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Who Chooses in the Hartford Region? Report 2: A Statistical Analysis of Regional School Choice Office Applicants and Non-Applicants among Hartford and Suburban-Resident Students in the Spring 2013 Lottery

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Summary

Which Hartford and suburban families were more (or less) likely to apply to Regional School Choice Office (RSCO) public school options such as interdistrict magnet schools and the Open Choice city-suburban transfer program? How do these applicants and non-applicants vary by student characteristics, achievement levels, school composition, and neighborhood demographics? This study seeks to answer these questions by matching student-level records from the RSCO school choice lottery with potential applicants in the Public School Information System (PSIS) student enrollment database. Access to both files was provided by the Connecticut State Department of Education (CSDE), under a no-cost data confidentiality contract approved by Connecticut's Office of the Attorney General, with additional files provided by the Hartford Public Schools and the US Census Bureau. Our goal is to help public policymakers understand different levels of student participation in the Hartford region's voluntary interdistrict school choice programs for integrated education, and to contribute to efforts to improve the quality of instruction for all students.

When we released Report 1 in May 2014, we identified disparities between RSCO Spring 2012 lottery applicants and non-applicants among a sample of 6,673 Hartford-resident students enrolled in Hartford Public Schools (HPS) district and interdistrict magnet schools from grades 3 to 7. In that study, we found statistically lower RSCO lottery participation by Hartford students with English Language Learner and special education needs, and higher participation by students with higher Connecticut Mastery Test (CMT) scores, and/or living in census areas with higher median household incomes or higher levels of owner-occupied housing.[1]

In Report 2, we expanded our analysis of RSCO Spring 2013 lottery applicants and non-applicants to include all grade levels in both Hartford and suburbs, defined as the RSCO transportation area. We identified 17,710 non-duplicated RSCO applications in this area, and matched as many as possible to a broader pool of over 170,000 PreK-12 students in the Public School Information System (PSIS) database. While we successfully matched 94 percent of the

RSCO applicants in grades K-11, our rate was lower for 3- and 4-year-olds, since most are not yet listed in the public school database. Therefore, this report focuses primarily on applicants and non-applicants in grades K-11. When we calculated the probabilities of applying by student with certain characteristics, we used the Pearson chi-square to test for statistical significance at the 95 percent level of confidence. Since some of our sample sizes are large, small differences can be statistically significant, so we reported the difference between the actual versus expected number of applicants (based on the proportion of the students with the characteristic in our population) to indicate the magnitude of any disparities. More details about sources and methods appear in the body of the report.

Overall, when we compared Hartford-resident K-11 applicants to non-applicants in the RSCO 2013 lottery, we found some disparities. Hartford students who are English Language Learners were much less likely to apply, with 26 percent fewer students than expected. Hartford students with special education needs were somewhat less likely to apply, with 16 percent fewer than expected. Hartford students living in higher-income or higher-homeownership areas were more likely to apply, with 24 and 28 percent more students than expected, respectively. Regarding test score differences, Hartford applicants had slightly higher reading scores than non-applicants, but this disparity was small and was not found in any other subject areas. Along racial lines, we found that Hartford Black students were more likely to apply (11 percent more than expected), while Hispanic students were less likely (8 percent fewer than expected), with no difference for White students.

Among suburban students, the data reveal several large disparities. Suburban lower-income students were more likely to apply (43 percent more students than expected). Black suburban students were much more likely to apply (169 percent more than expected), and Hispanic suburban students were more likely to apply (48 percent more than expected), while White suburban students were less likely to apply (47 percent fewer than expected). Students in suburbs with more than 60 percent minority enrollment were far more likely to apply (132 percent more students than expected). Regarding achievement tests, higher-scoring suburban students were less likely to apply (12 percent fewer students than expected).

A. Why Disparities Matter

Why should we care about disparities between applicants and non-applicants to the RSCO lottery? When the Connecticut Supreme Court ruled in favor of the plaintiffs in the 1996 *Sheff v O'Neill* school desegregation case, and subsequent courts approved settlements toward a remedy, the state committed to achieve racial integration through voluntary school choice. This reform strategy has created greater educational opportunities, primarily through the expansion of interdistrict magnet schools (with specialized curricular themes and resources to attract urban and suburban students) and Open Choice (a city-suburban interdistrict transfer program). Both the Sheff plaintiffs and the State defendants have agreed to a series of goals to increase the percentage of Hartford racial minority students enrolled in integrated schools.

But this choice-driven reform relies on thousands of school lottery applicants to fulfill Connecticut's constitutional obligation to provide equal educational opportunity. The success of Connecticut's choice remedy rests on the actions of individual families, both in the city and the suburbs, to apply to interdistrict magnet and Open Choice schools. At the center of the state's expansive school choice program was an unanswered public policy question: *who chooses?* We conducted this study because no one has systematically compared RSCO applicants to non-applicants to determine whether all students are equally likely to apply to this voluntary choice program.

After the release of our first *Who Chooses?* report in spring 2014, and a related Connecticut Voices for Children *Choice Watch* report on enrollment data, there is a growing recognition of the disparity problem in public school choice. The new superintendent of Hartford Public Schools released her *Transition Report* in October 2014, which stated that:

> Many HPS stakeholders are concerned that inequality and unequal access disproportionately impact children of color, and they also have strong perceptions that: English Language Learners (ELL), children designated as special education (SPED), and children enrolled in most neighborhood schools have less access to magnets and Choice schools; neighborhood schools are not funded adequately; and large disparities exist in the quality of physical buildings and material conditions of magnet and neighborhood schools.[2]

Also, the signatories to the February 2015 Sheff III settlement extension expressed their concern about disparities, and agreed to take these steps:

> The SDE [State Department of Education], in cooperation with RSCO Partners, will continue to collect data and review proposals to change the lottery process to achieve the following outcomes:

i. Reduce the disparities in the number of students in ELL programs in the Hartford neighborhood schools and Sheff magnet schools;
ii. Reduce the disparities in the number of students requiring special education services in the Hartford neighborhood schools and Sheff magnet schools;
iii. Provide recognition for families that participate in RSCO lotteries over several years without obtaining an offer.[3]

Our series of *Who Chooses?* reports seek to contribute to this policy conversation. To be clear, our quantitative analysis of existing data does *not* determine the causes of these disparities. It is plausible that differences in applications may be attributed to multiple factors, such as:

- the design of the state's choice system, and the grade levels, locations, and themes of magnet schools,
- the actions of individual schools in encouraging certain families to apply,
- the actions of individual families who may be better-resourced to seek upward mobility through choice, or who may prefer to stay at their current school for various reasons.

But the first step toward investigating the disparity issue is to thoughtfully analyze data collected by state and local education agencies, as we seek to do in this report.

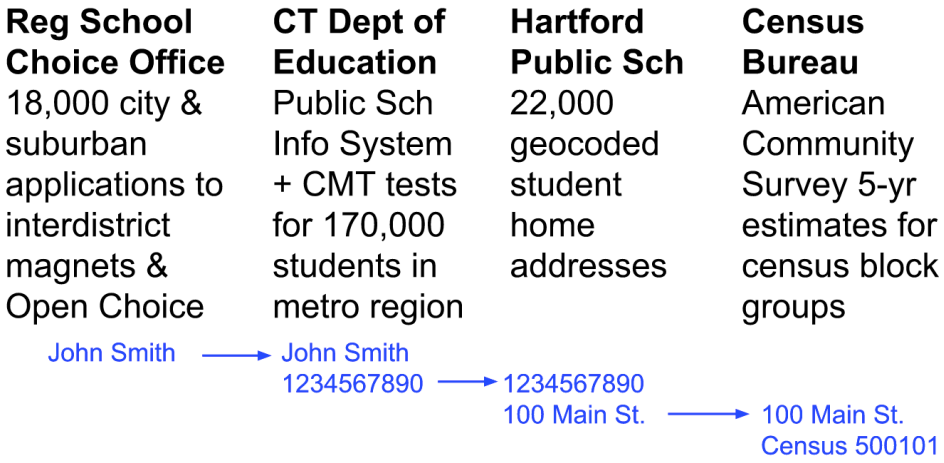
B. Background on Public School Choice in the Hartford Region

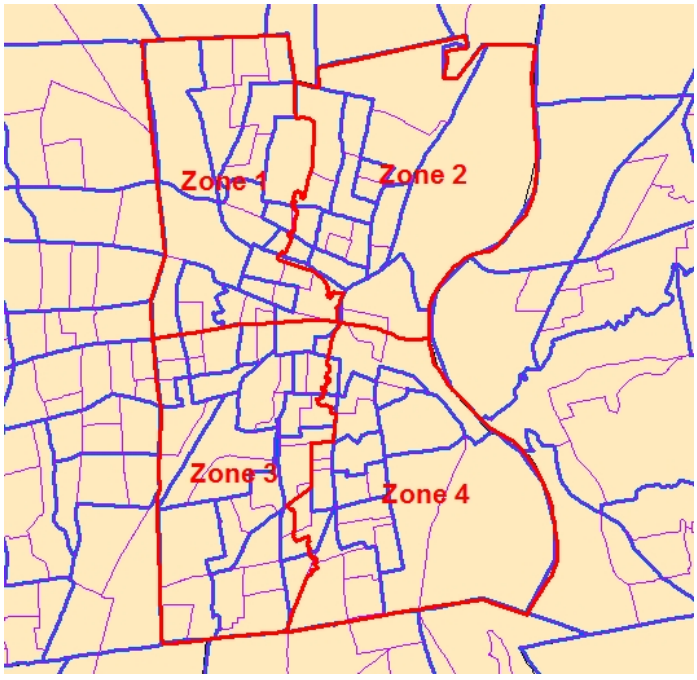
Over the past two decades, the range of public school choices for Hartford students has increased dramatically through three different policy changes. After the Connecticut Supreme Court's *Sheff v O'Neill* school desegregation ruling in 1996, and subsequent court-approved remedies (from Sheff I in 2003 to the Sheff III extension in 2015), the state legislature has funded the growth of voluntary integration through interdistrict magnet schools (with curricular themes designed to attract both city and suburban students) and the Open Choice program (where city students enroll in suburban district schools, and vice versa). Also in 1996, Connecticut lawmakers approved a bill to allow the creation of charter schools (which operate with public funds, but fewer regulations than district schools). Furthermore, in 2008, the Hartford Public Schools shifted from neighborhood school attendance areas to an "all-choice" initiative, which required families with students entering kindergarten or high school to submit a lottery application to their preferred HPS district school, with the option to switch schools between grades. Today, when all of these options are combined, the parent of a typical Hartford 6th grader is eligible to apply to over 40 different district and interdistrict public schools or programs in the metropolitan Hartford region.[4] While the long-term goal of the *Who Chooses?* research project is to analyze choice activity around public schools, this report focuses solely on the Regional School Choice Office (RSCO) applications for interdistrict magnets and Open Choice in the Spring 2013 lottery.

C. Data and Methodology

1) Linked data sources and individual confidentiality

The core of our analysis relies on linking student records across data silos, and doing so in a way that protects individual confidentiality. To fully understand "who chooses" to participate in the RSCO lottery, we need to compare the characteristics of applicants to non-applicants, meaning the larger pool of prospective students who could have applied. Both groups of students appear in separate CSDE datasets, but these were not connected until we linked them. In addition, our study adds value to state-managed student records by matching them to the local school district, which allows us to link home address data to neighborhood-level census block groups to better understand socioeconomic characteristics. All together, this study links four separate data silos.





City of Hartford (red), census tracts (blue), and census block groups (purple lines).

THE RSCO TRANSPORTATION ZONE

The transportation zone adopted by the Regional School Choice Office identifies the established borders for towns eligible to receive transportation for RSCO programs and schools.

Andover	Ellington	Hebron	Somers
Avon	Enfield	Manchester	South Windsor
Berlin	East Granby	Marlborough	Southington
Bloomfield	East Hampton	Middletown	Suffield
Bolton	East Windsor	New Britain	Tolland
Bristol	Farmington	New Hartford	Vernon
Burlington	Glastonbury	Newington	West Hartford
Canton	Granby	Plainville	Wethersfield
Coventry	Hartford	Portland	Windsor
Cromwell	Hartland	Rocky Hill	Windsor Locks
East Hartford	Harwinton	Simsbury	

PSIS data included 43 traditional districts shown above, plus 6 non-traditional districts: CREC, Achievement First Hartford, Goodwin (part of LEARN), Jumoke, Odyssey, and CT Technical Schools. *Image source: RSCO transportation brochure, 2014-15*

Our sources were similar to those used in Who Chooses Report 1, but we expanded our analysis in Report 2 to study more grade levels and the city and suburban region. In October 2014, CSDE provided us with three large datasets for 2012-13 (the focus of our time period) and other years:

a) Public School Information System (PSIS) records for October 2012, consisting of over 170,000 students enrolled in the 43 traditional public school districts located in the RSCO transportation region of central Connecticut, plus 6 non-traditional districts located in the Hartford area: Capitol Region Education Council (CREC), Achievement First Hartford, Jumoke Academy, Goodwin College magnet schools (part of the LEARN district) Odyssey Community, and the CT Technical High Schools.
b) Connecticut Mastery Test (CMT) subject scores for grade 3-8 students enrolled in the districts above, which are linked to PSIS by unique student ID numbers (SASID). Spring 2013 was the last complete year of CMT data, as this test will be replaced by the Smarter Balanced assessment.
c) The Regional School Choice Office (RSCO) provided over 18,000 applications submitted in Spring 2013, with outcomes for the 2013-14 school year. Fortunately, the RSCO 2013 application data we received for Report 2 was much more complete (including magnet and Open Choice preferences) than the RSCO 2012 data we received for Report 1.

The CSDE provided student-level data under a no-cost contract approved by Connecticut's Office of the Attorney General, which restricted the use of these confidential records only for the purpose of this study. Our research team implemented stringent security practices to protect the data, is prohibited from disclosing the data to any other party without the express written consent from the CSDE, and is required to destroy the data once the purpose is completed or the period of the agreement has ended. In this report, all student-level data has been aggregated into larger units to further protect anonymity, meaning that we do not report table cells of groups smaller than 5 students, or 20 students when it involves assessment data. Furthermore, the CSDE required us to receive their written consent before publishing our findings.

In addition, the Hartford Public Schools (HPS) provided approximately 22,000 records of student data for 2012-13, with home addresses as of June 2013, under a related no-cost agreement with security measures to protect student confidentiality. We geocoded student address records and linked them to American Community Survey 5-year estimate (ACS 2009-13) census block group data, which is publicly available from the US Census Bureau.

2) Methods and Limits of Recording Matching

To compare lottery applicants to non-applicants, we matched the RSCO Spring 2013 application records to a broader potential pool of students who could have applied. For our broader pool we selected the PSIS October 2012 database of students enrolled in public schools located inside the RSCO transportation area. Although RSCO applicants may reside anywhere in Connecticut, we narrowed our focus to those within the transportation area, where the vast majority are located.

CSDE staff helpfully provided data we requested for this study, and the quality of RSCO data continues to improve over time. Yet there are some limitations to RSCO and related datasets, which we identify below and about which CSDE is already aware, and we offer some recommendations to improve them for evaluations in future years:

a) Lack of SASID links between RSCO 2013 applications and other CSDE databases:
While CSDE maintains the RSCO application database, it currently does not match applicants to the unique student ID (SASID) in the CSDE PSIS database. As a result, we spent considerable time matching records to answer the question about who does (or does not) participate in the RSCO lottery, and are willing to share our matched files with CSDE upon request. To answer this question in future years, we recommend that CSDE match RSCO applications to PSIS records.

b) Fewer PreK matches due to lack of access to PKIS database:
Families with young children (who list their grade level as PreK Age 3, PreK Age 4, or presumably Not in School) comprise over 36 percent of the students within the RSCO Spring 2013 applicant pool. But these young children are the hardest to match because so few are already enrolled in public schools, and therefore do not appear in the PSIS database. When we removed PreK students, our K-11 matching success rate for the transportation area rose from 79 to 94 percent. Halfway through our analysis we learned about the existence of the PKIS (PreK Information System) database, which may have improved the quality of PreK record matching for this study. We did not receive 2012-13 PKIS data from CSDE for this study, and for subsequent years, PKIS data are now managed by a different state agency, the Office of Early Childhood. To answer the question about who does (or does not) apply to the RSCO lottery, we recommend that CSDE and/or OEC coordinate to match RSCO applications to PKIS records.

c) Non-usable RSCO application IDs:
Although RSCO assigned ID numbers to the Spring 2013 applications, these are not unique IDs over time, meaning that we cannot easily trace applicants from prior years who re-applied to the lottery. For this reason, our study cannot easily identify families who have applied to the RSCO lottery multiple times without receiving an offer. This issue of multi-year applicants was identified in the 2015 Sheff III extension, but cannot be addressed until additional years of RSCO applications are matched to PSIS, beyond the Spring 2013 lottery we matched for this

report. We recommend that RSCO use unique student identifiers (such as SASIDs) as a better way to track multi-year applicants in future years.

c) Internal RSCO school codes did not match standard CSDE school facility codes:
For lottery operations, the RSCO database maintains an internal 2-digit numerical code for magnet and Open Choice schools, which did not match the standard CSDE 7-digit school facility code system used in PSIS. RSCO staff provided us their lookup table, which we expanded (using PSIS) to include all public schools in the RSCO transportation area, and renumbered using the CSDE school facility code system. In future years, to better track the school origin and destination of lottery applicants, we recommend that RSCO adopt the CSDE 7-digit facility numbering system, and we are willing to share our expanded lookup table with CSDE upon request.

e) Documentation of RSCO application datasets over time:
All findings in this report are based on the RSCO Spring 2013 on-time application dataset we received in October 2014. CSDE staff informed us about a related dataset of late RSCO applications, which we did not receive in time to include in this report. There were 1,114 late applicants in Spring 2013, and while none of these received an offer, including them in future analyses would provide a richer answer to the question of who participates in the lottery system.

Also, we believe that RSCO data quality is improving over time. For Spring 2013 and prior years, RSCO staff manually entered a significant number of paper applications and may have invalidated those with data entry issues (such as incorrect grade levels for a requested magnet school). Since Spring 2014, virtually all on-time applications are automatically entered into the lottery due to vast number of parents who participate in the online system, thus reducing inaccurate parent data entries

One aspect of our study is that it merged datasets from different sources, such as RSCO and PSIS. We encountered some difficulties in matching data where documentation was not present. In the future, all evaluation efforts would benefit from datasets with richer metadata.

f) No RSCO supply-side data:
For this study, we did not request RSCO supply-side data, which would have provided us with the number and location of RSCO-managed magnet and Open Choice seats available in the lottery. Ideally, a richer analysis of the school choice market would include data on both the demand side (who chooses?) and the supply side (what choices are available?). We did not request RSCO supply-side data because we understand that the current status of seat declaration data is complicated by mid-year attrition and other factors. To improve the quality of school choice evaluations in future years, we recommend that RSCO produce a standardized count of available seats in its choice schools.

Given the first limitation noted above, our primary major task was to link records between CSDE data silos. We began with 18,366 RSCO Spring 2013 applications for all grades from the entire state that were provided to us in the October 2014 data delivery. After removing 31 duplicates (due to the RSCO practice in Spring 2013 of creating a second entry when manually placing students in a second school), we focused on 17,710 applicants from all grades who resided in the RSCO transportation area. Among these applicants, 35 percent resided in the City of Hartford and 62 percent resided in the suburban RSCO transportation area.

RSCO Spring 2013 PK-12 applications by residence	Total in CT	RSCO Transp Area	City of Hartford only	Suburbs (RSCO only)	Out of RSCO area
original applications file provided by RSCO	18366				
duplicates removed due to RSCO manual placement	31				
non-duplicated applications	18335	17710	6360	11350	625
percent of total		97%	35%	62%	3%

Using both automatic matching (by Last name, First name, Date of birth), and manual inspection of semi-automated matching (with two of the three variables above to catch different spellings, hyphenations, mistaken birthdates, with current, past, and future PSIS), we successfully linked 13,996 RSCO transportation-area applicants from all grades to PSIS (79 percent), as shown in the table below. Younger RSCO applicants (PreK3, PreK4, and Not in School) were the most difficult to match, since most are not enrolled in public schools and thus not in PSIS. Also, we removed a very small number (<5) of Grade 12 students who participated in next year's school choice. Therefore, by narrowing our focus to K-11 RSCO applicants in the transportation area, we successfully matched 10,667 (or 94 percent) to the PSIS database in 2012-13, or one year before or after.

Later in the study, we also linked the Hartford-resident portion of these K-11 RSCO-PSIS matched records to the HPS database, and successfully connected 3,180 (or 73 percent). The HPS database contained student home address data that was not available in the state's PSIS database. We geocoded the home addresses for nearly all of these Hartford-resident HPS students to link them to the American Community Survey 2009-13 census block group estimates for neighborhood-level socioeconomic data on median household income and percent of owner-occupied homes. We relied on linked census data as a socioeconomic measure for Hartford HPS students, since it is a continuous variable with fewer limitations than the Free and Reduced Price Meals proxy.[5] In the suburbs, where we did not have student home address data provided by local school districts, we used the Free and Reduced Price Meals variable as a lower-income proxy.

RSCO Spring 2013 apps by match rate	RSCO transp area	PSIS - RSCO match	Pct matched PSIS-RSCO	Hartford residents only	PSIS-RSCO-HPS match	Pct matched PSIS-RSCO-HPS
Not in school	2878	1219	42%	821	8	1%
PreK3	1589	606	38%	435	34	8%
PreK4	1937	1504	78%	762	162	20%
Kindergarten	1074	981	91%	395	265	67%
Grade 1	938	879	94%	397	291	73%
Grade 2	840	777	93%	353	270	76%
Grade 3	826	784	95%	367	288	78%
Grade 4	761	721	95%	339	263	77%
Grade 5	1774	1721	97%	490	373	76%
Grade 6	758	716	94%	270	190	70%
Grade 7	687	632	92%	286	188	65%
Grade 8	2399	2294	96%	934	722	77%
Grade 9	710	670	94%	297	191	63%
Grade 10	424	387	91%	171	111	64%
Grade 11	114	105	92%	43	28	63%
Total: All Grades (except 12th)	17710	13996	79%	6360	3384	53%
Total: Not in School + PK3 + PK4	6404	3329	52%	2018	204	10%
Total: K-11 only	**11305**	**10667**	**94%**	**4342**	**3180**	**73%**

In this report, we compare grade K-11 RSCO Spring 2013 lottery applicants from the transportation zone to non-applicants, only if their matches appeared in the PSIS Fall 2012 database. Although we initially found SASID identification numbers for 10,667 RSCO K-11 applicants in the Spring 2013 lottery, only 10,083 (95 percent) of these students appear in the Fall 2012 PSIS. The other 5 percent either moved into the Hartford region after October 2012, or appeared in the Fall 2011 or Fall 2013 PSIS.

As a result, our study focuses on 152,376 K-11 students from PSIS Fall 2012 who resided in the regional transportation area. We divide these into two groups: the applicants (10,083 who we matched in the RSCO Spring 2013 lottery) and the non-applicants (142,293 who had no match in that lottery). Overall, 7 percent of these PSIS K-11 students submitted RSCO applications that spring, which broke down to 18 percent for Hartford residents and 5 percent for suburban residents.

Later in the report, to compare achievement differences, we narrowed our analysis to students in the CMT grades levels (3-8). We found that only 82 percent of Hartford residents were reported to have scores in three subject areas (reading, writing, and mathematics), while 93 percent of suburban residents had three CMT scores.

PSIS Fall 2012 students by residence	RSCO Transp Area	Hartford residents	Suburbs in transp area
All Grades	170288	23480	146808
Grades K-11	152376	21027	131349
Non-Applicants (no match in RSCO Spring 2013 lottery)	142293	17211	125082
Applicants (matched in RSCO Spring 2013 lottery)	10083	3816	6267
Pct RSCO applicants in K-11 PSIS	**7%**	**18%**	**5%**
Grades 3-8 (CMT grades)	75813	10019	65794
Gr 3-8 with 3 CMT scores	69598	8186	61412
Pct Gr3-8 with 3 CMT scores	**92%**	**82%**	**93%**

D. Key Findings

1) English Language Learners and Special Education students by residence

For Hartford-resident K-11 students, English Language Learners and special education students were less likely to participate in the RSCO lottery in Spring 2013. We found that 176 fewer Hartford ELL students applied than expected (26 percent less), and 89 fewer special education students applied than expected (16 percent less). For suburban K-11 students, special education students also were less likely to participate, with 101 fewer than expected (about 15 percent less), but we found no disparity in applying between suburban English Language Learners and non-English Language Learners.

Residence	English Language Learners K-11	Probability of applying	Actual	Expected	Difference	Percent Difference from Expected
Hartford	ELL	0.13	500	676	176 fewer ELL students applied than expected	-26%
	not ELL	0.19				
Suburbs	ELL	0.045			No significant difference	
	not ELL	0.048				

Residence	Special Education K-11	Probability of applying	Actual	Expected	Difference	Percent Difference from Expected
Hartford	SPED	0.15	484	573	89 fewer SPED students applied than expected	-16%
	not SPED	0.19				
Suburbs	SPED	0.040	592	693	101 fewer SPED students applied than expected	-15%
	not SPED	0.049				

2) Socioeconomic status by residence

We found opposite patterns when looking at the socioeconomic status for urban and suburban students who participated in the RSCO 2013 lottery. In Hartford, 90 percent of students qualify for the federal Free and Reduced Price School Meal program, so we developed a more precise SES measure using home address data provided for all urban students enrolled in any HPS school. We successfully geocoded 73 percent of student addresses to census block group estimates for median household income and percent owner-occupied housing, and found that Hartford-resident HPS K-11 students who lived in higher-income and higher-homeownership census areas were more likely to participate in the lottery.

Among Hartford-resident HPS K-11 students, 138 more higher-income students (or 24 percent) and 163 more higher-homeownership students (or 28 percent) applied than expected.

Residence	Median household income of census block group, K-11	Probability of applying	Actual	Expected	Difference	Pct Diff. from Exp.
Hartford in HPS	Over $40k	0.23	703	565	138 more higher-income applied than expected	24%
	Under $20k	0.19				

Residence	Percent owner-occupied housing of census block group, K-11	Probability of applying	Actual	Expected	Difference	Pct Diff. from Exp.
Hartford in HPS	Over 40%	0.23	755	592	163 more high-homeowner applied than expected	28%
	Under 1%	0.18				

For suburban K-11 students, we lacked home address data, so we measured individual eligibility for the federal Free and Reduced-Price Meals program as a proxy for lower-income students. When we combined all suburbs, lower-income students were much more likely to participate in the RSCO lottery, with 789 more lower-income applicants than expected (43 percent more).

Residence	Lower-income (eligible for free or reduced-price meals), K-11	Probability of applying	Actual	Expected	Difference	Pct Diff. from Exp.
Suburbs	Eligible	0.068	2607	1818	789 more lower-income students applied than expected	43%
	Not eligible	0.040				

3) Racial differences by residence

We also found significant racial differences for urban and suburban students who participated in the RSCO lottery in Spring 2013. While students may select multiple races, for this analysis we constructed three mutually exclusive categories (Black only, White only, and Hispanic with any race), which means that those with other racial identities are not included here.

For Hartford K-11 residents, 169 more Black students applied than expected (11 percent more), and 151 fewer Hispanic students applied than expected, but there were no significant differences for White students.

Residence	Race, K-11	Probability of applying	Actual	Expected	Difference	Pct Diff. from Exp.
Hartford	Black	0.20	1667	1498	169 more Black students applied than expected	11%
	Not Black	0.17				
	Hispanic	0.17	1826	1977	151 fewer Hispanic students applied than expected	-8%
	Not Hispanic	0.20				
	White	0.18			No significant difference	
	Not White	0.18				

For suburban residents in the same grades, the differences were larger. Both Black and Hispanic suburban students were more likely to apply, while White students were less likely to do so. Specifically, we found that 1,130 more Black students (169 percent more) and 478 more Hispanic (48 percent more) students applied than expected, but 1,907 fewer White students applied than expected (47 percent less).

Residence	Race, K-11	Probability of applying	Actual	Expected	Difference	Pct Diff. from Exp.
Suburbs	Black	0.13	1797	667	1130 more Black students applied than expected	169%
	Not Black	0.04				
	Hispanic	0.07	1481	1003	478 more Hispanic students applied than expected	48%
	Not Hispanic	0.04				
	White	0.03	2147	4054	1907 fewer White students applied than expected	-47%
	Not White	0.09				

When we focused more closely on the racial composition of suburban towns, we found that students in suburbs with more than 60 percent minority enrollment were far more likely to participate in the lottery. Specifically, 1,482 more students from predominantly minority suburban towns applied than expected (132 percent more).

Residence	Student minority percentage of town, K-11	Probability of applying	Actual	Expected	Difference	Pct Diff. from Exp.
Suburbs	Over 60%	0.11	2605	1123	1482 more students from towns > 60% minority applied than expected	132%
	Under 30%	0.02				

4) Student achievement by residence

To examine achievement disparities, we focused on grade 3-8 students who received scores in three areas of the Connecticut Mastery Test (reading, writing, and mathematics). While 93 percent of suburban residents received scores in all three areas, only 82 percent of Hartford residents did so, probably due to higher proportions of exemptions for English Language Learners, special education students, or other reasons. For Hartford-resident test takers, those with higher CMT reading scores were more likely to apply to the RSCO lottery in Spring 2013, but we found no difference in the math and writing scores. By contrast, when we combined all suburban test takers with reported scores, those with higher CMT results in all three areas were less likely to apply to the lottery, with 279 fewer higher-scoring students than expected.

Residence	CT Mastery Test (higher-scoring = 4 or 5 in all three subjects) Grades 3-8	Probability of applying	Actual	Expected	Difference	Percent Difference from Expected
Hartford	All subjects higher	0.26			No significant difference	
	All subjects lower	0.25				
	Reading higher	0.27	900	846	54 more higher-scoring reading applied than expected	6%
	Reading lower	0.24				
Suburbs	All subjects higher	0.056	2059	2338	279 fewer higher-scoring students applied than expected	-12%
	All subjects lower	0.079				

F. Detailed Analysis

1) Characteristics of RSCO Applicants and Non-Applicants by Residence

The following tables describe characteristics of RSCO applicants and non-applicants in the pool of all PSIS students in 2012-13, in Hartford and the suburbs. In the general characteristics table, for example, 13 percent of Hartford applicants versus 4 percent of suburban applicants were English Language Learners. In the census characteristics, Hartford applicants lived in block groups with 26 percent home ownership versus 68 percent for suburban applicants. The achievement table reports percentages of higher-scoring students, defined as CMT levels 4 to 5.

General Characteristics of RSCO 2013 applicants and non-applicants in PSIS 12-13	**Hartford residents**			**Suburban residents in transp area**		
	All	Apps	Non-Apps	All	Apps	Non-Apps
All K-11	21027	3816 (18%)	17211 (82%)	131349	6267 (5%)	125082 (95%)
% Male	51%	50%	52%	51%	50%	51%
% English Language Learners (ELL)	18%	13%	19%	4%	4%	4%
% Special education needs	15%	13%	16%	11%	9%	11%
% Free or reduced-price meals	90%	94%	89%	29%	40%	28%
% Black	39%	44%	38%	11%	29%	10%
% Hispanic	52%	48%	53%	16%	24%	16%
% White	4%	4%	4%	65%	34%	66%
by Grade level						
% Kindergarten	9%	9%	10%	8%	9%	8%
% grade 1	10%	9%	10%	8%	8%	8%
% grade 2	9%	8%	9%	8%	7%	8%
% grade 3	8%	9%	8%	8%	7%	8%
% grade 4	8%	8%	8%	8%	6%	8%
% grade 5	8%	12%	7%	8%	19%	8%
% grade 6	8%	6%	8%	8%	7%	9%
% grade 7	8%	6%	8%	8%	6%	9%
% grade 8	8%	22%	5%	9%	21%	8%
% grade 9	10%	7%	11%	9%	6%	9%
% grade 10	7%	4%	8%	9%	3%	9%
% grade 11	7%	1%	8%	9%	1%	9%

Census Characteristics of RSCO 2013 applicants and non-applicants in PSIS 12-13	**Hartford residents by census block group**			**Suburban residents in transp area by town**		
All K-11, by census area (ACS 2009-13)	All	Apps	Non-Apps	All	Apps	Non-Apps
Average Pct owner-occupied housing	24%	26%	24%	71%	68%	72%
Average median household income	$29,540	$30,382	$29,325	$74,461	$68,987	$74,735

Achievement Characteristics of Applicants and Non-Applicants with 3 Reported Scores in Grades 3-8, CMT Spring 2013	**Hartford residents**			**Suburban residents in transp area**		
	All	**Apps**	**Non-Apps**	**All**	**Apps**	**Non-Apps**
Students with 3 scores reported	8186	2048	6138	61412	3896	57516
% High-Achieving Math level (4-5)	33%	32%	33%	72%	65%	72%
% High-Achieving Reading level (4-5)	41%	44%	40%	74%	70%	74%
% High-Achieving Writing level (4-5)	43%	44%	43%	71%	66%	71%
% High-Achieving in All levels (4-5)	20%	21%	19%	57%	50%	58%
Avg Math Vertical score (200-700)	490	500	487	534	536	534
Avg Reading Vertical score (200-700)	456	465	452	495	497	495

2) Hartford-Resident Applicants as Percent of School Enrollment

The table below lists schools in order of RSCO applicants as a percentage of Hartford-resident student enrollment.

Hartford-resident K-11 RSCO 2013 Matched Applicants as Percent of School Enrollment

School	Code	Type in 12-13	Applicants matched with PSIS	Pct of Total Apps	School Enroll (Hartford-res K-11 Oct '12)	Apps as Pct of Hartford-res School Enroll
Dr. Joseph Bellizzi Middle School*	0645311		31	0.8%	57	54%
Sarah J. Rawson Elementary School	0641711		209	5.5%	558	37%
McDonough Expeditionary Learning School	0641211		130	3.4%	384	34%
Simpson-Waverly School	0642611		93	2.4%	279	33%
West Middle School	0642111		200	5.2%	616	32%
M. L. King School	0641611		106	2.8%	336	32%
Kennelly School	0641011		206	5.4%	684	30%
Montessori Magnet School at Annie Fisher	0643711	magnet	23	0.6%	79	29%
Batchelder School	0640411		136	3.6%	482	28%
Two Rivers Magnet Middle School	2415014	magnet	31	0.8%	112	28%
Parkville Community School	0641511		134	3.5%	498	27%
Dr. Ramon E. Betances Early Reading Lab Sc	0642811		69	1.8%	258	27%
Dr. James H Naylor/CCSU Leadership Acade	0641411		180	4.7%	687	26%
Clark School	0642411		87	2.3%	361	24%
M. D. Fox Elementary School	0640811		128	3.4%	533	24%
Fred D. Wish Museum School	0642211		90	2.4%	375	24%
SAND School	0640111		110	2.9%	484	23%
Burr School	0642311		160	4.2%	706	23%
Renzulli Academy	0644011		25	0.7%	115	22%
Breakthrough Magnet School	0643311	magnet	34	0.9%	158	22%
Noah Webster Micro Society School	0642011	magnet	54	1.4%	252	21%
Expeditionary Learning Academy at Moylan	0643211		121	3.2%	586	21%
Sanchez School	0643011		92	2.4%	458	20%
University High of Science and Engineering	0646711	magnet	28	0.7%	148	19%
Montessori Magnet School	2413114	magnet	20	0.5%	106	19%
Burns Latino Studies Academy	0640611		105	2.8%	564	19%
Hartford Magnet Trinity College Academy	0645411	magnet	71	1.9%	393	18%
Hartford Transitional Learning Academy	0649011		7	0.2%	39	18%
STEM Magnet School at Annie-Fisher	0642511	magnet	31	0.8%	173	18%
Asian Studies Academy*	0640711		87	2.3%	514	17%
Achievement First Hartford Academy	2880113	charter	138	3.6%	824	17%
Milner Elementary School	0641911		59	1.5%	353	17%
Jumoke Academy	2610113	charter	55	1.4%	335	16%
Public Safety Academy	2415214	magnet	21	0.6%	135	16%
Reggio Magnet School of the Arts	2410314	magnet	16	0.4%	104	15%
High School Inc.	0647611		41	1.1%	286	14%
Betances STEM Magnet School	0643811	magnet	6	0.2%	44	14%
Great Path Academy Middle College High Sc	0647911	magnet	8	0.2%	59	14%

Table continued on next page

Global Communications Academy	0643611		55	1.4%	408	13%
University of Hartford Magnet School	2410214	magnet	18	0.5%	142	13%
Breakthrough II Elementary School	0643511	magnet	15	0.4%	123	12%
Museum Academy	2410514	magnet	12	0.3%	102	12%
Glastonbury/East Hartford Magnet School	2410114	magnet	6	0.2%	53	11%
R.J. Kinsella Magnet School of Performing A	0641111	magnet	35	0.9%	310	11%
Bulkeley High School Lower School	0646111		66	1.7%	586	11%
Environmental Sciences Magnet School at N	0640911	magnet	26	0.7%	260	10%
Culinary Arts Academy	0646011		19	0.5%	196	10%
HPHS Law and Government Academy	0647411		39	1.0%	416	9%
Academy of Aerospace and Engineering	2415114	magnet	16	0.4%	181	9%
Metropolitan Learning Center for Global an	2416114	magnet	12	0.3%	139	9%
Greater Hartford Academy of the Arts Magr	2415314	magnet	7	0.2%	85	8%
HPHS Academy of Engineering and Green T	0647211		26	0.7%	329	8%
International Magnet School for Global Citiz	2410414	magnet	7	0.2%	90	8%
Greater Hartford Academy of the Arts High	2416414	magnet	11	0.3%	143	8%
HPHS Academy of Nursing and Health Scien	0647511		28	0.7%	371	8%
Capital Preparatory Magnet School	0646911	magnet	18	0.5%	255	7%
Journalism and Media Academy Magnet Sch	0647711		9	0.2%	130	7%
Pathways Academy of Technology and Desi	0646611	magnet	9	0.2%	132	7%
Howell Cheney Technical High School	9001616	technica	8	0.2%	122	7%
Classical Magnet School	0646411	magnet	18	0.5%	278	6%
Sports and Medical Sciences Academy	0646511	magnet	14	0.4%	289	5%
Global Experience Magnet School	0116311	magnet	≤ 5	0.1%	22	na
Connecticut IB Academy	0436311	magnet	≤ 5	0.1%	36	na
Bulkeley High School Upper School	0647111		≤ 5	0.1%	209	na
Ana Grace Academy of the Arts Elementary	2410614	magnet	≤ 5	0.1%	25	na
Medical Professions and Teacher Preparatio	2416514	magnet	≤ 5	0.1%	77	na
Two Rivers Magnet High School	2416714	magnet	≤ 5	0.1%	28	na
Discovery Academy	2418114	magnet	≤ 5	0.0%	30	na
Connecticut River Academy	2456014	magnet	≤ 5	0.1%	119	na
A.I. Prince Technical High School	9001516	technica	≤ 5	0.1%	408	na
Others with Hartford residents			164		1798	9%
TOTAL			3816	100%	21027	18%

Note: This table shows only RSCO applicants matched with PSIS data.

Note: Bellizzi Middle School phased into Asian Studies Academy at end of 2012-13.

3) Statistical Analysis of the Characteristics of RSCO Applicants

The last two tables summarize our answer to this question: are students *with a specific characteristic* more likely to apply than students *without that characteristic?* Our key findings are featured in the front of this report. We tested to see if these probabilities are statistically significant, and if so, we reported the direction and magnitude of the difference. Since our sample size is large, small differences can be statistically significant, so we note that actual versus expected numbers to calculate the gap and place it in context. We use the Pearson chi-square statistic to test for statistical significance at the 95 percent level of confidence.

Hartford-resident Probability of Submitting RSCO 2013 Application by Characteristic

Hartford K-11	Probability of applying	Actual	Expected	Difference	Pct Diff. from Exp.
Male	0.18			No significant difference	
Female	0.19				
English Language Learner	0.13	500	676	176 fewer ELL students applied than expected	-26%
not ELL	0.19				
Special Ed	0.15	484	573	89 fewer SPED students applied than expected	-16%
not SPED	0.19				
Black	0.20	1667	1498	169 more Black students applied than expected	11%
Not Black	0.17				
Hispanic	0.17	1826	1977	151 fewer Hispanic students applied than expected	-8%
Not Hispanic	0.20				
White	0.18			No significant difference	
Not White	0.18				
Hartford in HPS K-11					
Median household income of census block group					
Over $40k	0.23	703	565	138 more higher-income applied than expected	24%
Under $20k	0.19				
Percent owner-occupied housing of census blk group					
Over 40%	0.23	755	592	163 more high-homeownership applied than	28%
Under 1%	0.18				
Hartford CMT Gr 3-8					
Higher Scoring (4-5)					
All subjects higher	0.26			No significant difference	
All subjects lower	0.25				
Reading higher	0.27	900	846	54 more higher-scoring reading applied than expected	6%
Reading lower	0.24				
Writing higher	0.26			No significant difference	
Writing lower	0.25				
Math higher	0.24			No significant difference	
Math lower	0.25				

Suburban Probability of Submitting RSCO 2013 Application by Characteristic

Suburban K-11	Probability of applying	Actual	Expected	Difference	Pct Diff. from Exp.
Male	0.047	3152	3221	69 fewer males than expected	-2%
Female	0.049				
English Language Learner	0.045			No significant difference	
not ELL	0.048				
Special Ed	0.040	592	693	101 fewer SPED students applied than expected	-15%
not SPED	0.049				
Free or Reduced Price Meal	0.068	2607	1818	789 more lower-income students applied than expected	43%
not FRPM	0.040				
Black	0.13	1797	667	1130 more Black students applied than expected	169%
Not Black	0.04				
Hispanic	0.07	1481	1003	478 more Hispanic students applied than expected	48%
Not Hispanic	0.04				
White	0.03	2147	4054	1907 fewer White students applied than expected	-47%
Not White	0.09				
Asian	0.08	598	361	237 more Asian students applied than expected	66%
Not Asian	0.05				
Student minority composition of town					
Over 60%	0.11	2605	1123	1482 more students from towns with > 60% minority applied than expected	132%
Under 30%	0.02				
Suburban CMT Gr 3-8 Higher Scoring (4-5)					
All subjects higher	0.056	2059	2338	279 fewer higher-scoring students applied than expected	-12%
All subjects lower	0.079				
Reading higher	0.060	2712	2879	167 fewer higher-scoring reading than expected	-6%
Reading lower	0.074				
Math higher	0.057	2526	2791	265 fewer higher-scoring math than expected	-9%
Math lower	0.079				
Writing higher	0.059	2574	2769	195 fewer higher-scoring writing than expected	-7%
Writing lower	0.074				

Conclusion

Connecticut's school desegregation strategy relies upon voluntary school choice programs, such as interdistrict magnet schools and city-suburban transfer programs. To evaluate the effectiveness of these programs, we needed clearer answers to the "who chooses?" question, by conducting a statistical comparison of applicants and non-applicants to the Regional School Choice Office lottery as demonstrated in this report.

Overall, when we compared Hartford-resident K-11 applicants to non-applicants in the RSCO 2013 lottery, we found some disparities. Hartford students who are English Language Learners were much less likely to apply, with 26 percent fewer students than expected. Hartford students with special education needs were somewhat less likely to apply, with 16 percent fewer than expected. Hartford students living in higher-income or higher-homeownership areas were more likely to apply, with 24 and 28 percent more students than expected, respectively. Regarding test score differences, Hartford applicants had slightly higher reading scores than non-applicants, but this disparity was small and was not found in any other subject areas. Along racial lines, we found that Hartford Black students were more likely to apply (11 percent more than expected), while Hispanic students were less likely (8 percent fewer than expected), with no difference for White students.

Among suburban students, the data reveal several large disparities. Suburban lower-income students were more likely to apply (43 percent more students than expected). Black suburban students were much more likely to apply (169 percent more than expected), and Hispanic suburban students were more likely to apply (48 percent more than expected), while White suburban students were less likely to apply (47 percent fewer than expected). Students in suburbs with more than 60 percent minority enrollment were far more likely to apply (132 percent more students than expected). Regarding achievement tests, higher-scoring suburban students were less likely to apply (12 percent fewer students than expected).

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