative outcomes**

- Closure Decision Year 2002: 1 pre-phaseout cohort
- Closure Decision Year 2003: 2 pre-phaseout cohorts
- Closure Decision Year 2004: 3 pre-phaseout cohorts
- Closure Decision Years 2005-2008: 4 pre-phaseout cohorts

### **Regents/Local diploma outcomes:**

- Closure Decision Year 2002-2003: 0 pre-phaseout cohorts (these schools were omitted from analyses of Regents and local diploma rates)



- Closure Decision Year 2004: 1 pre-phaseout cohort
- Closure Decision Year 2005: 2 pre-phaseout cohorts
- Closure Decision Years 2006: 3 pre-phaseout cohorts
- Closure Decision Years 2007-2008: 4 pre-phaseout cohorts

## APPENDIX C: STATISTICAL MODELS USED TO ESTIMATE IMPACTS OF HIGH SCHOOL CLOSURES

This appendix provides the technical specifications of the statistical models that were used to generate the estimates underlying the impact findings in Chapters 4 and 5 of the full report.

Chapter 4 describes the logic and general analytic strategy behind the comparative interrupted time series (CITS) analysis used to estimate the impacts of high school closures in NYC. That chapter provides an overview of how we used the CITS approach to estimate impacts of a closure decision on students who were enrolled in schools during the phaseout process. Chapter 5 provides the basic logic behind an extension of the CITS approach used to estimate impacts of closures on students who were likely to have enrolled in the closed schools, had the schools remained open. In addition to the technical specifications of the models used in both sets of impact analyses, this appendix also presents the analytic models used to identify the post-closure group of students included in the analysis for Chapter 5.

### Estimating Impacts on Student Outcomes During the Phaseout Process

The CITS analyses underlying the findings presented in Chapter 4 are based on multi-level regression models that estimate differences in changes over time between outcomes for students in the closure schools and outcomes for students in matched comparison schools.<sup>i</sup> Specifically, the models estimate trends in student outcomes during the years leading up to the closure decisions, as well as deviations from those trends for students enrolled in the schools after a closure decision and during the phaseout process. The trends and deviations for comparison schools reflect the influence of other factors on low-performing schools during the same period. The differences in deviations from historical trends between closure schools and comparison schools represent the impact of the closure decision over and above other potential influences.

The multi-level structure of the models accounts for the fact that the outcomes are measured for clusters of students in each school year and each school. It is important to account for such clustering because the variation in student outcomes is likely to be influenced, at least partially, by the particular school year and the particular school within which students are clustered. If this source of variation were ignored, then the estimates generated by the analysis would appear to have less variability and more precision than they actually have. In other words, the estimates might appear to be statistically significant when, in fact, they are not.

For example, the CITS analysis of impacts on 9<sup>th</sup> grade student outcomes found in Chapter 4 estimates the following multi-level model for students enrolled in the closure schools during the phaseout period:<sup>ii</sup>

$$Y_{ijt} = \beta_0 + \beta_1 RELYR_{jt} + \beta_2 PHASEOUT_j + \beta_3 RELYR_{jt} * PHASEOUT_j + \beta_4 RELYR_{0jt} + \beta_5 RELYR_{0jt} * PHASEOUT_j + \alpha_{1y} PHOYR_{jy} + \alpha_{2y} RELYR_{jt} * PHOYR_{jy} + \alpha_{3x} X_{ijt} + u_{jy} + u_{tjy} + e_{ijt}$$

Where:

$Y_{ijt}$	Outcome for student $i$ in school $j$ in year $t$ (relative to the year of the closure decision).
$RELYR_{jt}$	Continuous variable for time period, relative to the year of the closure decision, centered on the year of the closure decision (=0).
$PHASEOUT_j$	Dichotomous variable indicating that school $j$ was a closure school (=1) or a comparison school (=0).
$PHOYR_j$	Vector of dummy variables indicating the school year (2002-2003 through 2008-2009) in which a closure decision was made for school $j$ .
$X_{ijt}$	Vector of student characteristics and pre-high school performance measures to control for differences among students across schools and cohorts.
$RELYR_{0jt}$	Dichotomous variable (=1) for outcomes that occurred for students during the year of the closure decision, (=0 otherwise).
$u_{jy}$	Random error associated with clustering of schools within a closure decision year ( $y$ ).
$u_{tjy}$	Random error associated with clustering of time points (relative to the year of the closure decision) within schools and within a closure decision year ( $y$ ).
$e_{ijt}$	Estimation error associated with clustering of students within schools and school years.

This CITS model estimates the following quantities for 9<sup>th</sup> grade outcomes:

$\beta_1$	Estimate of the trend (or slope) of the outcome over the years leading up to the closure decisions for the comparison schools.
$\beta_2$	Estimate of the fixed difference in the outcome between the closing schools and the comparison schools during the years leading up to the closure decisions.
$\beta_3$	Estimate of the difference in the outcome trend (or slope) between the closing schools and the comparison schools over the years leading up to the closure decision.
$\beta_4$	Estimate of the deviation in the outcome from the pre-closure decision trend for the comparison schools.
$\beta_5$	Estimate of the difference in the deviations from the pre-closure decision trends between the closing and comparison schools.
$\alpha_{1y}$	Vector of fixed effect estimates of the difference in average pre-closure decision outcomes (intercepts) associated with each closure decision year ( $y = 2002$ through 2007) compared to the average for the last closure decision year (2008).

- $\alpha_{2y}$  Vector of fixed effect estimates of the difference in pre-closure decision outcome trends (slopes) associated with each closure decision year ( $y = 2002$  through  $2007$ ) compared to the trend for the last closure decision year ( $2008$ ).
- $\alpha_{3x}$  Vector of fixed effect estimates of the differences in background characteristics and middle school outcomes among students across schools and school years.

Tables 4, 5 and 6 in Chapter 4 and Tables A-3, A-5, and A-7 in Appendix A include three columns of numbers derived from this CITS model, in addition to the baseline projection of the outcomes in the year of the closure decision:

- $\beta_4 + \beta_5$  Listed in the second column of numbers as “Phaseout School Change.” This represents the deviation from the trend in the years prior to the closure decision for the phaseout schools. It provides an indication of the degree to which outcomes were different for students who were enrolled in the closing schools as they were being phased out compared to their peers who were enrolled in the same schools prior to the closure decision.
- $\beta_4$  Listed in the third column of numbers as “Comparison School Change.” This represents the deviation in a given outcome from the trend in the years prior to the closure decision for the comparison schools. It is an estimate of the degree to which outcomes were changing for students in low-performing schools that avoided a closure decision. This is intended to account for policies, programs, or initiatives other than school closures that may have influenced school behaviors and changed student outcomes.
- $\beta_5$  Listed in the fourth column of numbers as “Estimated Impact.” It is an estimate of the difference in the deviations from the pre-closure decision trends for the closing and comparison schools. This represents the impact of the closure decision over and above the influence of other influences on outcomes for students in low-performing schools.

The model above and the resulting estimates represent analyses of impacts on 9<sup>th</sup> grade outcomes for students who entered 9<sup>th</sup> grade in the year of a closure decision. Chapter 4 also presents estimates of the cumulative impact of the phaseout process on these students’ outcomes, over the course of their high school career. Our analyses focused on these students because they received the longest and most extensive exposure to the phaseout process. The analysis of impacts on outcomes measured during these students’ scheduled 10<sup>th</sup> grade, 11<sup>th</sup> grade and 12<sup>th</sup> grade years (including graduation outcomes) rely on the statistical model described above with three additional terms:

- $RELYR_{1_{jt}}$  Dichotomous variable (=1) for outcomes that occurred for students during the year after the closure decision, (=0 otherwise).
- $RELYR_{2_{jt}}$  Dichotomous variable (=1) for outcomes that occurred for students during the second year after the closure decision, (=0 otherwise).

*RELYR\_3<sub>jt</sub>* Dichotomous variable (=1) for outcomes that occurred for students during the third year after the closure decision, (=0 otherwise).

These terms reflect outcomes measured during the three years after the closure decision. They correspond to students' scheduled 10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup> grades (including graduation), respectively. Each of these terms were interacted with the *PHASEOUT<sub>j</sub>* indicator to reflect the difference in the deviations from the pre-closure decision trends between the closing and comparison schools. The differences in these deviations represent the impact of the phaseout process on outcomes measured during students' scheduled 10<sup>th</sup>, 11, and 12<sup>th</sup> grades (including graduation), respectively.

The model we used to estimate impacts on students' outcomes in their scheduled 10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup> grades (including graduation) accounts for the fact that other students were scheduled to be enrolled in those grades during the closure decision year. For example, there are two groups of 10<sup>th</sup> grade students who were exposed to the phaseout process in any school: a) students in 9<sup>th</sup> grade during the closure decision year (the main focus of the analysis), who were exposed to the phaseout process during their 9<sup>th</sup> and 10<sup>th</sup> grade years; and b) students who were in 9<sup>th</sup> grade during the year before the closure decision, who were exposed to the phaseout process during their 10<sup>th</sup> grade year.

Note that when estimating the pre-closure decision trends for 10<sup>th</sup> grade outcomes, we only include outcomes for students who were scheduled to be in the 10<sup>th</sup> grade *prior* to the closure decision year. Therefore, estimates for the term *RELYR\_0<sub>jt</sub> \* PHASEOUT<sub>j</sub>* for impacts on 10<sup>th</sup> grade outcomes are for the year *of* the closure decision—the first year that these 10<sup>th</sup> grade students were exposed to the phaseout process. Estimates for *RELYR\_1<sub>jt</sub> \* PHASEOUT<sub>j</sub>* represent the impact on 10<sup>th</sup> grade outcomes for the year following the closure decision and the second year that the original group of students (i.e., students in 9<sup>th</sup> grade during the year of a closure decision) was exposed to the phaseout process.<sup>iii</sup>

Although not presented in the report, analyses were conducted to examine the impact of the phaseout process on students who were scheduled to be in 10<sup>th</sup>, 11<sup>th</sup>, or 12<sup>th</sup> grade in the year of a closure decision. As noted above, these students were only exposed to the phaseout process for a portion of their high school years. The analyses found that none of the estimates of impacts on outcomes for these students were statistically significant and most were close to zero.

## Estimating Impacts on Student Outcomes After High Schools Close

Chapter 5 of the report discusses the general analytic approach used to estimate impacts on students who were likely to have attended the closed schools, had those schools remained open. Below, we provide further technical details about this analysis, which was conducted in two stages. In Stage 1 we identified a group of students that would likely have attended a closed high school had it remained open. In the report, we refer to these students as the “post-closure cohort.” In Stage 2, we used an extension of the CITS analysis to estimated impacts on outcomes for the post-closure cohort. Following is a more detailed description of these stages.

**Stage 1: Identifying a post-closure cohort of students who would likely have attended a closed school had it remained open.**

We began our analyses by identifying a cohort of students who began high school in the year after a closure decision and reflect similar background characteristics and middle school performance levels as students who enrolled in a particular closure school before the closure decision. From this group, we then selected those students who appeared to be likely to have enrolled in a closed school based on (a) either their choice of a high school within the same building or (b) their having attended a middle school or lived in a community from which previous cohorts of students had attended the closed school.

Specifically, this first stage of the analysis involved a three-step process that was carried out for each of the 29 high schools that were identified for closure between 2002 and 2008. These steps are described below.

**Step 1** used a statistical model to estimate the relationship between student background characteristics and middle school attendance and enrollment in a high school identified for closure. The model was estimated for a sample of students who enrolled in a high school in the year prior to the closure decision and students from the district who enrolled in high school in the year after the closure decision. This logistic regression model resulted in a score for each student reflecting the probability of that student enrolling in a closure school as a weighted combination of the student's characteristics. The model is specified below:

$$\text{Logit}(\text{CLOSE}_i) = \alpha_0 + \alpha_1 \mathbf{X}_i$$

Where:

$\text{CLOSE}_i$  Dichotomous indicator that was coded as 1 if middle school student  $i$  enrolled in a high school that was identified for closure the following year, or coded as 0 if student  $i$  enrolled in another high school.

$\mathbf{X}_i$  Vector of student background characteristics and middle school performance indicators including gender, race/ethnicity, age, home language other than English, eligible for free or reduced price lunch, identified for English language learning services, identified for special education services, attendance rate, indicator for chronic absenteeism, ELA and math test scores and achievement categories, over-age for grade level, and indicators for missing data.

**Step 2** identified the neighborhoods, community school districts, boroughs, middle schools, and destination high school buildings of the last cohort of students who entered each closed high school. This information provided the basis for replicating the geographic distribution of students who had previously enrolled in the closed high schools.

**Step 3** used the scores that were estimated from the logistic regression model in Step 1 to identify students with the same weighted combination of background characteristics as those who enrolled in the school identified for closure. This matching process was conducted using a “nearest neighbor” criterion (i.e., students in the closure and post-closure cohorts with estimated scores that were within 0.10 standard deviations of each other). The nearest neighbor criterion was applied without replacement (i.e., one unique post-closure student identified for each student from the closed school). The matching process prioritized nearest neighbor students in the following order: 1) students who attended a high school in the same building as the closed high school; 2) students who attended a middle school that previously sent students to the closed high school; 3) students who lived in the same zip code as a student who previously attended the closed school; or 4) students who attended a middle school or high school in the same community school district or borough as the closed high school.

In all, 45 percent of the matches were found among students who attended a high school in the same building as the closed school; 33 percent of the matches were found among students who attended a middle school that previously sent students to the closed high school; 11 percent of the matches were found among students who lived in the same zip code as a student who previously attended the closed school; 6 percent of the matches were found among students who attended a middle school in the same community school district as the closed high school; and 4 percent of the matches were found among students who attended a high school in the same community school district as the closed high school.<sup>iv</sup>

### **Stage 2: Estimating impacts for the post-closure cohort using CITS models.**

The second stage of the impact analysis utilized an extension of the CITS models described above. Specifically, the CITS model for this analysis included terms reflecting the outcomes for students who first enrolled in high school in the year immediately following a closure decision year. For the closure schools, this included students in the post-closure cohort. For the comparison schools this included an additional cohort of students who enrolled in those schools during the same year (i.e., the year following a closure decision).

The CITS analysis, for example, utilized the following multi-level model to estimate impacts on 9<sup>th</sup> grade outcomes for students in the post-closure cohort. Note that this model includes all parameters described above plus an indicator for outcomes for students in the post-closure cohort.

$$Y_{ijt} = \beta_0 + \beta_1 RELYR_{jt} + \beta_2 PHASEOUT_j + \beta_3 RELYR_{jt} * PHASEOUT_j + \beta_4 RELYR_{0jt} + \beta_5 RELYR_{0jt} * PHASEOUT_j + \beta_6 RELYR_{1jt} + \beta_7 RELYR_{1jt} * PHASEOUT_j + \alpha_{1y} PHOYR_{jy} + \alpha_{2y} RELYR_{jt} * PHOYR_{jy} + \alpha_{3x} X_{ijt} + u_{jy} + u_{tjy} + e_{ijt}$$

Where:

$RELYR_{1jt}$  Dichotomous variable (=1) for outcomes that occurred for students who entered high school in the year after the closure decisions, (=0 otherwise).

This CITS model adds the following two quantities to those described earlier:

- $\beta_6$  Estimate of the deviation in the outcome from the pre-closure decision trend for students who enrolled in the comparison schools in the year after the closure decision.
- $\beta_7$  Estimate of the difference in the deviations from the pre-closure decision trends between the post-closure cohort associated with the closure schools and the cohort that enrolled in the comparison schools in that year.

Table 9 in Chapter 5 and Table A-10 in Appendix A include three columns of numbers derived from this CITS model, in addition to the baseline projection of the outcomes into the year after the closure decision:

- $\beta_6 + \beta_7$  Listed in the second column of numbers as the “Post-Closure Change.” This represents the deviation from the pre-closure decision trend for the post-closure cohort of students. It provides an indication of the degree to which outcomes were different for students who were likely to have enrolled in the closing schools had the schools remained open, compared to their peers who were enrolled in those schools prior to the closure decision.
- $\beta_6$  Listed in the third column of numbers as the “Comparison School Change.” This represents the deviation in the outcome from the pre-closure decision trend for the additional cohort of students who enrolled in the comparison schools. It estimates the degree to which outcomes were changing for later groups of students in low-performing schools that avoided a closure decision. This is intended to account for policies, programs, or initiatives other than school closures that may have influenced school behaviors and changed student outcomes.
- $\beta_7$  Listed in the fourth column of numbers as the “Estimated Impact.” It is an estimate of the difference in the deviations from the pre-closure decision trends between the post-closure cohort associated with the closed schools and the additional cohort of students in the comparison schools. This estimate represents the impact of the closures over and above other influences on outcomes for students in low-performing schools.

The model above and the resulting estimates represent analyses of impacts on outcomes measured during students’ 9<sup>th</sup> grade year. The results presented in Chapter 5 of the report also reflect the cumulative impact of the closures on outcomes for these students through their scheduled 10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup> grade years (including graduation). As with the model for estimating impacts during the phaseout process, the analysis of closure impacts on these outcomes rely on the same statistical model with additional terms that reflect outcomes measured during the years corresponding to students’ scheduled 10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup> grades (including graduation). See page 19 for further details.



## Notes

<sup>i</sup> See page 14 of the full report for the methods used to identify comparison schools.

<sup>ii</sup> Note that this model is presented in reduced form and is fitted with up to four pre-phaseout years (centered on the closure decision year = 0) and one post-phaseout year.

<sup>iii</sup> In a similar manner, the model accounts for the fact that other students were enrolled in the 11<sup>th</sup> grade during the year of the closure decision. As discussed in footnote 22 of the report, however, cohorts of students who began their high school enrollment three years prior to the closure decision (which would

have occurred in their scheduled 12<sup>th</sup> grade year), are assumed to have been unaffected (or only marginally affected) by the phaseout process. With this assumption in mind, 12<sup>th</sup> grade outcomes for these students are considered to be part of the pre-phaseout period in the analysis.

<sup>iv</sup> Sensitivity analyses were run for different restrictions on the samples (e.g., students from pre-specified boroughs), combinations of background characteristics; and matching criteria (e.g., 0.5, 0.4, 0.3 and .05 standard deviations). Results from these sensitivity tests yielded a similar pattern of results to those presented in the report.

**Find this report online at:**

[http://steinhardt.nyu.edu/research\\_alliance/publications/hs\\_closures\\_in\\_nyc](http://steinhardt.nyu.edu/research_alliance/publications/hs_closures_in_nyc)

**The Research Alliance for  
New York City Schools**

285 Mercer Street, 3rd Floor | New York, New York 10003-9502  
212 992 7697 | 212 995 4910 fax  
[research.alliance@nyu.edu](mailto:research.alliance@nyu.edu) | [www.steinhardt.nyu.edu/research\\_alliance](http://www.steinhardt.nyu.edu/research_alliance)

The Research Alliance for  
New York City Schools conducts  
rigorous studies on topics that  
matter to the city's public schools.  
We strive to advance equity and  
excellence in education by  
providing nonpartisan evidence  
about policies and practices that  
promote students' development  
and academic success.