Pathways to Education:
An Integrated Approach to Helping At-Risk High School Students

Philip Oreopoulos
philip.oreopoulos@utoronto.ca
University of Toronto, NBER, CIFAR

Robert S. Brown
rob.brown@tdsb.on.ca
Toronto District School Board

Adam M. Lavecchia
adam.lavecchia@mail.utoronto.ca
University of Toronto

Abstract: Pathways to Education is a comprehensive youth support program developed to improve academic outcomes among those entering high school from very poor social-economic backgrounds. The program includes proactive mentoring to each student, daily tutoring, group activities, career counseling, and college transition assistance, combined with immediate and long-term incentives to reinforce a minimum degree of mandatory participation. The program began in 2001 for entering Grade 9 students living in Regent Park, the largest public housing project in Toronto, and expanded in 2007 to include two additional Toronto projects. In all three locations, participation rates quickly rose, to more than 85 percent, even though parents and students were required to commit in writing to conditions and high expectations of the program. Comparing students from other housing projects before and after the introduction of the program, high school graduation and post secondary enrollment rates rose dramatically for Pathways eligible students, in some cases by more than 50 percent.

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I. Introduction

Children from very poor social-economic backgrounds are subject to many stresses while growing up and are vastly more at-risk of ending up poor, incarcerated, unhealthy, and unhappy than children from more affluent backgrounds.[1] Not only do impoverished children often receive poorer parental investments - in part because parents are subject to many social-economic stresses themselves - they also are exposed to far worse school and neighborhood environments at critical development stages. This compounding adversity can take a serious psychological toll.[2] Ethnographic studies document harsh realities from being regularly exposed to violence, subject to low expectations and, overall, "weighed down by a world of no".[3]

Overarching programs have long been sought to meaningfully overcome these challenges. Evidence on their effectiveness is usually disappointing, but there are exceptions.[4] In the well-known Perry Preschool Project, extremely disadvantaged preschoolers from rural Michigan were randomly provided two years of intensive preschool and home visits by experienced teachers. More than thirty years later, those selected into the program were substantially less likely to have spent time in jail (28 versus 52 percent) and substantially less likely to have received government assistance (59 versus 80 percent).[5] More recent research also

[1] Holzer et al. 2008, Lynn and McGeary, 1990, and McLoyd, 1998.
[2] Dearing, 2008
[3] See Dvorak, 2010, Osofsky, 1999, and Polidano et al. 2012. For ethnographic study examples, see Venkatesh, 2000, and the BBC documentary series, "Growing up poor" (http://www.bbc.co.uk/programmes/b01s8p78/episodes/guide, accessed on August 1, 2013).
[4] Camilli et al, 2010
[5] Schweinhart et al., 2005

points to promising interventions directed at disadvantaged adolescents. Some chartered schools accepting poor students into their programs by lottery have been shown to generate impressive long-term benefits.[6] Dobbie and Fryer (2011b) identify common features among them, including more time in school, tutoring, after-school assistance, and a culture of high expectations. Fryer (2012) finds applying these features to public schools can lead to similar estimated impacts. Similarly impressive gains to high school attainment and academic performance were found from another recent randomized trial that provided daily two-on-one tutoring combined with social-cognitive behavioral therapy to disadvantaged students from Chicago (Cook et al., 2014).

This paper evaluates another recent effort to comprehensively help at-risk youth escape from chronic poverty. The Pathways to Education Program (Pathways) began as a grass-roots effort by staff from the community health center of Regent Park, Canada's oldest and largest public housing project, in Toronto. Regent Park represents one of Canada's poorest neighborhoods. It comprises of 2,087 high- and low-rise apartment units within a self-contained downtown community, and is home to 7,500 residents, all paying rent-geared-to-income. The community faces relatively high levels of crime and gang activity. From the 2001 census, 87 percent of family households living in Regent Park are classified as falling below Statistics Canada's Low-Income Cut-Off (LICO), 56 percent of residents are

[6] Dobbie and Fryer, 2011a, Abdulkadiroglu et al., 2011

single parent, and 59 percent of residents have no earnings.[7] In the 1990s, more than half of Regent Park youth failed to complete high school.

From this backdrop, the Board of Directors for the Regent Park Community Health Centre began to discuss a plan for the development of a program that could promote and support academic achievement for Regent Park youth, with the ultimate goal of fostering a more positive community environment. The program adopts a multi-faceted approach, offering extensive tutoring, mentoring, and financial support (such as bus tickets tied to attendance at school and bursaries for postsecondary schooling), as well as easy access to student-parent workers who provide information and advice as needed on a wide range of issues. After several years of consultation and obtaining seed funding, the program began in the 2001-2002 school year for entering Grade 9 students from Regent Park, and was phased in for successive Grade 9 cohorts each year thereafter. Eligibility is based solely on residing in Regent Park, though participation requires parents and students to commit to the program's high expectations in writing each year.

The Boston Consulting Group (BCG) conducted a pro bono evaluation of Pathways in 2007 and concluded that the program led to a fall in the high school dropout rate from 56 percent to 10 percent. A concern with this evaluation is that it involved comparing dropout rates among Pathways participants to a group previously living in the same area. In other words, the comparison group included everyone that would have been eligible for the program, but the treated group

[7] A household falls below the LICO if they spend more than 20 percentage points above the average comparative household on food, clothing, and shelter. For example, if the average Canadian family spends 35 percent of before-tax income on food, clothing, and shelter, a family that spends more than 55 percent of before-tax income on these items falls below the LICO.

included only participants, possibly those who would have done better anyway. The BCG evaluation also did not account for the general tendency for dropout rates to decline over time when looking at successfully younger cohorts. Data and full details of the study were never made available, making follow-up analyses and further exploration challenging.

Few other youth intervention evaluations find such large effects as the BCG study does for Pathways. If the size of these program impacts could be replicated in other settings, scaling up the Pathways program could lead to a highly effective strategy for helping disadvantaged youth. This paper represents a more transparent attempt to evaluate impacts from the introduction of Pathways. We compare students from Regent Park and other Toronto housing projects entering high school between 2000 and 2007 to produce a more convincing and clear evaluation of the Program's initial impact on high school completion, postsecondary enrollment, as well as on intermediate school attainment measures within high school. We also explore differences in Pathways participation and impacts by gender, language spoken at home, and initial academic ability.

Matching Pathways participants to Toronto District School Board high school students from Regent Park, we find Pathways participation rates quickly rose to more than 85 percent. While our estimated effects are not on the same order of magnitude as those concluded in the BCG study, they are nevertheless impressive. We estimate that Pathways eligibility increased high school completion by 40 percent (from 38 to 53 percent) and post secondary enrollments by more than 50 percent (from 34 to 53 percent). We find intermediate effects on math and reading

scores, as well as on the likelihood of taking more university prerequisite courses. Pathways appears to impact females more than males, but immigrant and non-immigrant families equally.

The expansion of Pathways in 2007 at two additional Toronto housing projects (Rexdale and Lawrence Heights) provides an opportunity to check the internal and external validity of the Regent Park estimates. Even when looking only at the first year impact of the program, results are consistent for the expansion sites compared to Regent Park - almost full participation among eligible students (85 percent), and a very large relative increase in high school completion. College enrollment impacts are also significant for males.

The next section better details the structure of the Pathways program. Section III describes the data. Section IV presents the main results and several robustness checks. Section V concludes with a discussion on costs, possible mechanisms underlying the results and an outline for further research.

II. The Structure of the Pathways to Education Program[8]

A. Origins

The Pathways to Education program began as an effort to address poor academic performance by youth from Toronto's Regent Park, Canada's largest public housing project. Regent Park is comprised mostly of immigrants (69 percent in 2001), hailing from a wide range of countries, including Somalia, Bangladesh, the Congo, Vietnam, China, and Latin

[8] For more details about the origins and administration of Pathways to Education, see Bales, 2004, Rowen and Gosine, 2006, and Rowen, 2012.

America. It is difficult to obtain data to determine the extent of criminal activity by neighborhood in Canada. However, what little data does exist suggests that Regent Park's residents experience significant crime and drug activity (Oreopoulos, 2008). In 1992, there were 55 reported assaults causing bodily harm on Regent Park property, a rate of about 15 per 1,000 residents (26 per 1,000 households). That number is much higher than the 1995 rate of 1.7 assaults per 1,000 residents in the Toronto Census Metropolitan Area).[9] Nine murders occurred in the year Pathways was introduced (Rowen, 2012). In 2010, a string of shootings left three dead over three weeks. In 2013, a 15 year-old Pathways student was shot and killed.

Historically, Regent Park experienced much higher dropout rates than the rest of Toronto. A cohort of students who entered Grade 9 in 1993 in the former Toronto Board of Education was tracked for a number of years to assess dropout rates. This analysis revealed that, among Regent Park students, the fraction still in school or out of school without a diploma by the end of the sixth year of high school was 56 percent compared with 29 percent for students in the rest of the city.

In the mid-1990s, the Board of Directors for the Regent Park Community Health Centre began to formulate an action plan for encouraging "Community Succession", a vision of greater economic mobility involving children growing up to take on successful careers and, in turn, giving back to the community that helped them attain these goals. Members of the board were heavily influenced by a presentation from Jack Geiger at a 1995 International Conference of Community Health Centres, held in Montreal. Geiger presented a case study of how the Tufts-

[9] The housing project data comes from previous Metro Toronto Housing Corporation security tabulations. Toronto and Chicago assault tabulations are from Statistics Canada (1995) respectively.

Delta Health Center in the late 1960s expanded its operations to take on a larger role of community development and foster social change.[10] The expansion included public transportation, a pre-Head Start early childhood enrichment program, a nutritional and recreational program for elderly residents, a supplemental food program, and a crop sharing cooperative. Geiger said the most important impact of the expansion was a multi-faceted educational program, providing evening high school equivalency and college preparatory courses, as well as assistance with college and professional school applications and providing scholarship information and university contacts. He argued that the education program increased social and human capital and led to a positive cycle of improved community development.

Over the next five years, board and staff members from Regent Park's Health Centre constructed the Pathways to Education program based on this idea of community succession and a review of research of other programs that might work in the Regent Park setting, along with discussions with community members and other stakeholders. Members initially considered including a summer job program for youth finishing high school to give students job experience and a larger employment and training initiative for older youth, but decided to focus on education to keep operations at a manageable scale. With funding from the Ontario Trillium Foundation, the program began initially in the 2001-2002 academic school year for approximately 115 students living in Regent Park and transitioning into Grade 9. Each year another cohort was added. By the 2004 to 2005 academic year, enrolment reached 615.

[10] A version of the presentation was published. See Geiger (2002).

Eligibility for Pathways is inclusive, based only on residence. In contrast to other programs that specifically target students based on criteria such as financial need or initial academic ability, Pathways is available to every Regent Park youth attending high school (beginning with students entering Grade 9 in 2001). Participation is voluntary, and requires both students and parents to agree each year in writing to the program's conditions and high expectations.[11] To recruit students, Pathways developed strong ties with the five elementary schools that include Regent Park in their catchment areas. Schools help identify eligible students, provide contact information, and facilitate meetings with parents.

B. Pathway's Four Pillars

There are four pillars of support to the Pathways program: Counseling, Academic, Social, and Financial. Each student is assigned to a Student-Parent Support Worker (SPSW), who is employed full-time by Pathways. SPSW's serve as the main connection between students and the program. They are responsible for working with each student and parent to help ensure academic success. The relationship begins prior to the start of high school at a mandatory orientation session. Students are required to meet with their SPSWs at least twice a month, more if needed. Through relationships with high schools, SPSW's monitor students' absenteeism, grades, and other participation in Pathways activities. They provide information to students about events and community resources and distribute free bus tickets. SPSWs often serve as the go-to people for dealing with any issues that

[11] Copies of both agreements are shown in Appendix A.

may arise at home, school, or around the community. They are each responsible for approximately 50 students over a school year, and end up focusing more of their time on those who appear to need it most. If crises or issues arise, they may work together with other facilitators to determine how best to manage these situations. Many SPSWs maintain contact with their students after graduation on an informal basis.[12]

Pathways participants also receive extensive academic support in the form of free local evening tutoring, provided up to four nights a week. Tutoring is conducted both in small groups and on a one-on-one basis. It is available in core academic subjects, as well as for development of literacy and general study skills. Tutoring is mandatory twice a week, with exemptions for students with previous term grade averages above a threshold (60 percent in Grade 9, 70 percent in Grade 10 and beyond). Tutors are volunteers that receive some training and help about 5 hours per week, on average. They include accountants, retired teachers, bank managers, parents of students, graduate students from teacher colleges, and even current and former Pathways students. The student-tutor ratio is generally less than 5 to 1.

In Grades 9 and 10, Pathways students receive social support in the form of group mentoring. Students are required to participate every two weeks, choosing from a range of activities focused on fostering social and group work skills and a commitment to the community. Previous examples included attending sporting

[12] A 2009 documentary film, "Invisible City", follows two struggling Regent Park and Pathways students over three years, and an SPSW worker that tries to help them. The film can be viewed here: http://www.nfb.ca/film/invisible_city/trailer/invisible_city_trailer

events, theatre, participating in creative arts, cooking, bowling, community recycling projects, and martial arts. Group mentoring now includes workshops from the "YouCan" program to teach conflict resolution.[13] Each group is comprised of approximately 15 youth and 3 volunteer mentors, who are often university students. By Grades 11 and 12, students may still choose from specific activities offered, but also may play more of an active role in choosing more independent activities based on their own talents and interests. SPSWs and students agree on biweekly activities that may occur within or outside of the community (including tutoring younger grades). Social support also comes in the form of career mentoring. Pathways offers many events for students preparing to exit high school, including resume preparation classes, job interview practice, college and university campus visits, and visits to potential employers. Students also receive personal assistance from SPSWs on post secondary applications, including fee waivers.

The final pillar of Pathways support is financial. Support comes in two forms: immediate assistance, for helping with the costs of going to school, and longer term assistance, for helping with the costs of going to college. Free public transportation tickets and school supplies are provided to Pathways participants, but they must meet with their SPSWs to get them. Tickets are allocated bi-weekly based on previous period school attendance. The largest three attended high schools by Pathways students are 2, 3, and 5 kilometers away. Evidence from focus groups and staff experience suggests that the tickets provide strong motivation for

[13] www.youcan.ca

program participation and going to school.[14] One of the most expensive components of the Pathways program is a trust fund for each participant. For each year of participation the program sets aside $1,000, up to a maximum of $4,000 that can be used toward tuition and other post secondary expenses after high school graduation.

If students in Pathways miss school, or miss mandatory SPSW meetings, tutorial sessions, or group mentoring workshops, their SPSWs will have a conversation with them. SPSWs will first focus on encouraging attendance before mentioning the possibility of program withdrawal. If lack of participation is discussed and no meaningful response occurs, a warning letter is sent home to a parent. If there is still no progress, they may be dropped from the program. Very few students are ultimately dropped. As the Pathways Coordinator of Tutoring and Mentoring previously remarked, "We do not give up easily...Our philosophy is that you set high expectations and the kids will rise to them. If they haven't met them, they are on their way. If they have made a mistake, we try to help them see it as a small setback." (Bales, 2004).

C. Expansion

[14] In one focus group, a student remarked, "If I don't go to school one day and like next time, I get my tickets, my SPSW would be like, you didn't go to school these days, and so you'd get two less tickets 'cause this day you didn't go to school so you shouldn't have those tickets and so you know, you can't skip because you're like damn I need these tickets.". Another Grade 11 student remarked, "I have to go [to tutoring] because of Pathways. If I don't go I'm not gonna get my tickets to go to school, if I don't get my tickets, I can't go to school there's no other way...except...walking."

A pro bono evaluation by the Boston Consulting Group reported in 2007 that Pathways led to a rapid fall in the high school dropout rate, from 56 to 10 percent. As mentioned above, full details of the report were not made public and the pre-pathways sample included all eligible for the program (living in Regent Park), while the post-Pathways sample included only those in Pathways. Nevertheless, the report generated wide public attention and attracted various organizations, including government, in wanting to provide further support. Other community organizations also became interested in adopting the Pathways program for themselves. A new charitable foundation, called Pathways Canada, was established to raise money and oversee expansion across the country.

Pathways Canada secured funding to expand in 2007 to two more sites in Toronto. Targeted sites were among the city's 13 "priority neighborhoods", inner city areas with a combination of high crime activity and high social service need. Almost all of these neighborhoods include large public housing projects. Like Regent Park, interest in adopting Pathways drew support from the neighborhoods' community health centres. Pathways Canada selected the Rexdale Community Health Centre in Rexdale (Jamestown) and Unison Health and Community Services in Lawrence Heights to operate the program beginning for residents from these areas entering Grade 9 in 2007 and phased in each year with an additional Grade 9 cohort. The Rexdale catchment area and housing project, located in the northwest end of Toronto, is about one-fourth the size of Regent Park, while the Lawrence Heights catchment area and housing project, located north of the city centre, are

about one-half the size of Regent Park.[15] Both neighborhoods are comprised largely of immigrants and low income families from ethnically diverse backgrounds. Crime and gang activity are relatively high compared to the rest of the city.

Pathways expanded to three other sites in 2007 outside Toronto: Ottawa, Kitchener, and Montreal. In 2009, Scarborough Village in Toronto was added, along with another low-income community in Hamilton. In 2010, three new sites were added in Winnipeg, Kingston, and Halifax. Shawinigan (Quebec) was added in 2012.

III. Data and Methodology

A. Toronto District School Board Data

Data compiled for this study comes from three main sources: the Toronto District School Board (TDSB), Toronto Community Housing (TCH), and Pathways administrators. TDSB administrative data are available for high school students that entered Grade 9 beginning in 2000, the year prior to when Pathways was introduced.[16] Our baseline data begins with all recorded students entering Grade 9 at a TDSB school between 2000 and 2007.[17] Background information includes

[15] The Rexdale project include 554 housing units. Lawrence Heights housing project contains 1,452 housing units, while Regent Park contains 2,429 housing units. Both sites include in their catchment areas a small fraction of nearby residential homes outside the housing projects, though we do not include students from these outside homes in our sample.

[16] Brown (2006) describes this data in more detail.

[17] Students attending Catholic or private schools are therefore not included in the sample analysis. This omission does not likely affect estimated program impacts given the small fraction attending non-TDSB

gender, immigrant status, an immigrant's year of arrival, language spoken at home, age, high school attended, and residential address in Grade 9.

We estimate Pathway's impact on a variety of outcomes, beginning in Grade 9. The TDSB data contain information on grade performance in Grade 9 mathematics and English courses. Each subject variable indicates a students' performance level in the course: 0 for students who had not achieved a credit by the end of their first year (i.e. failed the course); 1 for students who completed with an average mark of 50 to 59 percent; 2 for students with an average of 60 to 69 percent; 3 for students who completed with an average mark of 70 to 79 percent; and 4 for students with an average mark of 80 percent or more.[18] We also create a summary dummy variable for Grade 9 performance equal to 1 if the sum of the English and Mathematics variables is one or less (which we call 'low Grade 9 grades'), zero otherwise.

Our data also indicates whether students passed both the Reading and Writing components of the Ontario Secondary School Literacy Test (OSSLT) when the test was initially taken in Grade 10. The OSSLT is a standardized test designed to be written by all Grade 10 high school students in Ontario. Passing both components of this test is a requirement for high school completion. Students that did not write for at least one of the two days of the test are treated as having not passed.

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schools (about 10 percent) and the fact that Pathways eligibility is based on location of residence, not location of school.

[18] We recode a small fraction of students with missing values as having attained 0 level.

We also record whether a student takes courses in grade 9 and 10 that place him or her on a university track. Under the Ontario secondary school curriculum, students choose a program of study that includes grade 9 and 10 courses that are classified as academic (university-directed), applied (college-directed), or locally developed essentials (workplace-directed). Our indicator variable takes on a value of one if a majority of courses taken in grades 9 and 10 are academic, zero otherwise. About three-quarters (75.8 percent) of students from the 2000 cohort for all of Toronto are classified as on academic track, compared to about half (48.7) for our sample of public housing tenants.

Our outcome variable for high school graduation within five years is equal to one for students recorded as completing their Ontario Secondary School Diploma (OSSD) by the end of their fifth year from entering high school (in Grade 9), or as having completed at least 30 credits (a student with 30 or more credits but without being recorded as graduated is likely due to measurement error). It is equal to zero otherwise for students that either (i) remained in the TDSB system the following Fall (in year 6), (ii) transferred outside TDSB to another school system, or (iii) left school without graduating. The alternative variable of graduating or returning in year 6 generates almost identical results.

Ontario's two central application service organizations for postsecondary education (one for colleges, another for universities) provide TDSB with application data and confirmations of acceptance. We have information on whether our entering Grade 9 students eventually applied to and accepted a college or university program within five years. Students are only permitted to accept one offer. For

exposition we refer to this outcome as enrolled, since virtually everyone that accepts an offer enrolls.

B. Public Housing Address Data

The TDSB data is matched to Toronto public housing projects using uniquely identifiable postal codes. We focus on the 113 projects built before 1976 by the Metro Toronto Housing Corporation Authority, now called Metro Toronto Housing (MTC).[19] To create a publicly available dataset, some nearby and small projects are grouped together, ending up with 57 housing project groups. Addresses for these locations were obtained from MTC directly and cross-checked using Canada Post's online postal code finder. Every household residing in these projects pays rent geared to income.[20] That is, approximately 25 to 30 percent of a household's gross total income is charged as rent.

For any given period, all MTC housing applicants use the same form. Prior to 1995, applicants were placed on a waiting list based on a point system. Households were given points primarily based on financial need, but also on current living conditions, welfare participation, overcrowding, and whether they were living in emergency housing. High demand for subsidized housing meant only those families who attained the near-maximum number of points were given offers of

[19] Projects that accommodate only seniors and a small number of projects that house only aboriginals or special needs families were omitted.
[20] Smaller MTC projects built after 1976 allowed for mixed housing, with some households paying rent-geared to income, others paying market rent. We omit these residences to focus on a comparison group of Grade 9 students whose parents only pay rent-geared to income.

accommodation, and even then these families waited an average of one and a half years. Those with the most points were housed first, giving preferences to families most in distress. Beginning in 1995, MTC adopted a more chronological order approach to the waiting list, with special consideration given to new arrivals to Canada, the homeless, and for those in domestically violent situations. Even for those that qualify for special consideration, wait times for offers of accommodation were often substantial. Average wait times in 1998 were 5 to 7 years (Toronto Social Housing Connections, 1998).

With these long wait times, families had an incentive to remain eligible for accommodation in as many housing projects as possible. The ability to state housing preferences varied over time. In the early 1980s, families could not specify which project or area they wished to be housed. The application form in the 1990s made it easier to indicate area preferences (across 15 to 17 possible city zones). Families could indicate they only wanted to be listed for specific communities or projects, however doing so would likely lead to longer wait time before an offer of accommodation. Currently, a family that does not specify any preference on the MTC application is automatically placed on the waiting list for housing developments in the zone of current residence.

Pathways was not announced to residents prior to its initial recruitment, both in Regent Park and in the expanded 2007 sites, Rexdale and Lawrence Heights.. Given the chronological approach to assigning applicants to public housing units and the long wait times, it is unlikely that households with a preference to go to these projects because of Pathways would be in our data (in general, applicants

have a preference for smaller projects to avoid living in neighbourhoods with a high density of poor households). Movement across projects is rare and not allowed without exceptional reasons (e.g. change in work location).

We match public housing postal code addresses, recorded when entering Grade 9, to the TDSB data. Each code generally refers to one side of a city street, often over only one block or a single apartment building. Approximately three-fourths of families living in these postal codes were located in public housing addresses with unique postal codes. To help ensure similarity across our sample, with all families paying rent-geared to income and facing a similar application process, we only use postal codes that uniquely match to these projects. The baseline sample from this match is 6,901 students that began Grade 9 at a TDSB high school between 2000 and 2007 while residing in a Toronto public housing project in which all parents were subject to rent-geared to income.

C. Pathways Participation Data

Pathways registration and participation data were also matched to the baseline TDSB data. Pathways administrators provided a list of all students ever registered for the program since its inception in 2001. Information on student name, gender, day of birth, and especially Ontario Education Number (OEN) made it possible to link the two datasets.

We also have registration status for 2007. This allows us to examine changes in registration status between Grades 9 and Grade 12 for the 2003 cohort, changes

in status between Grade 9 and Grade 11 for the 2004 cohort, and changes in status between Grade 9 and Grade 10 for the 2005 cohort. Finally, we also have information on recorded monthly mentoring and tutoring sessions attended in 2003, 2004, and 2007.

D. Difference-in-Difference Analysis

Intent-To-Treat (ITT) effects are estimated from a difference-in-differences methodology, looking at the relative differences in outcomes between students from Regent Park, Rexdale, and Lawrence Heights and students from other housing projects before and after Pathways was introduced. Our baseline results are from the following regression model:

(1) $y_{ipc} = \beta T_{ipc} + \delta' X_{ipc} + e_p + e_c + e_{ipc}$

where y_{ipc} is an outcome variable for individual i, from housing project p, who entered Grade 9 in year c. T is a dummy variable indicating whether an individual is eligible for Pathways. X is a vector of the individual's demographic characteristics, including gender, age in grade 9, immigrant status, and a dummy variable for whether English is the primary language spoken at home. The coefficient of interest is β, the average effect of being eligible to participate in Pathways. To explore whether Pathways generated similar effects when initially

introduced in Regent Park and when expanded, we estimate ITT effects separately for the 2000 to 2006 period, when only Regent Park introduced Pathways, and for the 2001 to 2007 period, when the two expansion sites introduced the program.[21] Given the smaller sizes of Rexdale and Lawrence Heights, we combine the two sites and refer to them collectively as Rexdale/LH.[22]

Standard errors are clustered by housing project to allow for correlation in the outcomes of students residing in the same housing project across school years[23]. We also present results using alternative inference methods based on the wild cluster bootstrap, a synthetic control group, grouped means and with confidence intervals computed using the method described in Conley and Taber (2011) in Appendix B.[24]

It is fortuitous from a research perspective that the program was rolled out for successive cohorts. Grade 10 Regent Park students in 2001 and Grade 10

[21] Combined average program effect estimates, over the 2000 to 2007 period are shown in the appendix. An alternative approach of estimating separate Pathways effects for Regent Park and Rexdale/LH over the 2000 and 2007 period requires dropping observations from the other treated site and thus reducing sample size. Results are similar, and reported in the next section.

[22] We also report estimated program effects at each new site, which are generally similar but some confidence intervals are too wide to draw precise conclusions.

[23] With 57 housing projects (clusters) in the final dataset, all inference is based on 57 – 1 = 56 degrees of freedom. As is well known (see Cameron and Miller (2013)), the CRVE are asymptotically valid as long as the number of clusters gets large. Our final dataset with 57 clusters is consistent with Angrist and Pischke's (2009) "42" rule of thumb. Finally, all clusters have more than 30 observations.

[24] Recent Monte Carlo evidence suggests that the cluster robust variance estimator (CVRE) may lead to standard error estimates that are biased downwards when cluster (group) sizes are different and when the proportion of treated clusters is very small (MacKinnon and Webb (2013)). On the other hand, existing methods to correct for cases like ours, with different cluster sizes and small proportion of treated clusters, may be biased towards rejecting true effects. As discussed in Appendix B, recent literature suggests conducting inference using standard errors from a cluster wild bootstrap procedure. However, Mackinnon and Webb (2013) show that cluster wild bootstrap standard errors severely under-reject true null hypothesis when the proportion of treated clusters is very small, the opposite problem of the CVRE standard errors. As a result, it is likely that the "true" standard errors are somewhere between the two. Moreover, the main qualitative finding that eligibility for Pathways led to large and statistically significant effects on academic outcomes is robust to these two procedures and others, as shown in the Appendix. while the data in this application feature both different cluster sizes and small proportion of treated clusters, given the lack of consensus in the literature we use the CVRE for our baseline estimates.

Rexdale/LH students in 2007 were never eligible for Pathways. The possibility exists of spillover effects, if these earlier cohorts benefited from Pathways improving outcomes of later cohorts. This would tend to bias estimated program effects downwards. Given that Pathways students account for about a quarter or less of all students in a given cohort at a given high school, aggregated spillover effects may be small.

The difference-in-differences approach requires two main assumptions for causal inference: 1) underlying pre-Pathways differences between projects that eventually adopt Pathways and comparison projects remain fixed, even after the program is introduced, and 2) the counterfactual outcome path for Pathways projects follows same pattern as that for the comparison projects. We conduct a number of robustness checks to assess the reliability of these assumptions. First, we use alternative comparison groups (only very large projects, only downtown projects, only future projects (for Regent Park), or only projects within the 13 city designated 'at-risk' neighborhoods). Second, we use the 1996 and 2001 micro census files, with postal codes, to test whether a more detailed set of background characteristics remain relatively similar for cohorts over a longer time series than we have available from the TDSB data. Comparing program effects using more than one program introduction over different time periods, of course, also provides a robustness check to the overall results, and a check on external validity for whether the impacts from the program's initial introduction can be replicated in other locations. It also should be reassuring that we find similar significant effects for different sub-groups, suggesting our findings are not spurious.

E. Descriptive Statistics

Table 1 presents sample size counts of our baseline data. From the total of 6,901 students entering a TDSB school in Grade 9 between 2000 and 2007 from a Metro Toronto Community housing project, 1,274 are from Regent Park, 737 are from Rexdale/LH, and 4890 are from other projects. We track roughly 150 students entering Grade 9 from Regent Park each year, 90 students from Rexdale/LH each year, and and about 600 students from other projects.[25] The 863 students in the 2000 Grade 9 cohort compares to the 18,798 students in the Toronto District School Board (Brown, 2006).

The table also describes average demographic characteristics for the combined sample of 2000 to 2007 cohorts in our baseline data. The table shows a difference in language spoken at home between students from Regent Park and other projects. The fraction of students whose language at home is not English is the highest for those from Regent Park (74.5 percent) compared to any other development. The next highest are 68.0 (Quebec High Park), 66.7 (Stableford Farm), 59.3 (Edgeley Village), 56.8 (Blake Street), 56.8 (Flemington Park), 56.4 (Alexandra Park), 56.2 (Kennedy Road), and 56.0 (Beecker Street) percent. A likely explanation for these differences is that Regent Park contains larger unit sizes, on

[25] Regent Park's cohort sample more than doubles between 2006 and 2007. While we have no background information to explain the sharp rise, we do not have reason to believe the data are incorrect. Pathways participation data show a proportionate rise between those years, and descriptive background variables remain, on average, the same. In any case, our main program estimates for Regent Park exclude the 2007 cohort, and when we do include it, estimates are generally the same.

average, to accommodate larger families than other housing projects. Ethnic and immigrant composition have generally not changed over cohorts. In our impact analysis, controlling for differences in language spoken at home does not substantially alter the results, and we find similar effects for immigrants and non-immigrants.

F. Pathways Registration and Participation

All children living in Regent Park and entering Grade 9 beginning in the 2001-2002 school year are eligible to participate in Pathways, as are entering Grade 9 students in 2007-2008 living in Rexdale/LH. Participation requires students and their parents to first register each year by completing an agreement form. To help enlist households, administrators obtain Grade 8 classroom lists from local elementary schools and go door-to-door to encourage those eligible to register. Those introducing the program are usually community members themselves. Registration efforts also involve advertising throughout the housing project and word of mouth. The Community Health Centres that deliver Pathways are conveniently walking distance from housing project residents.

Figure 1 shows Pathways registration rates among TDSB students entering Grade 9 between 2000 and 2007. In the first year of the program in Regent Park, 58.8 percent of eligible students registered. In the second year the fraction registered climbs to 80.7 percent and by the third year, 89.3 percent of all Regent Park Pathways eligible students located in the TDSB data are matched to the

program registrant list. The fraction registered remains high for the remaining four years of recorded data and even climbs to 96 percent for the 2007 cohort. This represents a remarkably high coverage rate of eligible students. The Pathways participation rate in the initial year at Rexdale and Lawerence Heights is also impressive, at 83.3 and 87.7 percent respectively.

Not shown in the tables, but worth mentioning is that Grade 9 registration rates are similar for males and females, English speaking and non-English speaking students, and for low and high performing students. For example, Grade 9 male and female Pathways registration rates among the 2004 Grade 9 cohort from Regent Park are 86.4 percent and 91.3 percent respectively. Four years later, registration rates for those still in school were 80.0 percent and 86.4 percent respectively. Initial Pathways registration rates are also similar between eligible students speaking English and not speaking English at home (85.2 percent and 90.1 percent respectively). Finally, while Grade 9 math and English grade performance variables (0 if a grade less than 50 percent, 1 if grade is 50 to 59 percent, etc…) may well be endogenous to Pathways participation, it nevertheless is interesting to note similar rates of participation between those whose sum of these two variables was one or less and those whose sum was greater than one (85.7 percent versus 90.0 percent respectively).

Participation in various Pathways activities was not well recorded. At least up to 2007, no data was collected on public transportation ticket provision or SPSW visits. Group mentoring and individual tutoring sessions were recorded, but even for these cases, data quality is unclear. Tables 2A and 2B show monthly mentoring

and tutoring sessions attended for the 2003 Grade 9 cohort enrolled in Pathways. Generally, participants were required in Grades 9 and 10 to attend two tutoring sessions each week unless exempted based on grade performance, and were required to attend two group mentoring sessions each month. Yet, the Table 2A suggests that registrants were attending only about half of these required sessions, on average. In the first recorded month of October in Grade 9, for example, 2003 registrants attended 3.9 tutoring sessions and 1.0 mentoring activities, on average. Tutoring activity falls off to between 2 and 3 sessions attended each month, on average, after December, likely due to some students becoming exempt. We find slightly higher tutorial attendance in Rexdale/LH during its initial Pathways year in 2007, and lower group activity, relative to Regent Park.

Among those attending any tutorial sessions in a given month, Table 2B shows the number of sessions attended remains above 4, on average. Group mentoring activity, among those that do go, is similar across program sites, around 1.5 times a month. Taken at face value, the data imply that registrants are not attending all the mandatory tutoring and mentoring sessions. On the other hand, the data do indicate significant and regular attendance throughout the school year.

IV. Impact of Pathways on High School Achievement and Postsecondary Enrollment

A. Graphical Summary

Figures 2A and 2B summarize our high school completion results graphically. Figure 2A shows high school completion rates by the end of 5th year for youth that

entered high school in Grade 9 between 2000 and 2007 from different Toronto Public Housing Projects. 38.2 percent of students from Regent Park that entered Grade 9 in 2000 (and not eligible for Pathways) graduated by their fifth year.[26] The graduation rate for students entering Grade 9 a year later -- the first year of Pathways -- rises to 52.0 percent, a 13.8 percentage point increase. The rate increases further, to 60.0 percent for the 2002 Grade 9 cohort, and then remains relatively stable to 2007, with the exception of a jump up in 2004 (to 68.1 percent) and a jump down in 2005 (to 53.0 percent). Thus, the graduation rate rises steadily for students from Regent Park corresponding exactly to the rise in Pathways participation (58.8 percent in 2001 and 80.3 percent in 2002). In contrast, the figure indicates, only modest and slow improvement for cohorts from other projects (excluding Rexdale/LH). Initially, a higher fraction of students from these other projects go on to finish compared to Regent Park, but after Pathways is introduced, the pattern is reversed.

By assuming graduation rates in Regent Park would have followed the same pattern as that in other projects if Pathways had not been introduced, we can estimate the program's overall impact on becoming eligible. Figure 2B shows this graphically by normalizing graduation rates by initial site differences observed in 2000. Between cohorts 2000 and 2001, the figure shows a relative rise in the Regent Park graduation rate by 15.4 percentage points, the period Pathways is introduced. Similarly, using all 2000 to 2007 cohorts, the relative graduation rate in

[26] Another 13.5 percent remained in TDSB the following year, 7.4 percent transferred outside TDSB, and 40.5 percent dropped out.

Regent Park after the introduction to Pathways increases, on average, 13.5 percentage points, a significant improvement.[27]

The break in trend for Rexdale/LH graduation rates in 2007 also corresponds to the introduction of Pathways. High school graduation rates at Rexdale/LH follow closely the rates observed for the comparison projects from 2000 to 2006, then jump from 49.0 percent to 64.4 percent in 2007, when the program was introduced. That is a 10.6 percentage point increase in the graduation rate relative to the rate change between 2006 and 2007 at the comparison project sites.

B. Regression Analysis

Table 3 shows our main estimated effects of Pathways eligibility on high school graduation for Regent Park and Rexdale/LH, both for the full sample and for various subgroups. As outlined in equation (1) and discussed in the previous section, outcomes are regressed on a Pathways' eligibility indicator (student is from Regent Park and entered Grade 9 in 2001 or later or student is from Rexdale/LH and entered Grade 9 in 2007), as well as a set of dummy variables for housing project and cohort, along with controls for age when entered grade 9, gender, immigrant and home language status. We drop the 2007 Grade 9 cohort when estimating Regent Park program effects and drop the 2000 cohort when looking at

[27] Also noteworthy is that the estimated treatment on the treated (TOT) effects are almost exactly the same when using the first year of Pathways (a 23.1percentage point increase in the probability of high school graduation [0.136/0.588]) versus using the second year (a 20.9 percentage point increase in the probability of graduation [0. 168/0.803]).

Rexdale/LH, which allows us to keep the full sample for these remaining years (combined results are shown in the Appendix). Graduation is defined as being recorded as obtaining a diploma while dropping out is defined as not graduating and showing up at a TDSB or other high school the following year. Standard errors are clustered by housing project[28]. We present similar results using alternative standard error and confidence interval estimates in Appendix B, Table A1.

As shown, Pathways eligibility effects (Intent-to-Treat) are large both for Regent Park and Rexdale/LH. We estimate, with statistical significance at the 1 percent level, that the 2001 introduction of Pathways in Regent Park increased the 5 year graduation rate by 15.2 percentage points (from 38.2 percent to 53.4 percent) and the 2007 introduction in Rexdale/LH increased the rate by 9.7 percentage points (from 47.9 percent to 57.6 percent).[29]

Table 3 also shows how these effects differ by student background. Pathways impacts females significantly more than males for both Regent Park and Rexdale/LH, though both gender groups appear to benefit at least to some degree. Our estimated Pathways impacts are generally similar by whether English is spoken at home. We also compare results for low achieving Grade 9 students (measured by whether they failed or almost failed Grade 9 Mathematics or English) to those who did not achieve low Grade 9 grades. While this variable is likely endogenous to

[28] See footnote 19.

[29] Similar estimates arise when using graduation after 6 years as the outcome variable (but with data from the 2000 and 2004 cohorts only). For Regent Park, Pathways eligibility increased 6-year high school graduation rates by 21.7 percentage points (from 38.2 to 59.9 percent, standard error 0.025). We also find separate eligibility effects for Rexdale (a 15.1 percentage point increase in high school graduation from a pre-Pathways mean of 45.4 percent) and Lawrence Heights (an 8.5 percentage point increase from a mean of 49.3 percent).

Pathways eligibility (as we provide evidence for in Table 5), the bias is downwards for both subgroups if students at the margin of getting better grades are the ones affected by the program. It seems worth noting that, nevertheless, we find positive and significant Pathways eligibility effects at both the Regent Park and Rexdale/LH sites. Absolute gains are larger for higher achieving students, perhaps because students with serious initial difficulty are harder to help. This is in line with the notion of dynamic complementarities in human capital skill formation (Cuhna and Heckman, 2007).

If we define Pathways participation as ever signing up for the program, participation effects (Treatment-on-the-Treated) are about 20 percent larger than eligibility effects, since most students from both Regent Park and Rexdale/LH take-up the program. Appendix Table A2 shows these Treatment on Treated estimates using Pathways eligibility as an instrument for Pathways participation and the same difference-in-differences methodology as above. They require the assumptions that non-participants are unaffected by Pathways and that no one is made worse of by Pathways. Under these assumptions, introducing the program led participants to increase 5-year graduation rates by 19.1 percentage points for Regent Park, and 12.0 percentage points for Rexdale/LH. Appendix Table 2 also shows participation effect estimates after defining participation as signing up for Pathways and attending at least one mentoring or tutoring session in Grade 9. Here the Treatment on the Treated effects are larger, but more so for Regent Park than Rexdale/LH.

Pathways not only focuses on helping at risk high school students graduate but also promotes postsecondary education. This is done explicitly through a

college scholarship to each participant of up to $4,000, college application assistance and fee waivers, and organized campus visits. The program also promotes college implicitly from helping improve grades (and eligibility), and through regular advising. Tables 4A and 4B look at post secondary outcomes for Regent Park and Rexdale/LH respectively. For Regent Park, we estimate very large impacts of Pathways on post secondary attainment, even larger than the high school completion impacts presented above. Application rates increase by 16.8 percentage points, up from a mean of 43.3 percent in Regent Park in 2000. This leads to a 9.8 percentage point increase in a 2-year college acceptance among Pathways' eligible cohorts by the end of their fifth year, and a 9.4 percentage point increase in university program acceptance. Similar to our high school attainment findings, impacts on postsecondary acceptances appear to be significantly larger among females than males, though significant for both. For females, Pathways in Regent Park more than doubles college acceptances. And also similar to patterns observed with our high school findings, Regent Park Pathways' effects on postsecondary acceptances are large for both English and non-English home speaking students and higher for students not initially failing their Grade 9 English or Math courses.

Table 4B shows the postsecondary results for the new Pathways sites introduced in 2007. While college and university application rates increased by about 10 percentage points (up from 51.1 percent), the overall effect on postsecondary enrolment was an increase by 4.4 percentage points and not statistically significant. Perhaps in the initial program year, Rexdale/LH students were encouraged to apply but to programs they could not get in to, or programs

that, ultimately, students were not interested. Specifically for males, however, we estimate that the program doubled college enrolment (from 12.1 to 24.1 percent).[30]

Finally, we estimate Pathways eligibility effects on some intermediate outcomes, within high school, to explore possible mechanisms by which Pathways may improve high school completion outcomes. Table 5 shows Intent to Treat effects from Pathways on Grade 9 Math and English grades, Grade 9 and 10 academic track status, and OSSLT Literacy Test pass rates. While these variables are the only intermediate outcomes we observe, all three are found to be significantly affected by Pathways' introduction, either for Regent Park or Rexdale/LH, or both.

C. Robustness Checks

We consider two robustness checks to examine how well our results hold. First, we consider alternative comparison groups to our baseline of youth from all Toronto Community Housing projects (other than Regent Park and Rexdale/LH) with only tenants paying Rent Geared to Income (RGI). Some of these projects are considerably smaller than Pathways projects, and scattered throughout the city. Although the application procedure is centralized and generic for all projects, applicants can specify region preferences or specific project preferences (the default is to be considered for housing within an applicants' current census subdivision).

[30] When estimating the eligibility effects for each new site separately, we find a 8.7 percentage point increase in post secondary enrollment for Lawrence Heights, while a 1.7 percentage point decrease for Rexdale. The Lawrence Heights effect is statistically significant using Huber-White standard errors, but not when using other methods discussed in the Appendix.

Table 6 shows results from using the same regression equations for Table 3, but with different comparison groups.

The first row of Table 6 shows the baseline results for Pathways eligibility effects on fifth year graduation rates. The second row uses for the comparison group only the twelve largest housing projects, aside from Regent and Rexdale/LH, which are similar in size and notoriety.[31] The total sample drops by almost one half. The effects remain large - about a 10 percentage point increase in graduation attributed to Pathways eligibility. The third row uses only the two largest downtown projects in the same subdivision as Regent Park. Here the point estimate for the Pathways effect on high school graduation is an increase of 7.5 percentage points, with a large standard error of 7.7 percentage points. The last row uses a sample with only housing projects within Toronto's "priority neighborhoods", which are areas with concentrated levels of crime and poverty. . Results are similar to the baseline results in row 1 and significant.[32] The main message from the table is that the choice in comparison group does not seem to affect the results. High school completion rates rise modestly and slowly for all the comparison groups examined. The rapid improvement in Regent Park and Rexdale/LH's academic outcomes following the introduction of Pathways is what appears to drive the results.

Our school district data do not permit us to go back before 2000 and test whether the performance gap between youth from Regent Park and other housing

[31] The large projects are Alexandra Park, Bleecker Street, East Mall, Edgeley Village, Jane Finch, Firgrove Crescent, Flemingdon Park, Lawrence Heights, Malvern, Moss Park, Pelham Park, Regent Park, Rexdale (Thistletown) and Warden Woods.

[32] We also test the robustness of the effect of Pathways eligibility for Regent Park residents using two housing projects that later adopt the Pathways program (beginning in 2007 for Rexdale/LH). Eligibility for Pathways is estimated to increase graduation rates by 14.0 percentage points (standard error of 2.7 percentage points), relative to this comparison group.

projects was relatively constant in years prior to Pathways. If performance for the 165 students from Regent Park who entered Grade 9 in 2000 was unusually poor compared to prior years, the observed subsequent improvement to later cohorts would incorrectly be attributed to Pathways. In an attempt to test whether the 2000 Regent Park cohort was anomalous, we obtained access to Statistics Canada's 1996 and 2001 census files with postal code identifiers to identify youth between age 9 and 17 living in the same public housing addresses as those in our sample. Although the timing of the censuses and their cross-section nature do not lend themselves well to testing Pathways' effects on final education attainment, we can instead use them to test whether background characteristics across projects remained stable for a richer set of variables than those available from the Toronto School Board data.

Table 7 shows mean characteristics from the census data for Regent Park and other housing project students. We assign students to Grade 9 cohorts based when the year they were age 14, since 92.3 percent of our TDSB sample was age 14 when they entered Grade 9. The pattern of more Non-English speaking students from Regent Park remains similar to that observed from the TDSB data. The census data also indicate families from Regent Park are generally poorer than those from other housing projects, receive more government income assistance, and are less likely with married parents. Due to the negative correlation between poverty and performance, we might expect to observe worse performance for students from Regent Park. This is not the case for the years after Pathways was introduced.

The last row presents coefficient estimates and standard errors for the interaction term of being from Regent Park and entering Grade 9 in 2000 after regressing each background characteristic on this interaction, along with fixed effects for housing project and cohort, and clustered standard errors at the project level. This coefficient tests whether overall differences in characteristics between Regent Park and other projects systematically differ for the 2000 Grade 9 cohort, our only pre-Pathways cohort in our TDSB data. All of the estimates are small and insignificant, except for the 'parent with university' variable, which indicates parents of the Grade 9 cohort from Regent Park are 3.8 percentage points less likely with any university education compared to other years. This difference would not, at least on its own, be enough to explain the much larger Pathways' effect estimates found in our TDSB data. Together with the insignificant differences found for the rest of the background variables, we interpret Table 7 as providing evidence against the hypothesis that the Grade 9 Regent Park cohort in 2000 was unusual in a way to lead to expect dramatically improved education outcomes for later cohorts.

V. Discussion and Conclusion

Pathways to Education is a comprehensive youth support program developed to improve academic outcomes among those entering high school from very poor social-economic backgrounds. The program includes proactive case workers assigned to each student at the start of Grade 9, free weekly tutoring and group activities throughout high school, career counseling, and college transition

assistance, combined with immediate and long-term incentives to reinforce a minimum degree or mandatory participation. The program is community-based, to address poor academic performance for youth from three of Toronto's largest public housing complexes. Since its start in 2001, Pathways has attracted national public and media interest. An internal 2007 consulting report concluded that "Pathways is one of the most successful programs we have found anywhere in North America". The program has recently been expanded to 11 other communities across Canada and efforts for further expansion continue. About half its financial support (47 percent) comes from national, provincial, and local levels of governments. The other half comes from considerable foundation (20 percent), corporate (19 percent), individual (8 percent), and other (6 percent) support.

This paper is an attempt to more transparently present an evaluation of the introduction of Pathways, with more convincing identification strategies and robustness checks than earlier assessments, and with a look at whether impacts were replicated at expanded sites. Our results remain impressive:

- Pathways reaches a remarkably high fraction of its target group: 80 to 95 percent of eligible students entering high school and their parents register in writing for the program
- At the program's initial site (in Regent Park), fifth year high school graduation rates increased from about 38 percent to 58 percent, while fifth year post secondary enrollment rates more than 50 percent, from about 43 percent to 59 percent

- The program's expansion, at two other sites in 2007, also led to impressive gains - an immediate 10 percentage point increase in high school graduation and about a 10 percentage point increase in post secondary enrollment for males
- High school impacts are larger for women and for students not failing initial math and English classes. Impacts are similar for students with English and non-English languages spoken at home
- Program effects are also positive for most of the limited intermediate outcomes we are able to look at: Grade 9 math and English grades, and taking a set of academic track courses.

Pathways costs approximately $3,500 per year per student in 2010 Canadian dollars, along with $1,200 in head office administrative costs (Boston Consulting Group, 2011). Direct operating costs comprise of 20 percent public transportation tickets, 15 percent scholarship expenditures, and the remaining towards SPPGs, tutoring and group activity operations. Over an average participants' entire duration in high school, Pathways is estimated to cost $14,000 in present value direct operating costs, plus indirect administrative costs, plus costs from extended enrollment in school. While substantial, if students affected by the program experience earnings gains in the range of previous returns to schooling estimates for marginal students, total benefits likely exceed costs, even when only looking at

benefits from additional tax revenue.[33] Including the many possible non-pecuniary benefits from additional schooling (Oreopoulos and Salvanes, 2011), as well as social benefits from reductions in crime and improvements to health (Lochner 2011) would reinforce this conclusion.

A better understanding of Pathways' mechanisms would help contain costs and lead to more detailed theories of change. The approach used in this paper for estimating average program effects cannot be used for trying to disentangle which program components worked and which did not. The components themselves were designed to work together: Student-Parent Support Workers are able to monitor and encourage tutoring use, inform students of group activities and events. Group activities promote social capital among Pathways participants. Free public transportation tickets and college scholarships are conditional on meeting with support workers and attending tutoring and group activities.

Looking at previous research, one can find evidence of large impacts for some of Pathways' components on their own. As discussed earlier, tutoring, after-school assistance, and a culture of high expectations are key parts to highly effective chartered schools (Dobbie and Fryer, 2011b). Personalized and regular coaching, at least at the college level, has also been shown to be effective at increasing education

[33] For example, suppose high school dropouts earn $25,000, on average, at age 20 and worked until age 65 with 1.5 percent real increases in wages. Suppose returns to additional high school for marginal students are in the range of 10 percent per year (Angrist and Krueger, 1991, Oreopoulos, 2007), and that Pathways compliers who complete high school because of the program increase their high school attainment by two years (for a total increase in annual earnings of about 20 percent). Similarly, suppose high school graduates earn $30,000 with the same wage profile implied above. Assume higher post secondary enrollment from Pathways implies a 20 percent return each year (e.g. Oreopoulos and Petronijevic, 2013, and Zimmerman, forthcoming). With Pathways increasing high school graduation by about 18 percentage points and college enrollment by about 21 percentage points participants, this implies a net present value increase in expected earnings of $72,789 using a 3 percent discount rate. With an average tax rate of 30 percent, this implies additional expected tax revenue of $21,837 per Pathways eligible.

persistence (Bettinger and Baker, 2011). Assistance with college transition and applications, including paying application fees, has also been shown to markedly increase college enrollment (Bettinger et al., 2012, Carrell and Sacerdote, 2013), although, of course, not high school completion. College trust incentives, very similar to those offered by Pathways, have also been found effective. A study in New Brunswick that randomly offered entering Grade 9 students college trust funds that accumulated by $2,000 each year in high school, up to a maximum of $8,000 - exactly double Pathways' incentive, reduced dropout rates by about 8 percentage points and increased postsecondary enrollment rates by about 10 percentage points (Frenette and Ford, 2012). A randomized trial in Chicago provided social-cognitive skills training, along with mandatory daily two-on-one tutoring, to help disadvantaged youth better self-regulate and interact (Cook et al. 2014). Impacts on school engagement, math and, in some cases, reading scores, were some of the largest ever estimated in the literature. The Accelerated Study in Associate Program, a comprehensive intervention designed to increase completion rates for low-income community college students, features many of the same components as Pathways including free public transportation tickets, mandatory tutoring, regular counseling over multiple years, and career advising services. Initial results from this program point to very positive effects on credit accumulation, as well as postsecondary retention and graduation rates (Scrivener and Weiss, 2013).

It is not possible to tell from the results in this paper whether only a few components of the program drive the results or whether its integration is crucial. In the absence of being able to experiment with variations of the program, qualitative

research through survey and ethnographic research may help. The expansion of additional Pathways sites outside of Toronto also provides an opportunity to test whether these initial impacts can be replicated. Implementation quality, community support, recruitment, communication efforts, and target population may be key underlying ingredients for program effectiveness that could explain why some site impacts are larger than others. Still, the program's initial introduction looks as though it was highly effective in improving education attainment for a sample of very poor youth. These results are promising, similar to recent intensive efforts to target disadvantaged youth, and point to the need for further research and policy discussion.

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Appendix A

REGENT PARK COMMUNITY HEALTH CENTRE
Pathways to Education

The Pathways to Education™ Program
Expectations of Students (18 yrs. & over) Involvement
2012-2013

The Pathways to Education™ Program was planned to provide a blend of supports to students to assist them to successfully complete high school, work on their career development and gain admission to college or university.

Subject to funding, The Pathways to Education™ Program will provide tutoring support, mentoring, TTC tickets, and will put $1000 for each year of high school completed by the student, to a maximum of $4000 to be used towards their college/university expenses. **Minimum participation of two qualifying years is require to be eligible to receive this scholarship. A qualifying year is from September to June or February to January.**

In order for students to benefit from the program and accomplish their goals in high school, it is important for students to take part **fully** in the program and its activities. All students benefit from regular mentoring and tutoring supports. Students receiving Special Education, ESL supports or similar accommodations will benefit from regular tutoring support and are strongly encouraged to attend, regardless of their marks.

Student Initials on each line ↓

As a student in the Pathways to Education Program™, I agree to:

- Maintain contact with my Student/Parent Support Worker (SPSW) by attending scheduled meetings and TTC pick-up days: _____
- Call my SPSW when I have any difficulties or questions regarding my success, safety or choices _____
- Attend tutoring at assigned sites at least twice a week until I can demonstrate that I am meeting the expectations as outlined below in all core subjects*, at the different grade levels. Requests for alternate tutoring support must be made in writing and approved by the Pathways staff. . _____

  Grade 9 courses –70% or more
  Grade 10 courses – 70% or more
  Grade 11 courses – 70% or more
  Grade 12 courses – 70% or more

- Attend my Specialty Mentoring activities as scheduled or other mentoring support as approved by the Pathways staff. _____
- Register in summer school if applicable to get my course credit; _____
- Make sure that I hand in homework assignments and write all my school exams; _____
- Complete the student survey for program improvement; _____

Note: TTC tickets are based on my attendance at school, mentoring and tutoring. Tickets may be withheld based on missed classes or days at school or lack of participation in mentoring or tutoring. _____

* Core subjects include courses in Natural Sciences, French, English, Mathematics, Geography and History.

Student (18 yrs. & over) Agreement to Participate

I have read and understand the above Expectations of Student Involvement and I agree to participate in the Pathways to Education™ Program. I understand that failure to abide by the Expectations of Student Involvement may result in being withdrawn from the program. **In the event of withdrawal, I understand that I shall forfeit any entitlement to benefits of the program, including any entitlement to funds held in trust for college/university expenses.**

I also understand that Pathways to Education™ Program is fully dependent on funding to provide the supports and should funding be reduced or cease, some or all program supports may be withdrawn.

I also understand that in the event of insufficient funding, the amount of funds available to me towards my college/university, if any, shall be determined by the Board of Trustees of Pathways. All funds payable from the trust shall be paid directly to the college/university based on the Distribution Policy set by the Board of Trustees.

_____ _____
Last Name (Please Print) First Name (Please Print)

Signature of Student_____

Date:_____

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The Pathways to Education™ Program is an initiative of the Regent Park Community Health Centre

REGENT PARK
Pathways to Education

The Pathways to Education™ Program
Expectations of Parent/Guardian Involvement
2012-2013

The Pathways to Education™ Program was planned to provide a blend of supports to students to assist them to successfully complete high school, work on their career development and gain admission to college or university.

Subject to funding, The Pathways to Education™ Program will provide tutoring support, mentoring, TTC tickets, and will put $1000 for each year of high school completed by the student, to a maximum of $4000 to be used towards their college/university expenses. **Minimum participation of two qualifying years is required to be eligible to receive this scholarship. A qualifying year is from September to June or February to January.**

In order for students to benefit from the program and accomplish their goals in high school, it is important for parents to encourage and support their child to take part **fully** in the program and its activities. All students' benefit from regular mentoring and tutoring supports. Students receiving Special Education, ESL supports or similar accommodations will benefit from regular tutoring support and are strongly encouraged to attend, regardless of their marks.

As a parent of a student in the Pathways to Education Program™, I agree to:

Parent/Guardian Initials on each line ↓

- Maintain contact with my Student/Parent Support Worker (SPSW) to find out about my child's attendance at school, mentoring and tutoring. _____
- Call my Student/Parent Support Worker when/if my child is absent from school for long periods due to travel, illness, suspension or other reasons, so that staff can assist in developing a continued work plan for my child; _____
- Support my child to attend tutoring at his/her assigned sites at least twice a week until my child can demonstrate that s/he is meeting the expectations as outlined below in all core subjects*, at the different grade levels. _____

  Grade 9 courses – 70% or more
  Grade 10 courses –70% or more
  Grade 11 courses – 70% or more
  Grade 12 courses – 70% or more

- Support my child to attend his/her Mentor Group (Gr 9 & 10s) meetings as scheduled or Specialty Mentoring (Gr11 & 12s) or other mentoring support as approved by the Pathways staff. _____
- Register my child into summer school if applicable to get his/her course credit; _____
- Support my child to complete all school exams; _____
- Complete the student survey for program improvement; _____

Note: TTC tickets are based on your child's attendance at school, mentoring and tutoring. Tickets may be withheld based on missed classes or days at school or lack of participation in mentoring or tutoring. _____

* Core subjects include courses in Natural Sciences, French, English, Mathematics, Geography and History.

Pathways encourages all parents to attend Parent/Teacher interviews at their child's high school throughout the year.

Parent/Guardian Agreement to Participate

I have read and understand the above Expectations of Parent Involvement and I agree to participate in the Pathways to Education™ Program I understand that failure to abide by the Expectations of Parent Involvement may result in my child being withdrawn from the program. **In the event of withdrawal, I understand that my child shall forfeit any entitlement to benefits of the program, including any entitlement to funds held in trust for college/university expenses.**

I also understand that Pathways to Education™ Program is fully dependent on funding to provide the supports to my child and should funding be reduced or cease, some or all program supports may be withdrawn.

I also understand that in the event of insufficient funding, the amount of funds available to my child towards college/university, if any, shall be determined by the Board of Trustees of Pathways. All funds payable from the trust shall be paid directly to the college/university based on the Distribution Policy set by the Board of Trustees.

Name of Parent/Guardian:

_____

(please print) **Last Name** **First Name**

Name of Child:

_____

(please print) **Last Name** **First Name**

_____ _____

Signature of Parent/Guardian Date

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The Pathways to Education™ Program is an initiative of the Regent Park Community Health Centre.

Appendix B: Robustness Checks with Alternative Inference Methods

Inference in difference in differences models with grouped (clustered) data has been an active area of research in the past few years.[34] The primary concern in this literature is that OLS standard error estimates are biased downward due to possible heteroskedasticity and serial correlation (at the group level) in the error term. This can lead to incorrect inference, over-rejection of the null hypothesis in significance tests of individual parameter estimates and confidence intervals that are too narrow. The standard error estimates reported in the main results above correct for possible heteroskedasticity and serial correlation in outcomes of students living in the same housing project. We cluster standard errors (CRVE) at the housing project level and with 57 clusters in the final dataset, each of which contains more than 30 observations, inference is based on the critical values of a t-distribution with 57 degrees of freedom. Nevertheless, there may be remaining concerns with this approach because (i) the proportion of treated projects is low relative to the number of untreated housing projects, (ii) the variation in cluster sizes and (iii) if the projects in our sample experience cohort specific shocks that determine outcomes (i.e. there are project x cohort fixed effects in equation (1)). In this Appendix we explore the robustness of the inference in the main results above to alternative specifications.

The CRVE consistently estimates variance of the ITT effect of interest in equation (1) if three key assumptions hold. The first assumption, that the number

[34] Cameron and Miller (2013) is an example of a review and discussion about the current state of this area of research.

of groups goes to infinity is well known. The "rule of 42" is a rule of thumb that applied researchers have used to justify the reliability of CVRE estimates. However, the consistency of the CRVE also depends on two other assumptions, specifically: (i) a degree of within-group correlation is constant across groups and (ii) each group contains an equal number of observations. The implications of violating these two assumptions for the reliability of standard errors computed using the CRVE has only recently received attention in the literature. In a series of Monte Carlo studies, MacKinnon and Webb (2013) show that the CRVE is unreliable when group sizes are very different. Using simulated data with relative groups sizes that mimic the population differences between U.S. states, they find that the CRVE severely over-rejects a true-null hypothesis even when the number of groups is very large. They find that performance is particularly poor when the proportion of treated groups is very small or very large relative to the number of untreated groups.

In light of this evidence, the characteristics of the data in this application are challenging for two reasons. First, there is significant variation in the sizes of the different housing projects in our sample. Large housing projects like Regent Park have approximately 150 observations per cohort while smaller housing projects like Sheppard Birchmount have approximately 10 observations per cohort. Also, only three projects (Regent Park, Rexdale and Lawrence Heights) receive treatment, in the form of the introduction of the Pathways program.

MacKinnon and Webb find that the wild cluster bootstrap discussed in Cameron, Miller and Gelbach (2008) performs much better than the CRVE. We test

the robustness of the results in the main analysis using the wild cluster bootstrap with 999 replications by constructing bootstrap confidence intervals for the 5-year graduation rate ITT estimates. The results for this procedure are reported in row 2 of Appendix Table 1 (ITT estimates, standard errors and 95% confidence intervals from the main analysis are reported in row 1 as a comparison). For the 5-year graduation rate, the distribution of ITT effects has a mean of 15.2 percentage points which is very similar to the estimated ITT in the main analysis. The ITT estimates at the 2.5 and 97.5 percentiles of this distribution imply 95% confidence intervals that range between 6 percentage points and 24 percentage points, nearly twice the size of the confidence intervals estimated using the CRVE.[35] While the confidence intervals implied by the cluster wild bootstrap are much larger than those implied by the CRVE, the empirical distribution of ITT effects implies that point estimates are still significant at the 1 percent level[36]. Similarly, the implied confidence intervals for the ITT estimates suggest that the effect of being eligible for Pathways at the Rexdale/LH (column 2) and three combined sites (column 3) is significant at conventional levels.

MacKinnon and Webb find that the wild cluster bootstrap under-rejects true null hypothesis in cases when the proportion of treated groups is below 10 percent and above 90 percent, the opposite problem of the CRVE. In this application, the

[35] The reported standard errors are the standard deviations of the estimated bootstrap distribution of ITT estimates.

[36] We also test the null hypothesis of a zero estimate for the ITT directly by imposing the null hypothesis in the data generating process (DGP) as in MacKinnon and Webb (2013). Equation (1) is then estimated for each bootstrap replication using the dependent variable formed by the DGP. A Wald test statistic is formed for each replication and the symmetric bootstrap p –value is computed. The null hypothesis of a zero ITT estimate is rejected at the α level if the symmetric bootstrap p-value is less than α. The null hypothesis is rejected at the 1 percent level.

proportion of treated projects is about 2 percent. The fact that we are able to reject the null hypothesis of a zero or a negligible ITT effect using this procedure is strong evidence of a relatively large and statistically significant impact of being eligible for Pathways on high school attainment rates.

As a second robustness check, we estimate the impact of eligibility for Pathways using the synthetic control method described in Abadie et al. (2010). This method directly addresses the case when there is only one treated group and several potential control groups. The essence of this approach is that the ideal control group in any comparative case study will have pre-treatment characteristics (variables) that are as similar as possible (in levels) to those of the treatment group of interest. With very similar pre-treatment characteristics, the post-treatment outcomes from this ideal control group are a reasonable estimate of the unobserved counterfactual outcomes for the treated group. The Abadie et al. method uses pre-treatment variables (both outcomes and covariates) from a pool of potential control group candidates to construct a synthetic control group that is most similar to the treated group of interest. Then, any differences in the post-treatment outcomes between the treated group and the synthetic control group can be attributed to the reform or event-study being analyzed.

In this application, data from the pool of control projects from the pre-Pathways cohorts (the 2000 cohort) are used to construct the synthetic control group[37]. Each of these projects is assigned a weight so that the weighted average of

[37] The synthetic control method relies on the assumption that the number of pre-treatment periods is large relative to the scale of the transitory shocks in the residual. With only one year of pre-treatment data, it is unclear whether this assumption is violated in this application.

each of the pre-Pathways characteristics from the synthetic control group most-closely resembles the 2000 Grade 9 cohort from Regent Park. Most projects are weighted relatively equally using this approach, with nearly all individual project weights varying between 1.5 to 3 percent of the synthetic control group[38]. This is contrasted with the OLS estimation in the main analysis which implicitly weights the projects with the most observations (the largest housing projects in the sample) the highest. The average pre-treatment 5-year graduation rate for the synthetic control group is 38.15 percent compared to 38.18 percent for Regent Park.

Row 3 in Appendix Table 1 reports the estimated impact of being eligible for Pathways using the synthetic control group method. Following the introduction of Pathways for the 2001-2002 academic year, the 5-year average graduation rate in Regent Park is 9.6 percentage points higher than that of the synthetic control group. This estimate is very similar to the difference-in-difference estimate reported in row 1.

Following Abadie et al (2010), we also evaluate whether the estimated impact of being eligible for Pathways is rare compared to a series of placebo studies. Specifically, we iteratively assigned each project to the treated group and constructed a synthetic control group for each case. The estimated placebo treatment effects are then compared to the estimated effect for Regent Park. Of the 57 estimated treatment effects (56 placebo estimates plus the Regent Park estimate), the 9.6 percentage point gap between Regent Park and the synthetic Regent Park is the 9th largest. Therefore, the probability of estimating a gap

[38] The control group project with the largest weight is Yorkwoods Village (11.9%), followed by East Mall (2.8%), Willowridge Richview (2.8%), Roywood Drive (2.6%) and Kennedy Glamorgan (2.4%).

between the treatment and synthetic control group greater than the magnitude of that for Regent Park is 17 percent[39]. This suggests that the estimated gap for Regent Park is relatively rare.

The model estimated in equation (1) assumes the absence of a project x cohort effect (equivalently, the underlying pre-treatment differences between Regent park and each of the comparison projects remains fixed both before and after treatment). Conley and Taber (2011) point out that when the number of treatment groups is finite, relaxing this assumption implies that the difference in differences estimator is not consistent even with a large number of clusters in total[40]. However, they show that if eligibility for treatment is randomly assigned (independent of the project x cohort effects), the limiting distribution of the differences in differences parameter can be estimated (up to the value of the parameter). The essence of their approach is that when the eligibility for treatment is randomly assigned, information from the residuals of the control projects can be used to estimate the limiting distribution of the differences in differences parameter. This can then be used to perform hypothesis tests and construct confidence intervals. Using several empirical examples, they show that confidence intervals may be much wider than those implied by traditional inference methods.

In row 4 of Appendix Table 1 we investigate whether the large and statistically significant ITT estimates presented in section IV are robust to relaxing this assumption. Assuming that the estimates in the main analysis represent the

[39] These results are available from the authors upon request.
[40] If the expectation of the project x cohort effect, conditional on treatment status, is equal to zero then the difference in differences estimator is still not consistent but is unbiased.

true values of the ITT parameter, both the 95% and 90% confidence intervals are computed using the method described in Conley and Taber (2011). The implied confidence intervals are very large relative to those computed using standard inference methods. The estimated confidence intervals suggest that the 5 year graduation rate is not statistically significant at the 5 percent level..

That being said, there are at least two reasons to believe that the assumption of non-zero project x cohort effects is unwarranted in this application. First, the cohorts we study enter high school (Grade 9) in consecutive years meaning that at any given time, each cohort will be in school at the same time as at least three other cohorts. Therefore, any project x cohort effects would represent shocks that impact one project-cohort but not any neighboring cohorts, even if students in the shocked cohort have peers or classmates that are in neighboring cohorts. If peer effects are important in determining high school outcomes, it is difficult to imagine how project-cohort specific shocks could enter equation (1)[41]. We also inspect the family/background characteristics of students in successive cohorts from the mid-1990s through the mid-2000s in Table 7 to check for evidence whether students from Regent Park and other public housing projects experience cohort specific shocks. The series appear to move together, leading us to conclude that there is no such evidence. For example, the trends in many of the demographic variables such as the percentage of immigrants, parent's university attainment, family earnings,

[41] Moreover, since eligibility for Pathways is determined by the housing project one lives in and not school and because many of the housing projects in our data are very close geographically, students living in one project have high school classmates that live in other projects. Assuming non-zero project x cohort effects would also suggest that there are important shocks that impact the high school outcomes of students but don't impact peers that live in housing projects nearby that are in the same cohort even if they attend the same school.

receipt of government assistance and poverty rate are similar for both Regent Park and the comparison housing projects from the mid-1990s to the mid-2000s.

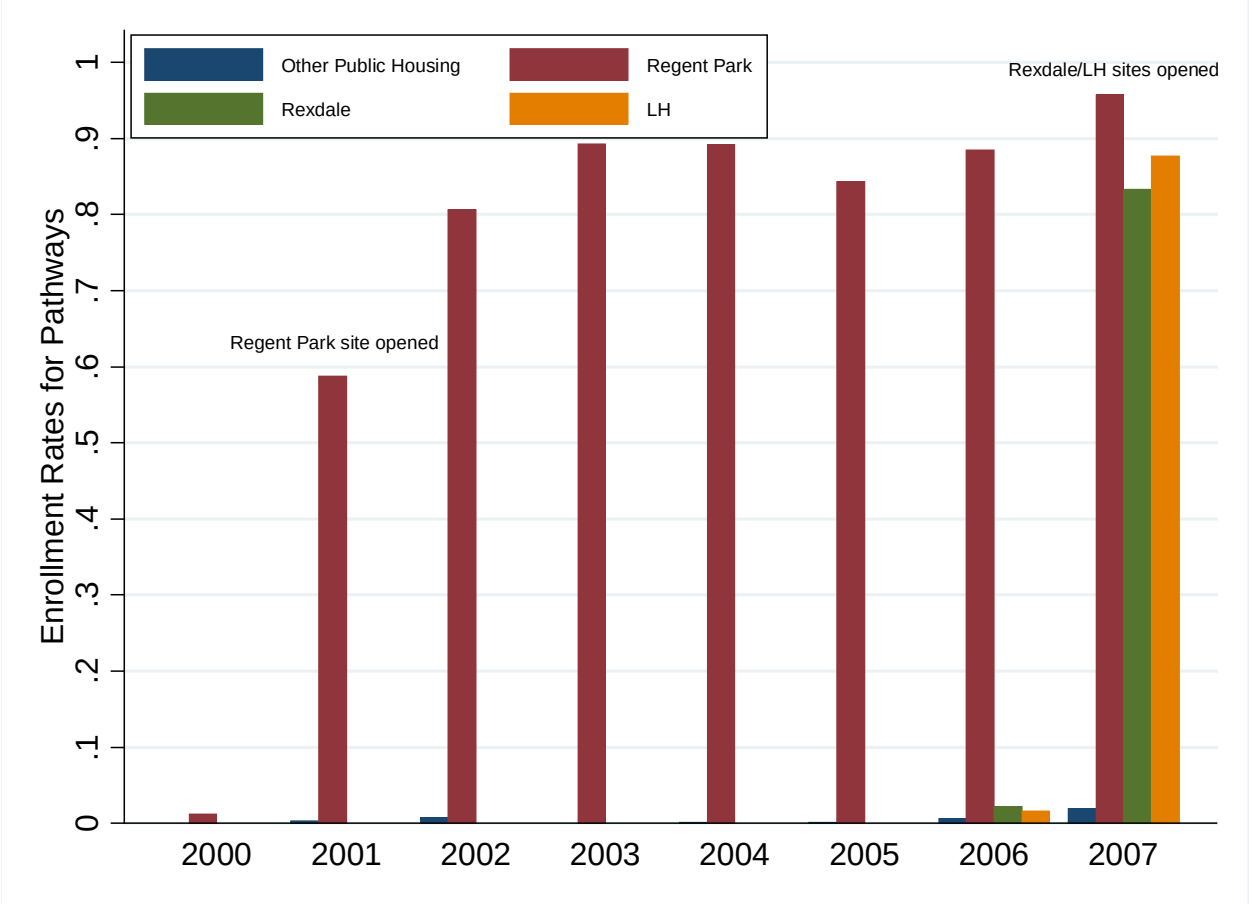
Next, we explore the sensitivity of the results to ignoring the heterogeneity in the comparison housing projects. We first collapse the high school attainment outcome variables into their annual means and by whether they are Regent Park, the Rexdale/LH sites or other public housing.. Row 5 in Appendix Table 1 reports the ITT parameter estimates of regressions of these annual means on a dummy variable equal to one if the annual mean is from a year when students from Regent Park or Rexdale/LH were eligible for Pathways[42]. Heteroskedasticity robust standard errors are reported in square brackets. Essentially, these regressions formally estimate the result in Figure 2. By grouping all comparison housing projects into one control group, we are ignoring any heterogeneity in the pre-treatment differences between the comparison projects. Similar to the main results above, estimated ITT effects are both large and significant for each of the high school attainment outcome variables. Eligibility for Pathways is estimated to increase the 5-year graduation rate by 14.7 percentage points in Regent Park and 9.6 percentage points at the Rexdale/LH sites. These estimates are very similar to the baseline results in row 1.[43]

We interpret these results, taken together with the robustness checks in section IV, as pointing to the introduction of Pathways having led to consistent and

[42] Regent Park, Rexdale/LH and post-Pathways period dummies are also included in these regressions.
[43] Differences in estimates between rows 1 and 5 are due to the fact that the group mean regressions do not weight project means by their sampling weight.

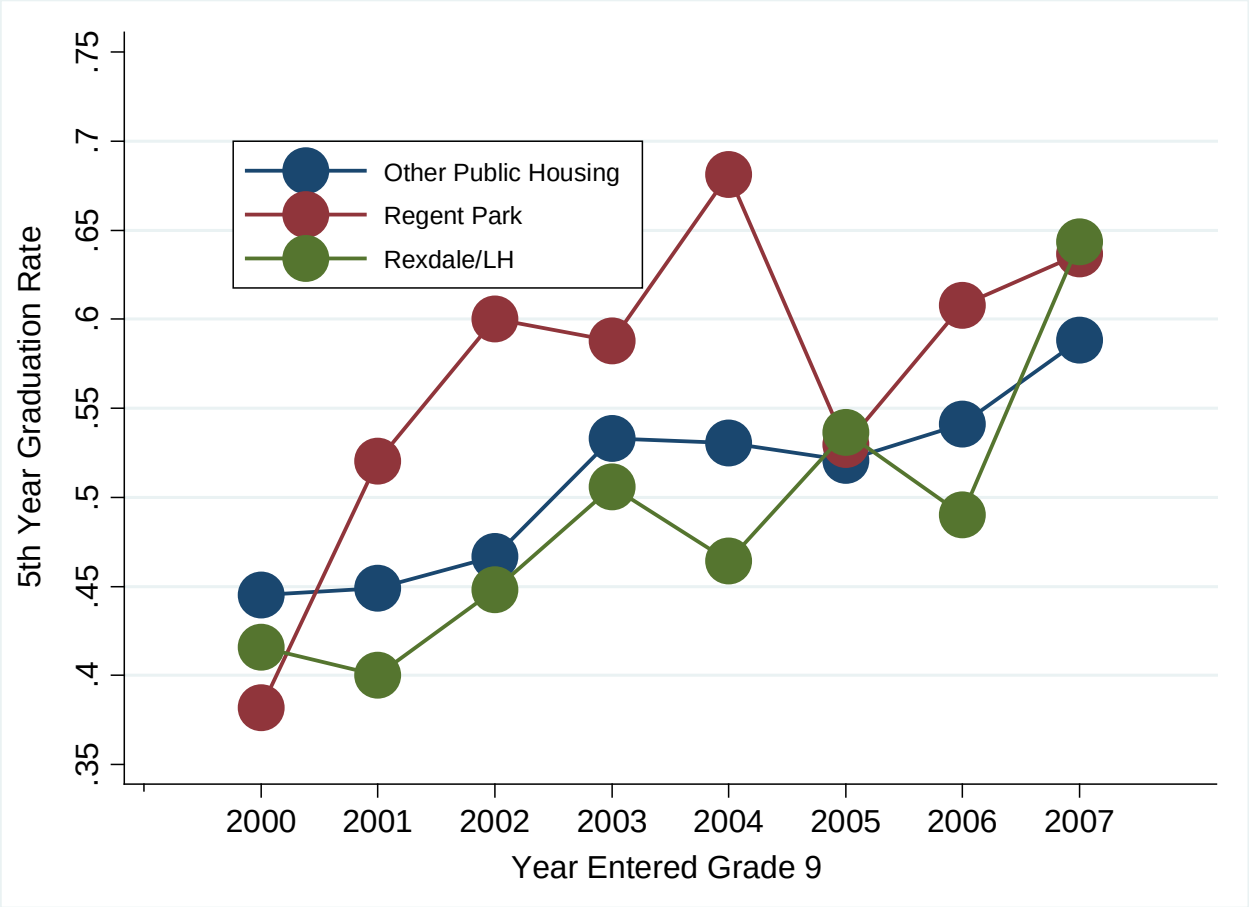
relatively large and statistically significant improvements in the high school dropout rate for students living in public housing in the City of Toronto.

Figure 1
Pathways to Education Enrollment Rates
Among 2000 to 2007 Grade 9 Students from Regent Park,
Rexdale, Lawrence Heights, and Other Toronto Public Housing Projects



Notes: The sample in this figure includes students from Toronto public housing residences (Regent Park, Rexdale or Lawrence Heights (LH), or other public housing) that entered a Toronto District School Board (TDSB) high school in Grade 9 between the 2000-2001 and 2007-2008 academic years. The figure indicates the fraction of this sample that ever enrolled in the Pathways to Education program. Other Public Housing refers to students who enrolled in Grade 9 in the TDSB and who live in public housing projects other than Regent Park, Rexdale, and Lawrence Heights, and whose projects have more than 30 students.

Figure 2A
Fraction Graduated from High School by 5th Year
Among 2000 to 2007 Grade 9 Students from Pathways
and Non-Pathways Toronto Public Housing Projects



Notes: This figure shows average 5-year graduation rates for students living in Toronto public housing who entered Grade 9 between the 2000-2001 and 2007-2008 academic years. Regent Park refers to students who enrolled in Grade 9 in the TDSB and who live in the Regent Park Housing Project. Rexdale/LH refers to students who enrolled in Grade 9 in the TDSB and who live in the Rexdale or Lawrence Heights public housing project. Other Public Housing refers to students who enrolled in Grade 9 in the TDSB and who live in public housing projects other than these three and whose projects have more than 30 students.

Figure 2B
Normalized Fraction Graduated from High School by 5th Year
Among 2000 to 2007 Grade 9 Students from Regent Park
and Non-Pathways Toronto Public Housing Projects



Notes: This figure shows the same information as in Figure 2A except that the high school graduation rate for each group for the 2000 cohort was subtracted from the actual rate for each cohort, leading to a baseline value of zero for all groups in 2000.

Table 1
Descriptive Statistics of High School Students from Regent Park, Newsites and Other Public Housing Projects
By Year Entered Grade 9

Regent Park	**Year Entered Grade 9**								
	2000-07	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Female	0.509	0.515	0.5	0.527	0.489	0.5	0.478	0.592	0.493
Age	14	14.1	14	14.1	14.1	14	14.1	14.1	14
English 2nd Language	0.734	0.745	0.757	0.72	0.641	0.804	0.754	0.692	0.741
Sample Size	1274	165	148	150	131	138	134	130	278
Rexdale/LH	**Year Entered Grade 9**								
	2000-07	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Female	0.495	0.584	0.547	0.54	0.471	0.429	0.536	0.423	0.446
Age	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14
English 2nd Language	0.52	0.449	0.427	0.46	0.437	0.583	0.582	0.577	0.594
Sample Size	737	89	75	87	87	84	110	104	101
Other Public Housing	**Year Entered Grade 9**								
	2000-07	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Female	0.484	0.527	0.507	0.486	0.487	0.463	0.466	0.456	0.484
Age	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14
English 2nd Language	0.443	0.376	0.419	0.412	0.417	0.433	0.478	0.495	0.505
Sample Size	4890	609	590	570	587	624	601	634	675

Notes: The top panel reports total and annual means of select demographic variables for students enrolled in Grade 9 in the Toronto District School Board (TDSB) and who reside in the Regent Park housing project. In the middle panel, 'New Sites' refers to the sample of students who enrolled in Grade 9 in the Toronto District School Board (TDSB) in the year(s) indicated and who reside in the Lawrence Heights (LH) or Rexdale housing projects. In the bottom panel, 'Other Public Housing' refers to the sample of students who enrolled in Grade 9 in the Toronto District School Board (TDSB) in the year(s) indicated and who reside in non-Regent Park, non-Lawrence Heights and non-Rexdale housing projects .

Table 2A
Pathways Mentoring and Tutoring Activity by Month
Among 2003 and 2007 Grade 9 Students Registered in Pathways
Registered in Pathways

	Registered in Pathways									
	Total	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**
Regent Park Site										
2003 Cohort: Gr9 Tutoring	25.57	3.85	4.04	2.05	2.69	3.2	2.76	3.11	2.57	1.31
2003 Cohort: Gr9 Mentoring	8.58	1.02	1.13	0.53	1.16	1.32	1.22	1.11	1.09	0
2003 Cohort: Gr10 Mentoring	3.28	0.66	0.72	0.3	0	0.5	0.44	0.45	0.21	0
2007 Cohort: Gr9 Tutoring	16.48	3.58	3.3	1.38	1.95	2.02	1.57	1.7	0.81	0.18
2007 Cohort: Gr9 Mentoring	0.71	0.03	0.21	0.11	0	0.14	0.07	0.09	0.06	0
Rexdale/LH Sites										
2007 Cohort: Gr9 Tutoring	24.32	4.38	3.67	1.67	2.86	2.61	2.27	2.85	2.53	1.48
2007 Cohort: Gr9 Mentoring	4.83	0.33	0.33	0.11	1.33	0.46	0.17	0.2	0.39	1.49

Notes: The top panel reports average annual and monthly number of tutoring and mentoring sessions attended by all students registered in the Regent Park Pathways site for Grades 9 and 10. The bottom panel reports average annual and monthly number of tutoring and mentoring sessions attendend by all students registered in the Lawrence Heights (LH) and Rexdale Pathways sites for Grade 9.

Table 2B
Pathways Mentoring and Tutoring Activity by Month
Among 2003 and 2007 Grade 9 Students Registered in Pathways
Only Students with At Least Some Activity in Given Month

		October	November	December	January	February	March	April	May	June
Regent Park Site										
2003 Cohort: Gr9 Tutoring	26.7	4.37	4.77	2.92	3.98	4.68	4.31	4.73	4.55	2.69
2003 Cohort: Gr9 Mentoring	9.47	1.47	1.59	1	1.62	1.61	1.68	1.63	1.59	N/A
2003 Cohort: Gr10 Mentoring	5.82	1.43	1.65	1	N/A	1.53	1.41	1.33	1	N/A
2007 Cohort: Gr9 Tutoring	24.5	6.03	5.97	3.53	5.41	4.79	4.35	4.73	2.92	4
2007 Cohort: Gr9 Mentoring	6.55	1	2.33	1.53	N/A	3	1.9	2	2.13	N/A
Rexdale/LH										
2007 Cohort: Gr9 Tutoring	28.2	5.95	5	2.56	4.52	4.45	3.34	N/A	4.23	2.86
2007 Cohort Gr9 Mentoring	10.2	1.61	1.52	1	4.14	1.9	2.14	1.31	3.4	6.84

Notes: The top panel reports average annual and monthly number of tutoring and mentoring sessions attended by students who attended at least one session registered in the Regent Park Pathways site for Grades 9 and 10. The bottom panel reports average annual and monthly number of tutoring and mentoring sessions attendend by students who attended at least one session registered in the Lawrence Heights (LH) and Rexdale Pathways sites for Grade 9. The first column in each row reports annual means for students whose tutoring or mentoring participation is positive in at least one month. Each of the monthly columns report monthly means for students whose tutoring or mentoring participation is positive in that month.

Table 3
Intent to Treat (ITT) Estimated Effects of Pathways on High School Graduation for Various Subgroups by End of Fifth Year Since Starting High School

	REGENT PARK (2000-2006)		REXDALE/LH (2001-2007)	
	Pre-Pathways Mean	**ITT**	**Pre-Pathways Mean**	**ITT**
Full Sample	0.382	0.152 [0.019]***	0.479	0.097 [0.020]***
Males	0.35	0.073 [0.031]**	0.434	0.065 [0.024]***
Females	0.412	0.238 [0.022]***	0.526	0.144 [0.044]***
English 1st Lang.	0.119	0.191 [0.027]***	0.428	0.126 [0.039]***
English 2nd Lang.	0.472	0.108 [0.037]***	0.527	0.084 [0.018]***
High Gr9 Grades	0.559	0.139 [0.028]***	0.597	0.125 [0.018]***
Low Gr9 Grades	0.095	0.071 [0.024]***	0.152	0.01 [0.041]

Notes: Sample is the same as in Table 1. Each column in the table reports the "Intent to Treat" (ITT) effects of Pathways to Education on 5-year high school graduation rates. Columns 1 and 3 report the Pre-Pathways means. Columns 2 and 4 report the corresponding estimated ITT effect for elligible students living in Regent Park post-Pathways (students who enrolled in Grade 9 in the 2001-2002 to 2005-2006 academic years) and the Lawrence Heights (LH) and Rexdale sites for the 2007-2008 academic year). All regressions include cohort (year) fixed effects and housing project fixed effects. Regressions in the top row include the following control variables: age (in Grade 9), female, immigrant, and english as a second language. The regressions in rows 2 to 7 include the same control variables with the exception of the variable used to define the sub-sample of interest. Standard errors are clustered at the housing project/development level. Student immigrant status and first language is based on TDSB registration records. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table 4A
Regent Park (2000-06) Intent to Treat (ITT) Estimated Effects of Pathways on Post Secondary Education (PSE) Enrollment by End of Fifth Year Since Starting High School

	Outcome Variable							
	Applied to PSE		Enrolled in PSE		Enrolled in College		Enrolled in University	
	Pre-Pathways Mean	ITT	Pre-Pathways Mean	ITT	Pre-Pathways Mean	ITT	Pre-Pathways Mean	ITT
Full Sample	0.433	0.168 [0.016]***	0.336	0.192 [0.021]***	0.119	0.098 [0.020]***	0.216	0.094 [0.018]***
Males	0.349	0.148 [0.030]***	0.317	0.12 [0.033]***	0.143	0.054 [0.026]**	0.175	0.066 [0.030]**
Females	0.507	0.191 [0.031]***	0.352	0.263 [0.029]***	0.099	0.14 [0.030]***	0.254	0.123 [0.028]***
English 1st Lang.	0.031	0.26 [0.031]***	0.031	0.209 [0.031]***	0.031	0.089 [0.025]***	0.000	0.12 [0.021]***
English 2nd Lang.	0.559	0.146 [0.034]***	0.431	0.193 [0.038]***	0.147	0.122 [0.031]***	0.284	0.072 [0.036]**
High Gr9 Grades	0.591	0.141 [0.026]***	0.466	0.198 [0.025]***	0.159	0.103 [0.023]***	0.307	0.095 [0.024]***
Low Gr9 Grades	0.13	0.108 [0.025]***	0.087	0.055 [0.019]***	0.043	0.063 [0.019]***	0.043	-0.008 [0.012]

Notes: Sample is the same as in Columns 1 and 2 of Table 3. Each column in the table reports the "Intent to Treat" (ITT) effects of Pathways to Education on four post-secondary education (PSE) outcome variables. Applied to PSE is a dummy variable equal to 1 if a student applied to at least one PSE institution in the province of Ontario in their final year of high school and equal to 0 otherwise. Enrolled in PSE is a dummy variable equal to 1 if a student accepted an offer of adminssion to a PSE institution in Ontario upon completing high school and 0 otherwise. Enrolled in PSE is a dummy variable equal to 1 if a student accepted an offer of adminssion to a PSE institution in Ontario upon completing high school and 0 otherwise. Each column reports the Pre-Pathways (students who enrolled in Grade 9 in the 2000-2001 academic year) means for the Regent Park housing project and the corresponding estimated ITT effect for elligible students living in Regent Park Post-Pathways (students who enrolled in Grade 9 in the 2001-2002 to 2006-2007 academic years). All regressions include cohort (year) fixed effects and housing project fixed effects. Regressions in the top row include the following control variables: age (in Grade 9), female, immigrant, and english as a second language. The regressions in rows 2 to 7 include the same control variables with the exception of the variable used to define the sub-sample of interest. Standard errors are clustered at the housing project/development level. Student immigrant status and first language is based on TDSB registration records. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table 4B
Rexdale/LH (2001-07) Intent to Treat (ITT) Estimated Effects of Pathways on Post Secondary Education (PSE) Enrollment by End of Fifth Year Since Starting High School

	Outcome Variable							
	Applied to PSE		Enrolled in PSE		Enrolled in College		Enrolled in University	
	Pre-Pathways Mean	ITT	Pre-Pathways Mean	ITT	Pre-Pathways Mean	ITT	Pre-Pathways Mean	ITT
Full Sample	0.511	0.097 [0.048]**	0.407	0.044 [0.040]	0.143	0.046 [0.053]	0.264	-0.003 [0.026]
Males	0.396	0.068 [0.076]	0.308	0.103 [0.091]	0.121	0.120 [0.051]**	0.188	-0.018 [0.045]
Females	0.628	0.155 [0.033]***	0.509	-0.010 [0.042]	0.167	-0.042 [0.051]	0.342	0.032 [0.086]
English 1st Lang.	0.424	0.054 [0.081]	0.338	0.070 [0.101]	0.134	0.060 [0.137]	0.203	0.010 [0.043]
English 2nd Lang.	0.593	0.130 [0.033]***	0.473	0.025 [0.020]	0.152	0.027 [0.020]	0.321	-0.002 [0.029]
High Gr9 Grades	0.647	0.129 [0.038]***	0.524	0.045 [0.033]	0.174	0.045 [0.049]	0.350	0.000 [0.028]
Low Gr9 Grades	0.122	-0.017 [0.098]	0.073	0.038 [0.075]	0.057	0.058 [0.082]	0.016	-0.020 [0.015]

Notes: Sample is the same as in Columns 3 and 4 of Table 3. Each column in the table reports the "Intent to Treat" (ITT) effects of Pathways to Education on four post-secondary education (PSE) outcome variables. Applied to PSE is a dummy variable equal to 1 if a student applied to at least one PSE institution in the province of Ontario in their final year of high school and equal to 0 otherwise. Enrolled in PSE is a dummy variable equal to 1 if a student accepted an offer of adminssion to a PSE institution in Ontario upon completing high school and 0 otherwise. Enrolled in College (University) are dummy variables equal to 1 if a student accepted an offer of admission from a 2 year community college (University) in Ontario and 0 otherwise. Each column reports the Pre-Pathways (students who enrolled in Grade 9 in the 2001-2002 to 2006-2007 academic years) means for the Rexdale and Lawrence Heights (LH) housing projects and the corresponding estimated ITT effect for elligible students living in Rexdale/LH Post-Pathways (students who enrolled in Grade 9 in the 2007-2008 academic year). All regressions include cohort (year) fixed effects and housing project fixed effects. Regressions in the top row include the following control variables: age (in Grade 9), female, immigrant, and english as a second language. The regressions in rows 2 to 7 include the same control variables with the exception of the variable used to define the sub-sample of interest. Standard errors are clustered at the housing project/development level. Student immigrant status and first language is based on TDSB registration records. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table 5
ITT Estimated Effects on High School Test Scores and Academic Track

Outcome Variable							
Gr9 English Level (0-4)		**Gr9 Math Level (0-4)**		**On Academic Track in Gr9**		**Gr10 Literacy Pass**	
Pre-Pathways Mean	**ITT**	**Pre-Pathways Mean**	**ITT**	**Pre-Pathways Mean**	**ITT**	**Pre-Pathways Mean**	**ITT**
Regent Park and Other Projects (2000-2006)							
1.488	0.214 [0.049]***	1.206	0.262 [0.056]***	0.533	0.076 [0.025]***	0.35	0.016 [0.024]
Rexdale/LH and Other Projects (2001-2007)							
1.75	0.116 [0.074]	1.41	-0.21 [0.141]	0.503	0.135 [0.017]***	0.463	0.051 [0.020]**

Notes: Sample is the same as in Table 3. Each column in the table reports the "Intent to Treat" (ITT) effects of Pathways to Education on four intermediate high school outcomes. Columns 1 and 2 report year end achievement levels (grades) for Grade 9 English and Math. An achievement level of 4 corresponds to an "A" grade while an achievement level of 0 corresponds to a failing grade. On Academic Track in Grade 9 is a dummy variable equal to 1 if the stduent is enrolled in "academic stream " courses and 0 otherwise. "Academic Stream" courses prepare high school students for university, "Applied Stream" courses preapre students for community college and "Essentials Stream" courses prepare students to enter the labour force after high school . Gr10 Literacy Pass is an indicator variable equal to 1 if a student has paased the Ontario Secondary School Literacy Test (OSSLT), a requirement for graduation in the Province of Ontario, on their first attempt (in Grade 10). All regressions include cohort (year) fixed effects and housing project fixed effects. Regressions include the following control variables: age (in Grade 9), female, immigrant, and english as a second language. Standard errors are clustered at the housing project/development level. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table 6
ITT Estimated Effects for Pathways to Education Program
Using Alternative Comparisson Groups

	Regent Park (2000-2006)		Rexdale/LH (2001-2007)	
Comparisson Projects	**Graduated by 5th Year**	**Sample Size**	**Graduated by 5th Year**	**Sample Size**
All (Baseline)	0.152 [0.019]***	5,847	0.097 [0.020]***	6,038
Large Density Projects	0.105 [0.020]***	2,942	0.093 [0.016]***	3,082
Large Downtown Projects	0.075 [0.077]	1,250	0.103 [0.015]***	2,029
Designated Priority Neighborhoods	0.127 [0.023]***	2468	0.096 [0.018]***	2598

Notes: Sample is the same as in Table 3. Each row in this table reports the "Intent to Treat" (ITT) effects of Pathways to Education using alternative definitons for the comparison (control) group. The baseline sample is the same as in Table 1. The definition of the Graduated by 5th Year outcome variable is the same as in Table 3. Large density housing projects include Alexandra Park, Bleecker Street, East Mall, Edgeley Village, Jane Finch, Firgrove Crescent, Flemingdon Park, Lawrence Heights, Malvern, Moss Park, Pelham Park, Regent Park, Rexdale (Thistletown) and Warden Woods. Large downtown projects include only Alexandra Park, Bleecker Street, and Regent Park. There are 11 additional housing projects which fall within the designedated "priority neighbourhoods". They are Rexdale, Scarlettwoods, Duncanwoods Drive, Pelham Park, Lawrence Heights, McCowan Road, Edgeley Village, Firgrove Crescent, Flemington Park, Yorkwoods Village and 'Other'. 'Other' refers to a group of small housing projects which are grouped together to create a publicly available data set . All regressions include cohort (year) fixed effects and housing project fixed effects. Regressions include the following control variables: age (in Grade 9), female, immigrant, and english as a second language. Standard errors are clustered at the housing project/development level. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

TABLE 7

Descriptive Statistics on Demographic Variables for Students in Toronto Public Housing: 1993 - 2006

Variable	Female	Age	Immigrant	Non-English	HS Parent	Univ. Parent	Married	Earnings (Parents)	Transfer Inc. (Family)	Family <LICO	Family Size	Number of Beds	Sample
Panel A: Regent Park													
1993	0.410	17.0	0.798	0.679	0.288	0.000	0.069	11438	13207	0.894	4.842	3.095	27
1994	0.550	16.0	0.518	0.462	0.259	0.000	0.094	8251	16328	0.829	4.849	3.147	38
1995	0.499	15.0	0.586	0.616	0.182	0.117	0.087	10658	15875	0.909	5.125	3.596	27
1996	0.606	14.0	0.509	0.440	0.198	0.065	0.092	8487	13142	0.926	4.821	3.360	27
1997	0.519	13.0	0.671	0.544	0.114	0.028	0.225	11641	13587	0.926	4.889	3.368	41
1998	0.480	14.0	0.703	0.562	0.262	0.037	0.065	10942	13881	0.925	4.742	3.038	64
1999	0.427	13.8	0.507	0.488	0.172	0.036	0.105	9864	13694	0.909	4.993	3.292	76
2000	0.446	12.4	0.635	0.529	0.232	0.016	0.101	10401	15154	0.885	4.884	3.286	65
2001	0.480	11.4	0.542	0.482	0.318	0.016	0.127	13628	12368	0.843	4.905	3.131	64
2002	0.476	13.0	0.716	0.653	0.214	0.139	0.129	7885	14972	0.947	4.892	3.085	39
2003	0.478	12.0	0.586	0.664	0.157	0.112	0.121	10098	12713	0.977	4.356	2.657	36
2004	0.512	11.0	0.418	0.518	0.311	0.073	0.223	17000	11240	0.852	4.989	2.899	37
2005	0.716	10.0	0.378	0.582	0.246	0.139	0.115	18939	10776	0.833	4.606	2.900	29
2006	0.393	9.0	0.245	0.403	0.432	0.000	0.085	15206	12975	0.848	4.584	2.726	32
All Years	0.486	12.9	0.537	0.563	0.242	0.049	0.116	11612	13590	0.894	4.828	3.112	602
Panel B: Other Public Housing													
1993	0.490	17.0	0.364	0.193	0.211	0.059	0.219	17163	10311	0.761	4.235	2.847	242
1994	0.460	16.0	0.400	0.197	0.195	0.073	0.309	16799	10838	0.730	4.226	2.845	261
1995	0.437	15.0	0.393	0.152	0.246	0.046	0.247	15567	11247	0.785	4.417	2.790	264
1996	0.465	14.0	0.435	0.171	0.241	0.031	0.269	14574	11788	0.790	4.622	2.861	280
1997	0.455	13.0	0.473	0.230	0.167	0.051	0.317	14776	11706	0.786	4.384	2.553	282
1998	0.510	14.3	0.447	0.185	0.277	0.053	0.261	18692	10027	0.709	4.407	2.700	572
1999	0.519	13.6	0.433	0.187	0.285	0.045	0.288	18210	10160	0.724	4.466	2.724	532
2000	0.496	12.5	0.418	0.187	0.235	0.055	0.281	17804	10254	0.749	4.469	2.804	538
2001	0.488	11.3	0.379	0.198	0.206	0.042	0.325	14874	10965	0.785	4.316	2.626	549
2002	0.566	13.0	0.426	0.191	0.291	0.090	0.244	21336	9195	0.694	4.530	2.749	266
2003	0.510	12.0	0.351	0.187	0.270	0.047	0.253	20847	9414	0.709	4.447	2.793	304
2004	0.484	11.0	0.236	0.127	0.282	0.037	0.312	16677	9243	0.765	4.450	2.755	312
2005	0.538	10.0	0.140	0.141	0.266	0.034	0.292	21791	9826	0.695	4.446	2.690	322
2006	0.461	9.0	0.081	0.184	0.289	0.078	0.312	20104	9700	0.719	4.529	2.674	312
All Years	0.495	12.8	0.182	0.364	0.250	0.052	0.283	17817	10301	0.742	4.426	2.736	5036
Panel C: Regent Park	-0.045	0.000	0.031	-0.031	-0.003	-0.038	-0.009	-1543	1539	-0.012	0.036	0.108	5667
Year 2000 Interaction	[0.057]	[0.000]	[0.040]	[0.070]	[0.021]	[0.011]***	[0.024]	[1359]	[975]	[0.021]	[0.213]	[0.085]	

Notes: Panels A and B report the annual means for background variables (descriptive statistics) for children between the ages of 9 and 17 living in Toronto public housing between 1993 and 2006. Data are obtained from the 1996 and 2001 Census of Canada. Panel C reports the regression coefficient and corresponding standard error (in square brackets) of a regression of each demographic variable on a dummy variable equal to 1 if the child lived in Regent Park in 2000 and 0 otherwise. All regressions include cohort (year) and housing project fixed effects . Standard errors are clustered at the housing project/development level. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Appendix Table 1
Intent to Treat (ITT) Estimated Effects for Pathways to Education Program
Alternative Inference Methods

	Regent Park (2000-2006)		Rexdale/LH (2001-2007)		All Pathways Sites (2000-2007)	
	Pre-Pathways Park Mean	**ITT**	**Pre-Pathways Park Mean**	**ITT**	**Pre-Pathways Park Mean**	**ITT**
Baseline	0.382	0.152 [0.019]*** [0.117,0.195]	0.479	0.097 [0.020]*** [0.058,0.136]	0.452	0.127 [0.021]*** [0.085,0.173]
Wild Cluster Bootstrap	0.382	0.15 [0.043]*** [0.061,0.235]	0.479	0.096 [0.055]* [-0.011,0.207]	0.452	0.126 [0.035]*** [0.058,0.200]
Synthetic Control Group	0.382	0.096	0.479	-	0.452	-
Conley/Taber CI	0.382		0.479		0.452	
95%		[-0.182,0.522]		[-0.342,0.681]		[-0.669,0.798]
90%		[-0.173,0.463]		[-0.297,0.524]		[-0.293,0.757]
Group Means (Baseline Sample)	0.382	0.147 [0.035]*** [0.077,0.217]	0.479	0.096 [0.042]** [0.014,0.177]	0.452	0.154 [0.028]*** [0.098,0.209]

Notes: Each column in the table reports the "Intent to Treat" (ITT) effects of Pathways to Education on the 5-year high school graduation rate. Each column reports Pre-Pathways means and the corresponding estimated ITT effect. For column 1 the ITT is for elligible students living in Regent Park post-Pathways (students who enrolled in Grade 9 during the 2001-2002 to 2006-2007 academic years). Column 2 reports the ITT for elligible students living in the Lawrence Heights and Rexdale sites post-Pathways (students who enrolled in Grade 9 during the 2007-2008 academic year). Column 3 reports the ITT for all Pathways sites for the 2000-2001 to 2007-2008 academic years. Row 1 reports the baseline estimates (Table 3, column 1) as a comparison. All regressions in row 1 include cohort (year) fixed effects, housing project fixed effects and the following control variables: age (in Grade 9), female, immigrant english as a second language. Standard errors are clustered at the housing project/development level. Row 2 reports mean ITT effects from 999 cluster-wild bootstrap replications along with corresponding standard deviations and 95% confidence intervals computed from the 0.025 and 0.975 percentiles of the estimated iTT distribution. Row 3 reports average differences in post-Pathways outcomes between treated cohorts and a synthetic cohort. Row 4 reports 95 percent and 90 percent confidence intervals, using the Conley/Taber (2011) method (see Appendix B). In row 5 the dependent variable is the housing project/group mean for each outcome. Regressions control for cohort (year) fixed effects and weight observations by the number of students in each housing project mean cell. For row 3, heteroskedasticity robust standard errors are reported in square brackets. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Appendix Table 2
Treatment on Treated (TOT) Estimated Effects for Pathways to Education Program

					Attended at Least 1 Mentoring or Tutoring Session in GR9			
	REGENT PARK (2000-2006)		Rexdale/LH (2001-2007)		REGENT PARK (2000-2006)		Rexdale/LH (2001-2007)	
	Pre-Pathways Mean	TOT	Pre-Pathways Mean	TOT	Pre-Pathways Mean	TOT	Pre-Pathways Mean	TOT
Full Sample	0.382	0.191 [0.024]***	0.479	0.12 [0.026]***	0.382	0.265 [0.034]***	0.479	0.124 [0.024]***
Males	0.35	0.093 [0.040]**	0.434	0.082 [0.029]***	0.35	0.138 [0.059]**	0.434	0.086 [0.032]***
Females	0.412	0.293 [0.027]***	0.526	0.175 [0.052]***	0.412	0.388 [0.036]***	0.526	0.175 [0.051]***
English 1st Lang.	0.119	0.247 [0.035]***	0.428	0.147 [0.051]***	0.119	0.371 [0.052]***	0.428	0.155 [0.046]***
English 2nd Lang.	0.472	0.133 [0.046]***	0.527	0.109 [0.024]***	0.472	0.181 [0.063]***	0.527	0.11 [0.024]***
High Gr9 Grades	0.559	0.173 [0.034]***	0.597	0.149 [0.025]***	0.559	0.23 [0.046]***	0.597	0.157 [0.021]***
Low Gr9 Grades	0.095	0.092 [0.031]***	0.152	0.015 [0.057]	0.095	0.148 [0.050]***	0.152	0.014 [0.054]

Notes: Sample is the same as in Table 3. Each column in the table reports the "Treatment on the Treated" (TOT) effects of Pathways to Education on 5-year high school graduation rates. Columns 1, 3, 5 and 7 report the Pre-Pathways means. Columns 2, 4, 6 and 8 report the corresponding estimated TOT effect for elligible students living in Regent Park post-Pathways (students who enrolled in Grade 9 in the 2001-2002 to 2005-2006 academic years) and the New Sites (Lawrence Heights and Rexdale for the 2007-2008 academic year). In columns 2 and 4 the Pathways participation dummy variable is instrumented with a dummy variable indicating whether the student was living in a housing project that offered Pathways when the student entered Grade 9. In columns 6 and 8 the explanatory variable of interest is a dummy variable equal to 1 if the student attended at least one tutoring or mentoring session in Grade 9. This is instrumented with a dummy variable indicating whether the student was elligible for Pathways (living in a housing project that offered Pathways when the student entered Grade 9). All regressions include cohort (year) fixed effects and housing project fixed effects. Regressions in the top row include the following control variables: age (in Grade 9), female, immigrant english as a second language. The regressions in rows 2 to 7 include the same control variables with the exception of the variable used to define the sub-sample of interest. Standard errors are clustered at the housing project/development level. Student immigrant status and first language is based on TDSB registration records. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.