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A Benefit-Cost Analysis of City Connects

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Abstract

Schools have historically and increasingly played an important role in providing services to meet students' social and emotional, family, health, and academic needs. Coordinating these services in a way that is strategically aligned with a school's academic mission and that efficiently addresses the needs of all students is often challenging and costly. This study is an initial investigation of Boston College's City Connects program, which supports students and schools by evaluating the needs of all students in a school and connecting them to services that are largely provided by community partner organizations. The program aims to help students by connecting them with an individualized set of services to address their academic, social/emotional, family, and health needs. The program also aims to assist schools by connecting them with community agencies and service providers, and streamlining student support referral and management to make the process of providing comprehensive approaches to supporting student learning more strategic and efficient. Prior research has shown evidence of effectiveness of City Connects in terms of increased achievement and educational attainment relative to similar schools that have not implemented the program (City Connects Progress Report, 2014; Walsh, et al., 2014a; 2014b). These positive effects must be weighed against the program's costs in a benefit-cost analysis to determine whether the program is a worthwhile social investment. This report shows that City Connects provides a whole-school comprehensive service at relatively low cost to the schools—schools themselves only bear about 10% of the core costs of the program. However, the methodological complexity of this work is entailed in the estimation of the total cost when considering the partnerships with community organizations. The results show that the total cost of six years of participation in City Connects from kindergarten through fifth grade (the dosage under which effects were measured) is $4,570 per student, which includes a portion of the costs of the community partner services received by the students in City Connects schools. Depending on what share of the community partner services are considered to be above and beyond the baseline level, the total cost estimate can range from $1,540 to $9,320 per student. Under the model that is most plausible based on implementation data, the benefit-cost ratio is 3.0 and the net benefits are $9,280 per student. This result implies that providing the program to a cohort of 100 students over six years would cost society $457,000 but yield $1,385,000 in social benefits, for a net benefit of $928,000. Even under the most conservative assumptions regarding costs and benefits, the program's benefits exceed its costs. Sensitivity tests show that the benefit-cost ratio lies somewhere between 1 and 11.8, with a best estimate of $3.00 in benefits per dollar of cost. Further research can investigate the relationship between the program, schools, and community partners and how services provided by partners compare in treatment versus comparison schools.

Keywords

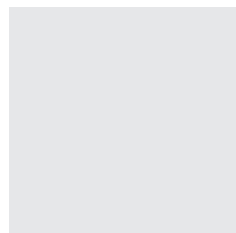comprehensive student support, benefit-cost

Disciplines

Economics | Educational Assessment, Evaluation, and Research | Education Economics

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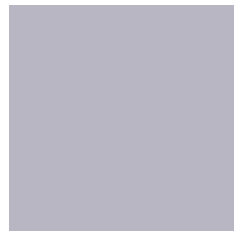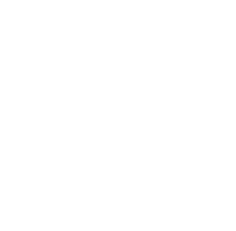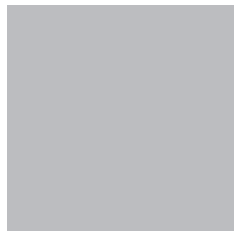
A BENEFIT-COST ANALYSIS OF CITY CONNECTS

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ABSTRACT

Schools have historically and increasingly played an important role in providing services to meet students' social and emotional, family, health, and academic needs. Coordinating these services in a way that is strategically aligned with a school's academic mission and that efficiently addresses the needs of all students is often challenging and costly. This study is an initial investigation of Boston College's City Connects program, which supports students and schools by evaluating the needs of all students in a school and connecting them to services that are largely provided by community partner organizations. The program aims to help students by connecting them with an individualized set of services to address their academic, social/emotional, family, and health needs. The program also aims to assist schools by connecting them with community agencies and service providers, and streamlining student support referral and management to make the process of providing comprehensive approaches to supporting student learning more strategic and efficient.

Prior research has shown evidence of effectiveness of City Connects in terms of increased achievement and educational attainment relative to similar schools that have not implemented the program (City Connects Progress Report, 2014; Walsh, et al., 2014a; 2014b). These positive effects must be weighed against the program's costs in a benefit-cost analysis to determine whether the program is a worthwhile social investment. This report shows that City Connects provides a whole-school comprehensive service at relatively low cost to the schools—schools themselves only bear about 10% of the core costs of the program. However, the methodological complexity of this work is entailed in the estimation of the total cost when considering the partnerships with community organizations.

The results show that the total cost of six years of participation in City Connects from kindergarten through fifth grade (the dosage under which effects were measured) is $4,570 per student, which includes a portion of the costs of the community partner services received by the students in City Connects schools. Depending on what share of the community partner services are considered to be above and beyond the baseline level, the total cost estimate can range from $1,540 to $9,320 per student. Under the model that is most plausible based on implementation data, the benefit-cost ratio is 3.0 and the net benefits are $9,280 per student. This result implies that providing the program to a cohort of 100 students over six years would cost society $457,000 but yield $1,385,000 in social benefits, for a net benefit of $928,000. Even under the most conservative assumptions regarding costs and benefits, the program's benefits exceed its costs. Sensitivity tests show that the benefit-cost ratio lies somewhere between 1 and 11.8, with a best estimate of $3.00 in benefits per dollar of cost. Further research can investigate the relationship between the program, schools, and community partners and how services provided by partners compare in treatment versus comparison schools.

Keywords

Benefit-cost analysis, comprehensive student support, student support services, school and community partnerships, learning support

Glossary of Common Terms

Ingredients—Resources, such as teacher time, that were utilized in a particular implementation at a specific time with a specified group of students. The ingredients are described, quantified, and matched with prices to estimate the total cost to replicate the implementation of the program.

Core Costs of City Connects—The core costs of City Connects comprises the monetary value of all ingredients utilized in providing the City Connects program, including the School Site Coordinator, school staff and materials, parental time, and City Connects Central Program Staff. These costs exclude external services, such as those provided by the community partners.

Community Partner Costs—City Connects matches each child in a school with tailored services that can benefit the growth and development of the child, some of which were provided by external community organizations or community partners. The costs of these community partners were evaluated to understand which should be allocated to estimates of the total cost to replicate the impacts of City Connects.

Total Cost of City Connects—The total cost of City Connects is the monetary value of all resources required to replicate the intervention, whether provided by City Connects or a community partner program. Due to the complexity of the program and the relationship between City Connects and the community partners, the total cost of City Connects is explored in three models. The preferred specification is the third model, which includes a portion of the costs of community partner services in the estimate of the total cost of City Connects.

Distribution of Financing Costs—The costs of City Connects are financed (or provided in-kind) by the City Connects central program office, the school system, and the parents of participating children. This report distinguishes among the costs (or ingredients) utilized in implementing the program and who bore the costs. The financial burden for each party is indicated as the costs to the school, the costs to City Connects, and the costs to parents.

CONTENTS

1. INTRODUCTION

Research has long established that out-of-school factors, such as physical and mental health, family support, and social and emotional development, significantly affect student learning (Berliner, 2009). Students in neighborhoods impacted by high rates of poverty often face out-of-school factors that impede learning for a variety of reasons, including limited school and family resources to invest in support services, higher average levels of student stress, and unpredictable student support systems (Dearing, 2008; Rothstein, 2010). Schools have attempted to play an important role in providing and coordinating student support services, and attempts are being made to expand the role of schools in coordinating comprehensive services. Nonetheless, in many schools these support services are provided in fragmented ways that lack comprehensiveness and do not address the needs of all students or engage teachers in a way that is deeply embedded in the academic mission of the school (Walsh & DePaul, 2008).

The City Connects program, developed at Boston College and first implemented in the 2001–2002 school year in the Boston Public Schools, aims to help students by connecting them with an individualized set of services to address their academic, social/emotional, family, and health needs. The program also aims to assist schools by connecting them with community agencies and service providers, and streamlining student support referral and management to make the process of providing comprehensive approaches to supporting student learning more strategic and efficient. The core of the program, described in more detail below, is provided by a team of School Site Coordinators who assess the strengths and needs of every single student at a school site in consultation with teachers in a series of Whole Class Reviews and connect students with appropriate services (City Connects Progress Report, 2014).

Prior research provides evidence that City Connects has a positive effect on academic achievement, social and emotional outcomes, and health knowledge and behaviors (City Connects Progress Report, 2014; Walsh, et al., 2014a; 2014b). The program was also found to reduce high school dropout rates (City Connects Progress Report, 2014). While evidence of program effectiveness is important, cost information and return on investment is also required for policymakers to make judicious decisions about resource allocation or replication of the intervention elsewhere. Educational interventions can be viewed as a social investment that entails costs and benefits. A careful analysis of the costs and benefits of City Connects is needed to determine if the benefits, or the returns on the investment, exceed the costs of the program. The first step of an economic analysis addresses the primary question, is the program worth the cost? But it is also important to ascertain the magnitude or size of the benefits compared to the costs of the program to better understand how much return is generated as a result of the investment. After these two analyses are completed, a policymaker is able to know the resources necessary to implement the program effectively and to establish evidence-based expectations of the program's benefits or outcomes prior to adopting the reform.

This study aims to address the primary question: Do the benefits of City Connects exceed the costs? As described above, City Connects is a complex multi-site intervention that works through systematic screening and appropriate intervention of all students. City Connects employs a process that reviews the academic, health, social and emotional, and family relationship needs of all students in the school in collaboration with teachers. Based upon this review it provides referral to services that address these needs, manages the relationships to reduce unnecessary overlap of services and to promote better matches with needs, and enlists additional school level support when needed. It is assumed that the

program's impact is a result of both the resources and services provided directly by City Connects as well as services provided by community partners. This study examines the costs of the City Connects program at two school sites in the Boston Public Schools as well as a sample of services provided to students by community partner organizations serving each school.

Although there are a range of programs that link school children to comprehensive services in schools and communities, none have undertaken rigorous studies of their costs or benefits that account for the complexity of the relationship between the program (City Connects in this example) and the service providers. For this reason, this work also addresses methodological issues in estimating the cost to replicate the measured impacts, whether they are related directly to City Connects activities or through partnerships with community organizations. Based on the results of this preliminary study, we will explore extending the analysis to a larger study that would further investigate the costs of City Connects and community partner services.

Future research could benefit from an examination of the literature on the effects and costs of similar programs that focus on providing services for the whole child within schools that utilize services available in the community. Accordingly, this study provides the first effort in that direction for City Connects and a model that might be applied to other programs with similar goals. In the following section, City Connects is described and the methods and results of this analysis are provided.

2. CITY CONNECTS: DESCRIBING THE PROGRAM

City Connects works with nearly 25 elementary and middle schools in Boston and Springfield, Massachusetts, Dayton, Ohio, and New York City. This study focuses on the program's initial and largest school district partner, the Boston Public Schools (BPS). In the 2013–2014 school year, City Connects served 18 public schools in Boston. The program initially served students in elementary grades, K–5, the focus of this study. City Connects is currently expanding to serve preschool, middle school, and high school grades in some locations.

The program enlists on-site School Site Coordinators (SSCs) who begin the school year by collaborating with school administrators and teachers to evaluate every student in each class as a Whole Class Review. During the Whole Class Review, the SSCs meet with each classroom teacher to assess the strengths and needs of each student in four major life areas: academics, social and emotional skills, health, and family. Together, they identify services to meet students' needs and assess whether any children require referral for more intensive follow-up or evaluation.

On an ongoing basis, SSCs directly provide services to individuals and small groups of students, while also working with their families, teachers, and community partners to ensure that the services being provided meet all of the students' needs. The SSCs are able to reassess as the year progresses and to make adjustments as necessary. SSCs are integrated into the wider effort of student support and youth development work at the schools they serve. They participate in Student Support Team meetings and provide counseling and crisis intervention support services to students in collaboration with the school administration.

In Boston, SSCs are employees of Boston College, but the model is flexible in that SSCs can be employees of the partnering school district while receiving training, support, and materials from the City Connects program. SSCs generally have Master's degrees in social work or school counseling and receive initial training from Boston College, in addition to ongoing implementation support and oversight from City Connects staff. At each participating school in Boston, City Connects provides a ratio of one SSC for every 400 students.

A critical piece of the work of SSCs is their knowledge of and familiarity with the range of services provided by community partners. Understanding the various services available allows them to better tailor service assignment to meet each student's specific needs. SSCs accomplish this by developing relationships with community partners, sharing information about partner services across the City Connects network, and gathering extensive data on service utilization. The types of services students receive include prevention and enrichment (e.g., tutoring or academic enrichment, athletics, dance, summer arts program), early-intervention (e.g., mentor programs, dental care, community-provided clothes and supplies) and more intensive services (e.g., psychological services or medical assistance). During an academic year, students often participate in multiple services, about five services each, on average. In addition to serving students, SSCs also aid the schools and community partners by streamlining the service referral process and communication, in part by providing a single point of contact for coordination.

It is conventional for schools to identify and seek specific services for children with obvious or dire needs, but schools rarely screen all children for the full range of academic, health, emotional, and family strengths and needs addressed by City Connects. In contrast, the City Connects program does this systematically, engaging in greater efficiency of process and with less likelihood of overlooking a student need. And, because the program serves multiple schools across the city, City Connects has continuous contacts with pertinent service providers in the community.

3. METHODS

3.1 Research Questions

1. What are the core costs of City Connects?
2. How are the core costs of City Connects distributed across the central program office, schools, and parents?
3. What is the cost of Community Partner services, on average?
4. What is the total cost and cost per student of City Connects? How does this estimate change when assumptions regarding the relationship between the program, the schools, and the community partners are altered?
5. What are the monetary values of the social benefits produced by City Connects through improvement in academic achievement and high school graduation rates?
6. Do the benefits of City Connects exceed their costs? What is the sensitivity of these estimates to different assumptions?

3.2 Study Sample

This study utilizes cost data from two school sites in Boston for the 2013–2014 school year. The schools were selected based on several criteria: they were long-term implementers of City Connects, whose data were included in reported evaluations of outcomes, and they represent different geographic areas within the city. A pragmatic criterion was their availability for site visits by the study team.

Both sites are large elementary schools, with more than 700 students. Both schools serve mostly minority students, who are from low-income families, many who have limited English proficiency. Table 1 provides demographic characteristics of elementary schools in Boston, City Connects schools in Boston, and the schools in this sample. The study sample has a higher representation of Asian students, fewer Hispanic students, and more English Language Learners than elementary schools in Boston Public School or City Connects more broadly. However, the two sites were typical with respect to the numbers of students eligible for free and reduced price lunch.

In order to understand the costs and benefits of the City Connects program, this study also includes an analysis of a sample of five community partners from each school site, for a total of 10 distinct community partners. Sampling is necessary because there are more than 70 community partners serving each school. The sampled community partners were selected based on the category of services provided, the intensity of the service, the number of students served, and the anticipated magnitude of marginal costs for serving one additional student based on the nature of the program (one-on-one programs likely having high marginal costs while an undersubscribed afterschool program may more easily accommodate an additional student without incurring additional costs). The sample of community partners provided a range of services such as tutoring, mentoring, behavioral support, health interventions, or the provision of needed materials such as books, coats, and backpacks.

3.3 Ingredients Method and Data Collection

This pilot study follows the ingredients method of cost analysis (Levin, 1975). This approach is widely recognized for its accuracy and authenticity because it encompasses all resources or ingredients utilized in implementing a program, based on the economic principle of opportunity cost (Levin & McEwan,

2001). This study measures the ingredients utilized during the 2013–2014 school year to implement City Connects. In addition, the study translates program effectiveness into monetary benefits that are conferred to society to calculate the returns to City Connects as a social investment.

In order to calculate a cost estimate that corresponds to the effectiveness estimate, the study includes three cost models. The three models explore the need for inclusion of community partner costs in an estimate of the cost to replicate City Connects. The goal of the cost analysis is to estimate the total monetary value of the resources required to replicate the impacts of City Connects. The study focuses on analysis of school sites because the decision to adopt City Connects is made at the school level. Costs are estimated in total and per student. The study also includes an analysis of the distribution of the costs across various stakeholders (such as the school, program, and parents).

For each school site, all program ingredients utilized by City Connects and the community partners during the 2013–2014 school year were identified. Qualitative ingredient descriptions were collected via interviews with SSCs, school staff, and representatives of the community partners. The interviews were semi-structured, following a protocol with questions regarding personnel, facilities, materials, and other inputs. More information on data collection is available in Appendix I: Technical Appendix.

The ingredients method requires each site and each program included in an analysis to be comprehensively investigated to identify and describe all ingredients data through document review, observations, and interviews with program staff. In this pilot study, the process was simplified to reduce the burden on community partners by using expedited interviews of shorter duration. The interviews mostly focused on the relationship between the partner, the school, and City Connects, as well as identifying the primary ingredients utilized by the partners in serving students, such as staff or volunteers to provide services.

3.4 Matching Ingredients to Boston Prices

All ingredients in this analysis were matched with Boston prices in 2013 US dollars. Ingredients were grouped into categories of personnel, facilities, materials and equipment, and other inputs. Ingredients in the category of personnel were matched with Boston prices available from the U.S. Department of Labor's Bureau of Labor Statistics (BLS) (2014b).[1] For personnel, fringe benefits were estimated using rates reported by the U.S. BLS via the National Compensation Survey (U.S. Bureau of Labor Statistics, 2014a).[2] The prices of ingredients are discussed in detail in Appendix I: Technical Appendix.

Volunteer time was estimated based on the specific tasks associated with their service. For example, average salaries for teacher assistants in Boston 2013 ($29,450/year, or $20.45/hour) were applied to those volunteers that provide tutoring or mentoring services. The Boston minimum wage was assigned to volunteers doing simple/low-skill tasks. We test the sensitivity of this assumption by including an additional analysis using a wage rate based on the volunteer's education level. The patterns of results are not changed by this test. The analyses are discussed in Appendix I: Technical Appendix.

Some services included parental involvement. Because this involvement may be important in replicating the effects, these costs were included in the analysis. The schools in the sample were largely attended by children from low-income families. Therefore, we estimated the market value of parental

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1 http://www.bls.gov/oes
2 http://www.bls.gov/ncs

time at the 2013 rate of minimum wage in Boston. Facilities costs were estimated by multiplying the square footage used by an annualized cost for new construction that included land acquisition and furnishings.

Materials were matched with prices available via online sources. For instance, the cost for a portable dental unit utilized by one community partner specializing in providing dental care was estimated using the *Dental Chair Surgical Chair Complete Package*, at the price of $3,699.99 per set.[3]

If necessary, prices were adjusted for inflation using the Consumer Price Index calculator available online (http://data.bls.gov/cgi-bin/cpicalc.pl). Additionally, since the program took place over six years, costs and benefits are expressed as a present value at the time of kindergarten using a 3.5% discount rate.

3.5 Costs Estimation

In a benefit-cost analysis, costs must account for the resources used to produce the impacts of the program. It is uncertain how much of the impact of City Connects is due to the resources of the City Connects program or the specific resources provided through community partner services In this study, the total costs to replicate the impact are reported as the core costs of City Connects both without and with the estimated costs of community partner services provided to students, reflecting this uncertainty.

In what follows, the costs of City Connects are described using three terms for clarity: core costs of City Connects, costs of community partners, and total cost of City Connects (see Glossary for further description). The core cost of City Connects is the monetary value of all ingredients used to implement City Connects, excluding community partner services. The costs of community partners provides information about the services and resources available to students through these external organizations. The total cost of City Connects is explored through three models to account for the relationship between community partner services and the impacts of City Connects.

3.5.1 Core Costs of City Connects

The core costs of City Connects include the School Site Coordinators (SSCs); the time devoted to the program by teachers, principals, guidance counselors, and other school staff; materials and facilities utilized in implementing the program; parental time; and the time contributed by City Connects Central Program Staff for training and implementation. These ingredients are incremental to the normal business of schools where the City Connects program is not present.

The central City Connects program, the schools, and students' parents finance the core costs of City Connects by paying directly for the ingredients or contributing them in kind. Therefore, the analysis of the core costs of City Connects will also include an examination of who pays for the program. Understanding how the costs are financed is especially important for school or district decisionmakers because it outlines the costs borne by the school separately from those borne by other entities.

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3 http://www.amazon.com/ In a sensitivity analysis, we amortized the cost of the dental package over 5 years using 3.5% discount rate. Amortization reduced per student cost for the dental service by $13, but amortization did not affect the per student cost of City Connects estimates under models 2 and 3.

3.5.2 Community Partner Costs

By design, one of the main functions of the City Connects program is connecting schools and students with various services provided by community partners. As described above, the City Connects staff provides some services, which are accounted for in the program costs through the program's ingredients (such as SSCs and facilities space utilized at the school). However, most specific services addressing students' identified needs are provided by community partner organizations. While there is no direct cost to City Connects for these services, the measured effects of City Connects partially rely upon the services students receive from community partners. Some effects may be due to strategically matching students to the particular set of services that best meet their needs, and efficiencies may be achieved due to the streamlining of the service referral process and the management of service receipt, which may result in better services being provided at lower cost or to more students with the same level of resources. However, City Connects may also induce students to receive additional services, may create new relationships between community partners and schools, or may incentivize a community partner to reallocate services from non-City Connects schools to City Connects schools due to the ease of working with the SSC and receiving a student who is well-suited for their program. Our study aims to explore these options to estimate the cost of resources needed to replicate the impacts of the City Connects program.

The costs for the sampled community partners at each school site are generalized to all community partners at that school using the distribution of the number of service referrals across the community partners (for details see Appendix I: Technical Appendix). Specifically, the number of services provided by each sampled community partner was divided by the total number of services provided by all community partners at each school site to calculate the percentage of total services provided by each sampled partner. This percentage was used to extrapolate from the costs of the 5 sampled community partners to the costs of all community partners at each site. This extrapolation assumes that the sample of community partners is representative of the services provided by all community partners affiliated with each school.

3.5.3 Total Cost of City Connects

We explore three potential models to estimate the total cost of City Connects. Some school services and some community partner services would be provided in the absence of City Connects. Determining how much additional cost from the community partners should be included in the estimate of total costs of City Connects requires some assumptions about service delivery; therefore, the total cost of City Connects will be presented as a range, rather than a single point estimate. This allows us to test the implications of our conclusions for the benefit-cost comparisons.

To estimate the total cost to replicate the impacts of City Connects, we explore a model that only includes the core costs of City Connects, a second model that includes the core costs of City Connects and the average cost per student for all community partners associated with each pilot school, and a third model that includes the core costs of City Connects and an estimate of the incremental costs of community partners. These models are illustrated in Figure 1. Specifications for each model are provided in Appendix I: Technical Appendix.

Note that all three cost models include the core costs of City Connects. As described above, the core costs include the services delivered directly by City Connects personnel, such as small-group social skills workshops. Student services provided directly by schools were assumed to be the same across City Connects and comparison schools, and thus were not included. City Connects staff participated

in and sometimes led their school's Student Support Team meetings. While the City Connects staff time spent in this meeting is captured in the core costs, the meeting is a standard practice in all BPS schools ("business as usual"). Thus, the total time of other school staff members attending the meeting are not included in the main analyses presented here. A sensitivity analysis is provided in Appendix I: Technical Appendix that includes the costs of other personnel who attended the Student Support Team meetings, such as school psychologists, teachers, principals, nurses, and occasional community agency staff members. This test explores the possibility of the contribution of this meeting to the effectiveness of City Connects either through additional time for collaboration or additional time to discuss student needs or progress.

City Connects Total Cost Model 1. Model 1 is a lower bound estimate that assumes that students in comparison schools receive equal amounts of services from community partners as students in City Connects schools. Thus, the only costs to replicate the implementation would be those included in the core City Connects costs. Implicitly, any program effects would be due solely to the City Connects program, likely through better identification of service need and better matching of services to students.

There is some empirical support for the assumption that overall levels of resources invested in services amongst community partner organizations are similar across treatment and comparison schools. Interviewees at several of the community partners indicated that the programs served similar numbers of students at City Connects sites and other schools in Boston, or that the program served similar numbers of students at the school sites before City Connects was affiliated with the school. Further, several partner services have very low variable costs relative to their fixed costs, implying that the marginal cost of serving one additional student is minimal.

However, it is possible that differences in outcomes between the treatment and comparison schools could be, in part, due to the qualities of specific services received (either additional services or better matching services to needs) from community partners via City Connects. Therefore, we explore the potential for a larger or more limited role of community partners in estimating the cost of City Connects in models 2 and 3 below.

City Connects Total Cost Model 2. The second cost model is an upper bound estimate of replication costs, attributing the full cost of community partner services for children in the two schools to City Connects. Costs are estimated by extrapolating from the sample of five community partners to the full range of services, based on the available data from City Connects' Student Support Information System. In this estimate, both the core costs of City Connects and the costs of community partner services are considered incremental to the comparison group or "business as usual." This is an extreme estimate and assumes that the only way schools receive community partner services is through the relationship with City Connects. As an extreme upper bound, this estimate represents the highest possible cost of City Connects that is bounded at less than infinity, as it is implausible that students in comparison schools would be receiving no community partner services. Nonetheless, an estimate of the costs of the community partner services associated with City Connects, regardless of whether or not they are above and beyond services received by students in the comparison group, is informative in describing what the City Connects program entails and the range of services received by students.

This estimate is also useful for consideration of replication as it includes all costs of community partner services. The city of Boston offers high-quality community services, where the community partners have long-standing relationships with the public schools and often many available resources, such as volunteers, to provide services. In this context, the cost of expanding services to accommodate

an additional student may be smaller than would be the case in a different setting. If the program were to be replicated in a setting where community partners are not available, schools do not commonly engage in partnerships with community organizations, or the capacity of community partners to serve students is limited, the total cost of City Connects may need to include the costs of community partner services to reflect the true cost needed to replicate the impact of the program.

City Connects Total Cost Model 3. The third cost estimate includes the core City Connects costs and a portion of the costs of community partner services. As illustrated in Figure 1, Model 3 is an intermediate approach between Model 1 and Model 2. While there is some empirical support for the effectiveness of Model 1, it is likely that at least some of the measured effects are due to additional services received by the City Connects schools and students. Model 2 likely overstates the cost of City Connects because the community partners provide extensive services to comparison group schools as well as to City Connects schools. Thus the cost of at least some of the partner services may not be higher for the City Connects schools. In fact some of the partner organizations provided services to the City Connects schools even prior to City Connects. This partial cost assessment for partner services to City Connects schools constitutes the approach that we believe approximates the most reasonable formulation of costs specification. Indeed, it may overstate costs if the differences between City Connects schools and comparison schools lack a substantial difference in partner services, but the overall effectiveness of City Connects schools is due to a more efficient screening and matching approach.

Unfortunately, detailed data were not available from comparison schools regarding the use of community partner services and the related resources. Thus, we relied upon interview responses from program directors at the community partner organizations to determine if any of the costs of community partner services (via shifted resources from comparison schools to City Connects, an exclusive relationship with City Connects, or an expansion of services) should be attributed to City Connects. More details on the estimation strategy are available in Appendix I: Technical Appendix.

3.6 Benefits Estimation

3.6.1 Education Outcomes

A benefit-cost analysis requires estimation of the monetary value of the effects of a program. In the case when outcomes are goods or services that are traded in a market, market prices can be used to incorporate information on value by considering supply and demand. Like most educational interventions, however, the outcomes of City Connects do not typically have a clear market value. In that case, we must estimate a shadow price, or willingness to pay for a desired outcome. Several methods exist for estimating shadow prices, including contingent valuation methods that rely upon surveying people directly to assess their willingness to pay as well as methods that utilize revealed preference as a proxy for markets.

City Connects has several outcomes with potential economic value. This study estimated economic benefits based on educational attainment, measured as a reduction in the high school dropout rate, and educational achievement, measured by increases in math and ELA test scores in grades 6–8 (for more details on the outcomes and evaluations, see Appendix II). These outcomes were obtained from evaluations of City Connects, including a recently-published peer-reviewed publication for the latter outcome (Walsh, et al., 2014b). There is extensive literature on the economic benefits of educational attainment and achievement and substantial consensus on their value (for example Belfield and Levin 2007a, 2007b, 2009; see section 3.6.2 below). By not including other potential benefits, this method will understate the value of the benefits and provide a conservative estimate. Other outcomes of the

program, such as report card measures of social and emotional outcomes and behavior, retention in grade, and health outcomes and behavior, are no doubt important, but their monetary value is not included here to reduce the risk of double-counting given the potential overlap or correlation among these outcomes and high school graduation.

Results on educational attainment are based on Walsh, et al. (2014a), a discrete event- history analysis that compares the probability of dropping out of high school for City Connects participants to other students in the Boston Public Schools who never attended a City Connects school, adjusting for individual covariates. This analysis found that City Connects was associated with a 48% reduction in the odds of dropping out of high school. Of the students enrolled in a City Connects school, 8% dropped out and 92% persisted or graduated. Of the Boston elementary students who did not attend a City Connects school, the dropout rate was 15%, resulting in a difference of 7 percentage points in dropout rates between the City Connects schools and the comparison schools.

To estimate benefits, the outcomes reported by Walsh et al. (2014a) were transformed from dropout prevention rates into high school graduation rates using data available from Boston Public Schools. In 2012, 72% of Boston Public School students graduated within 5 years of starting high school (Massachusetts Department of Elementary and Secondary Education, 2012). This graduation rate was combined with the Walsh et al. (2014a) data to estimate the graduation rate, the dropout rate, and the portion of students who remained in school. The dropout rate for BPS (the comparison group) was 15% and the graduation rate was 72%; therefore, the remaining 13% of students were assumed to remain in school for a 6th year. We apply the same proportions to the results reported in Walsh et al. (2014a). We assume that the 7 percentage point difference in dropout rates were reflected as additional graduates, and that the portion of students who remained in school without graduating (13%) remained unchanged. If this effect is applied to the sample of 2,265 students included in Walsh et al. (2014a), the program generated approximately 159 additional graduates.

Results for educational achievement are from Walsh et al. (2014b). This study utilized a propensity score model comparing math and English language arts (ELA) test results for grades 6–8 for City Connects participants and similar students in comparison schools. For students who participated in City Connects for six years, effect sizes range from 0.15–0.45 and these gains are actually higher for the later grades. To be conservative, we assume an effect size gain of 0.3 across all students.

Therefore, if City Connects is delivered to 100 students, the program will yield 7 new high school graduates (instead of high school dropouts) and the remaining students are considered unaffected. (Again, our estimate of results is conservative because we do not include benefits to students who would have graduated anyway, but benefited in other ways from the services linked to City Connects.) Alternatively, if City Connects is delivered to 100 students, each one is assumed to have an effect size gain of 0.3 in academic achievement. Both these yields can be monetized.

3.6.2 Benefit-Cost Method

To derive the economic benefits of City Connects we apply the well-established lifetime model of educational status (following the methods and principles described by Karoly (2012)).[4] Specifically, we compare lifetime profiles of earnings and related economic benefits by level of educational attainment

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4   The model has been applied at national, state, and local levels, as well as for subgroups of youth at different education levels. For example, studies include: Trostel (2009); Baum et al. (2010); Carroll and Erkut (2009). These studies find large benefits of educational attainment but they are difficult to synthesize as they vary with respect to student populations and apply different assumptions (e.g., on the discount rate).

and take the difference between the profile for a high school graduate or college enrollee versus a dropout. Similarly, we compare lifetime profiles for students with higher cognitive skills to those with lower cognitive skills. On average, persons with low skills and human capital face worse economic outcomes both immediately and over a lifetime (up to age 65). They have lower incomes, worse health status, exhibit greater criminality, and rely more on government welfare subventions. We calculate these outcomes in dollars and discount them back to be expressed as present values in kindergarten. We take the social perspective (including all economic consequences). Hence, they are consistent with the cost estimates and can be compared directly to obtain the net benefits and benefit-cost ratio.

We adapt and update estimates on the gains from attainment and achievement from studies by Belfield and Levin (2007a, 2007b, 2009). For earnings, these studies use data from the Current Population Survey to estimate differences by education level. Earnings data are calculated by gender and race and then pooled to yield a national average lifetime earnings stream for each education level.[5] These differences are very large (even from the perspective of their present value at kindergarten): high school graduates earn over $100,000 more than dropouts; and college graduates earn over $300,000 more. For health differences, the estimates use evidence from Schoeni et al. (2011): conservatively, each year of education adds 0.008 quality-adjusted life years (QALYs) annually during adulthood; this is equivalent to a 'health annuity' of $600 from kindergarten to age 65. For crime differences by education level, evidence is from Lochner and Moretti (2004). For welfare differences by education level, results are from Waldfogel et al. (2007). In total, the lifetime differences by education are very large. We calculate that each new high school graduate yields social benefits of $260,300 over a dropout.

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5   Earnings profiles reflect gross earnings plus health benefits, adjusted for state labor force participation rates, national productivity growth, and ability/motivation. Also, the profiles of those groups with more education are adjusted for ability/ motivation. For each dataset earnings are collapsed into education levels and five-year age bands. From these age bands each lifetime full earnings profile is extrapolated to age 65 and then discounted back to a present value at age 18. To derive tax payments we use declared after-tax federal income tax payments of respondents to the CPS (also adjusted for labor force participation, productivity growth, and ability). Full details are available from the authors.

4. RESULTS

4.1 Core Costs of City Connects

The core cost of City Connects in present value terms accounting for six years of participation during kindergarten through grade 5 is about $1,540 per student on average, as shown in Table 2. As shown by the total cost per site, the total core costs (or the school-level cost for serving all students throughout 6 years of participation) do not vary substantially across the two sites in our sample—both are approximately $1.2 million. Both sites had two SSCs, equivalent support from the central program office, and similar numbers of teachers participating in the whole class review process. Therefore, the difference shown in the site-level per student costs is due to similar fixed costs that are divided over different numbers of students enrolled in each school. By dividing the costs of the program over a larger number of students (a difference of nearly 80 students), the costs at Site 2 appear lower than at Site 1.

The ingredients of the core City Connects program are categorized into personnel, materials, and facilities. As shown in Table 3 in average present value terms adjusting for 6 years of participation, the category of personnel is the main source of costs for the program. School Site Coordinators (SSCs) were generally at the start of their careers and held a Master's degree in social work or counseling with special training for City Connects. Central program staff trained the SSCs, oversaw implementation, and provided other support to the SSCs and the schools. School staff included teachers, administrators and other school personnel who devoted time to the implementation and success of the program. Students' parents were also involved in the City Connects program through meetings and other communication with the SSCs. Items such as computers, desks, internet, and printers were included as materials. Facilities included City Connects office space, classrooms and other school space for Whole Class Reviews, and space for other activities.

4.2 Distribution of Core Costs of City Connects

City Connects relies on ingredients or resources from three main sources: the City Connects central program office, the schools and school district, and students' parents. As shown in Table 3, most of the core costs of City Connects (89.5%) were borne by the central program office for the School Site Coordinators, time contributed by central program staff, and some materials (computers and database). The schools financed about 10.1% of the core costs of the program. The costs to the school included teacher time for the whole class review, principal time, office space for the School Site Coordinators and other space to serve students, and some office materials such as desks. The remaining 0.4% of the core costs of City Connects were provided by parents.

4.3 Community Partners Costs

The costs of sampled community partner services vary substantially based on the type of service provided. Average per student costs for sampled services ranged from $460 to over $18,000. The largest category of total costs is personnel, followed by facilities, which also account for a significant portion of costs. For those partners that specialize in one-on-one tutoring or mentoring services with high variable costs based upon additional student participants, personnel and facilities comprise the majority of costs. In contrast, partners providing materials to students, such as backpacks, books, and clothes, have higher costs in the category of materials.

Table 4 presents the discounted total and per student costs at kindergarten for community partners, extrapolated from the sampled partner costs, at two school sites. Please see the Technical Appendix for details on the extrapolation procedure. On average, the services cost $7,530 per student for six years of program participation. However, large variations existed among sites in terms of per student cost, largely due to differences in the types of services provided. These differences may be the result of sampling at two levels—school sites and community partners within sites. In general, services that involved frequent one-on-one tutoring or mentoring, with frequent sessions, cost the most per student, especially those that used designated space for the services. Although some partners that provided health services seem to be costly, they did not necessarily yield high costs per student because these services were delivered less frequently. Partners that specialize in providing materials also had low per student cost, as result of the large number of students served.

In the next section, we explore three models of calculating the costs of City Connects based on the costs presented above. Note some schools provided services in addition to those provided by City Connects and the community partners. Because most schools are likely to provide those services regardless of the presence of City Connects, we did not consider those costs to be incremental. Therefore, the models below illustrate the core costs of City Connects, City Connects plus estimates of all community partner costs, and City Connects plus estimates of incremental community partner costs.

4.4 Total Cost of City Connects: Results from Models 1, 2, & 3

Table 5 presents results of the three cost models. Under Model 1, the present value cost of City Connects at kindergarten is $1,540 per student for six years of participation. The results for Model 1 are considered to be lower-bound estimates of the overall program costs because Model 1 only includes the core costs of City Connects (no community partner services included). The underlying assumption is that community partners provided services equally to schools that participated in City Connects and those that did not. In this scenario, the cost to replicate the impact of City Connects is represented by the core costs of the program and greater efficiency in screening and program matching of City Connects than in comparison schools.

The present value cost per student under Model 2 is $9,070 for six years of participation. Model 2 is an upper-bound estimate of the total cost of City Connects as it includes all costs of community partners. This model assumes that only the schools in the treatment group received services from community partners and as a result all community partner costs must be considered to replicate the impact of the program. This model may be important for policymakers in locations considering City Connects where community partners do not exist or where schools themselves would have to cover the costs of services of community partners.

Model 3 provides the intermediate estimate of $4,570 per student for six years of participation. Model 3 includes the core costs of City Connects plus a portion of community partner costs to reflect that some community partner services were provided only to City Connects schools or City Connects schools were preferred partners due to the involvement of City Connects. Thus, these community partner costs must be included to estimate the cost to replicate the impacts of City Connects.

As an intermediate estimate, Model 3 is the preferred specification, which was supported in interviews with community partners. However, this model is not without limitations. The assumptions are explored in more detail in Appendix I: Technical Appendix. In what follows, the cost per student from Model 3 ($4,570) is compared to the per-student benefits of the program, discussed in the next sub-section.

4.5 Benefits of City Connects

As discussed in section 3.6.2, each new high school graduate yields social benefits of $260,300. As shown in Table 6, when this benefit per new graduate is multiplied by the yield of additional graduates from City Connects (7%), the social benefits per City Connects student are $18,220. Alternatively, if each student obtains effect size gains in achievement of 0.3, the social benefits are $9,490 per City Connects student. Taking the average of these two estimates, we calculate that the benefits of City Connects are conservatively valued at $13,850 per participant (as a present value at kindergarten age).

4.6 Benefit-Cost Results

The benefits of City Connects exceed the costs by $9,280 per student, as shown in Table 7. The total cost of City Connects per student is $4,570 and the benefits per student are $13,850. The benefit-to-cost ratio, or the rate of return, is about 3. In other words, for each dollar invested in City Connects society can expect around $3 in return.

We explored the sensitivity of this finding to the various cost models and to the two benefits estimates. In each case, the benefits of the program exceed the costs (see Appendix Table AI). The upper bound estimate is based upon the lowest cost and the highest benefits. In this scenario, City Connects primarily redirects students and does not induce extra costs of community partner services, as shown in Model 1 (and the core costs of City Connects). The benefits are based only upon the benefits of increasing high school graduation. Thus, the net benefits are very large (at $16,680) and the benefit-cost ratio is 11.8. The lower bound estimate utilizes a sensitivity test estimate of the total cost estimate from model 2 and benefits from only the measured achievement gains. In this scenario, the benefits slightly exceed costs ($290) and the benefit-cost ratio is close to 1. Overall, the benefit-cost ratio lies somewhere between 1 and 11.8, with a best estimate of $3.00 in benefits per dollar of cost.[6]

It is likely that the actual benefits of City Connects exceed the amounts calculated here, possibly by a large magnitude. First, our calculations are conservative: they exclude labor productivity spillovers, the deadweight loss of distortionary taxes, and other consequences (such as intra-family effects) that cannot be monetized; they also do not count any benefits that accrue whilst the students are in school (see the discussions in Belfield and Levin, 2007; Trostel, 2010; and Karoly, 2012). Second, the high school graduation calculations assume non-marginal students (those who would have graduated or enrolled in college without the program) receive no benefit from the program. Finally, future projections suggest greater adversity for those with low skills (Autor, 2014); by using current cross-sectional data, we have likely understated the returns to education over the long run. It is also likely the costs of City Connects are not as high as reported here: these costs assume all students participate for six full years.

Finally, break-even analyses illustrate the robustness of these results. For example, looking only at cognitive gains (and not high school graduation), the benefits of City Connects equal the costs until the gains fall below an effect size of 0.15 (relative to an actual effect size of .15–.45 from the research

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6 Unfortunately we cannot make a direct benefit-cost comparison with other projects with similar goals. Our review of evaluations of the two most prominent of these projects indicates that they systematically overstate benefit-cost ratios by underreporting costs and overstating benefits, a result of using ad hoc methodologies rather than one that reflects accepted accounting practices for costs and benefits, such as the ingredients method.

evidence). That gain represents the cognitive score increase necessary for the program to 'break even'. As another example, looking only at high school graduation, the benefits of City Connects equal the costs until the yield of new graduates falls to 2 per 100 City Connects participants. That is, if the program improves the high school graduation rate by only 3 percentage points, it will break-even (relative to the research evidence showing a 7 percentage point advantage). That is, City Connects might still be half as effective and still break even.

5. DISCUSSION AND NEXT STEPS

These benefit-cost results are substantial and can be summarized for each class cohort of students. We assume an entry cohort of 100 kindergarten students into a new school in 2014. For that cohort the total cost of City Connects would be $457,000 over their years in that school. The social benefits of City Connects would amount to $1,385,000. Thus, the benefits of City Connects from society's perspective significantly exceed the costs by about $928,000.

This preliminary analysis provides strong evidence that the benefits of City Connects exceed the costs, even under the most conservative assumptions and models. In addition to the benefits associated with increased education attainment and achievement, City Connects may also benefit society by improving the capacity and efficiency of the community partners. During interviews with community partners, almost all of the representatives (usually program managers or directors) mentioned that City Connects staff at the school site helped to streamline their communication with the school. One program mentioned that this was such a significant advantage, that when expanding to new schools, they preferred City Connects schools. These comments are consistent with feedback provided by community partners in an internal program survey conducted by City Connects where partners working with City Connects schools reported much higher satisfaction than the partners working with non-City Connects schools (for example, communication with primary contact at school, referral processes, follow-up on service delivery, effectiveness of the partnership with schools in reaching goals, and gaining helpful feedback to improve service delivery). A recent piece in *The Boston Globe* included a quote from a community partner saying that their service was more efficient as a result of City Connects (Weintraub, 2014).

One area where this research should be extended is through examining the relationships between community partners and schools more thoroughly. Due to budgetary constraints, this report relied on a small sample of a total of 10 community partners—which is less than 10% of the partners per site from two sites. The intention of sampling was to minimize the burden of the interviews on the partners. The sampling strategy accounted for variability in service intensity and the hypothesized cost structure of services (fixed costs are divided across all students served, whereas variable costs are incurred with each additional student served). As a result, the analysis incorporated differences in marginal costs across services to the extent that our sample is representative of a range of marginal costs.

Further exploration could allow for more precision in data collection and broader sampling of the community partners. Our findings indicate that the core costs of City Connects are unlikely to vary considerably across sites, mitigating concerns about the small sample of sites and potential lack of representativeness; however, community partner costs may be subject to greater variation based on neighborhood and the population of students served, implying that a broader sample of community partners could be informative. The current data collection strategy included questions about the costs due to City Connects (incremental costs), the cost of one additional student (marginal costs), and any other changes in services that may have resulted from their partnership with City Connects. Based upon the empirical results of our investigation, it appears that very few services have zero or extremely low marginal costs, although some services likely have lower marginal costs than others. However, this is limited because the interviewees were generally not able to identify marginal and incremental costs or differences in resources as a result of City Connects.

Therefore, it is important to explore how community partners serve City Connects schools and non-City Connects schools (or City Connects schools prior to joining the program) to better understand the

resources that produced the impact on graduation and achievement. Further research can more deeply explore patterns of fixed versus variable costs for a larger sample of community partners, as well as community partner costs at comparison schools, to obtain more precise estimates of both the marginal and incremental costs of community partner services.

From society's perspective, increased efficiency in school-community partnerships or increased capacity to serve students as a result of City Connects are benefits of the program and therefore should be accounted for in a benefit-cost analysis. In this study, these net benefits are not neglected, in that all benefits associated with increased capacity, efficiency in delivering services, and better matching students and services should be captured in better academic outcomes (either educational attainment or achievement).

An interesting aspect of these findings is that a school receives the City Connects program at a fraction of the total cost. Schools pay for about 10% of the total costs of the program through staff time, providing facilities, and some materials. The resources received for this investment (totaling around $1.2 million) and the outcomes generated, which benefit the school and school district, provide support for consideration of this program as a comprehensive school-based service. Future examination of the scale-up of the program, in both costs and effects, is recommended. Other extensions of this work may include explorations of site-level variability in costs and service participation, a wider range of non-academic benefits, and the extent to which City Connects offsets costs to schools and community partners by streamlining the service referral and provision processes.

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FIGURES AND TABLES

Figure 1   Three Cost Models to Expore Service Delivery and the Costs of City Connects
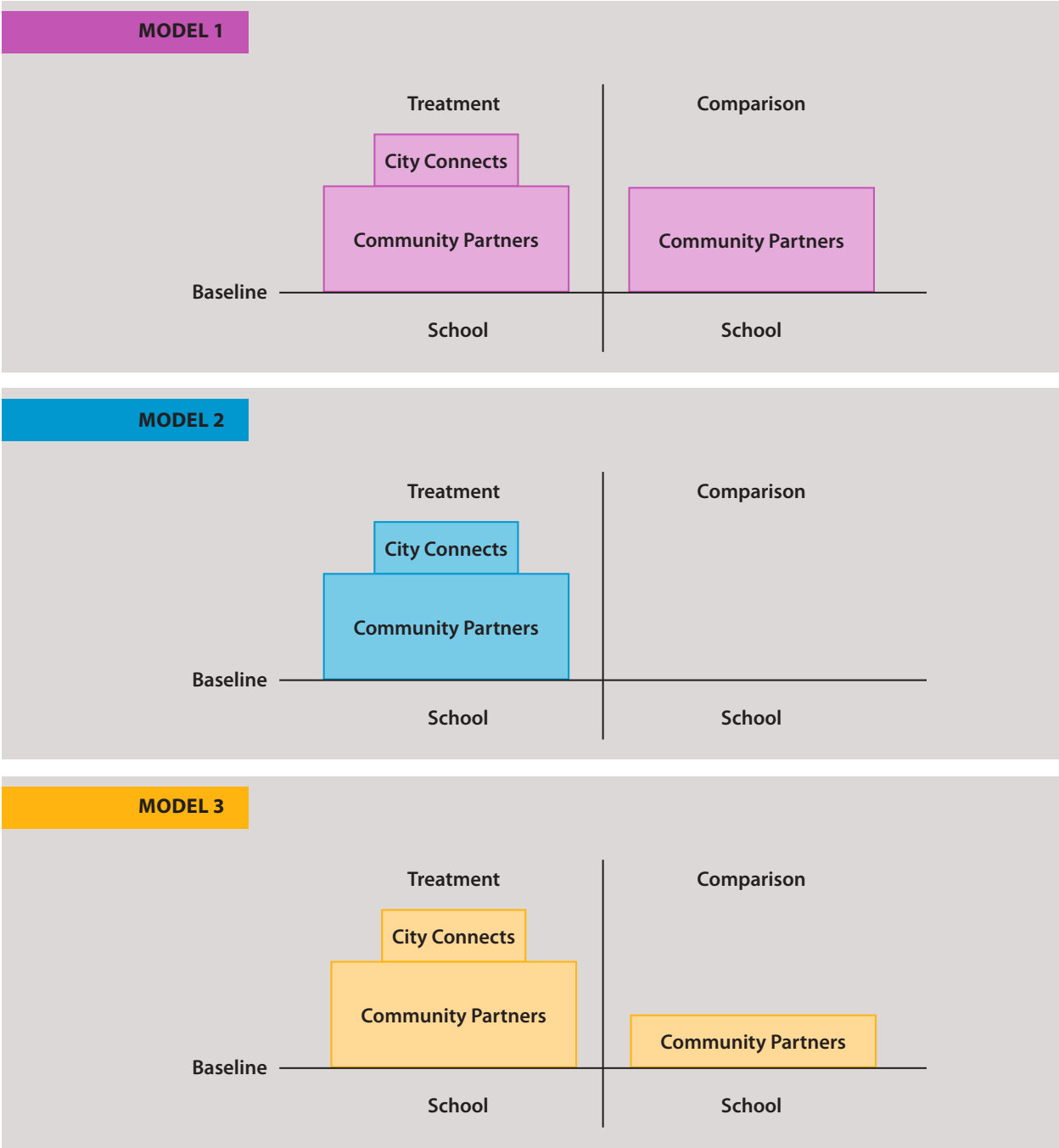
Table 1

**Demographic Characteristics of Elementary Schools
in Boston, City Connects, and the Pilot Sample**

	Boston Public Schools	City Connects Boston Schools	Pilot Study Elementary Schools
Number of schools	78	17	2
Grades served	PK–8	PK–8	PK–8
Number of students	38,033	7,533	1,560
Race/ Ethnicity PK–8			
% Asian	7.9	14.2	34.8
% Black	32.3	28.6	25.2
% Hispanic	44.3	44.3	28.0
% White	13.2	10.5	9.2
% Multi-racial/ Other	2.4	2.4	3.0
% English Language Learner	25.2	30.0	41.9
Poverty Status			
% Eligible Free Lunch	75.3	77.5	79.4
% Eligible Reduced-Price Lunch	2.4	2.4	2.2
Special Needs Students PK–8	20.5	21.0	19.7

Notes: Data from the 2013–2014 school year.

Table 2

Present Value Core Costs of City Connects by Site

	PV Cost Per Student	Number of Students	Total Cost
Site 1	$1,640	739	$1,208,830
Site 2	$1,460	821	$1,200,710
Pooled	**$1,540**	**1560**	**$2,409,540**

Notes: Core costs based on 6 years of participation (Walsh et al., 2014a; 2014b), discounted back to kindergarten using 3.5% discount rate, expressed in constant 2013 dollars using Boston average prices. Pooled cost per student weighted by total number of students served in 2013–2014.

Table 3
Distribution of Core Costs of City Connects in Boston

Ingredients	Total Cost (PV)	Cost to City Connects	Cost to School	Cost to Parents
Personnel				
Central Program Staff	$174,580	$174,580	$0	$0
School Site Coordinators	$900,040	$900,040	$0	$0
School Staff	$93,140	$0	$93,140	$0
Parental Involvement	$4,990	$0	$0	$4,990
Materials	$5,040	$2,870	$2,170	$0
Facilities	$16,410	$0	$26,760	$0
Total	**$1,204,560**	**$1,077,490**	**$122,070**	**$4,990**
Percent		89.5%	10.1%	0.4%

Notes: Core costs averaged across sites and weighted for site size in 2013–2014. Present Value (PV) based on 6 years participation (K–5), discounted back to kindergarten using 3.5% discount rate, expressed in constant 2013 dollars using Boston average prices.

Table 4
Costs of Community Partners

Ingredients	Site 1	Site 2	Pooled
Personnel	$1,863,820	$7,873,990	$9,737,810
Materials	$113,460	$260,370	$373,830
Facilities	$453,940	$1,095,880	$1,549,830
Other Inputs	$63,890	$20,240	$84,130
Total Cost	$2,495,120	$9,250,480	$11,745,600
Cost per Student	$3,380	$11,270	$7,530

Notes: Extrapolated from sampled services to full service costs based on sample share of total services. Present Value (PV) based on 6 years participation (K–5), discounted back to kindergarten using 3.5% discount rate, expressed in constant 2013 dollars using Boston average prices. Pooled estimate assumes sites are independent and weights for differences in site size.

Table 5
Total Cost of City Connects

	Number of Students Served	Model 1 (Lower Bound)		Model 2 (Upper Bound)		Model 3 (Intermediate)	
		Total Cost	Cost Per Student	Total Cost	Cost Per Student	Total Cost	Cost Per Student
Site 1	739	$1,208,830	$1,640	$3,703,950	$5,010	$2,974,130	$4,020
Site 2	821	$1,200,710	$1,460	$10,451,190	$12,730	$4,149,110	$5,050
Pooled	1560	$2,409,540	$1,540	$14,155,140	$9,070	$7,123,240	$4,570

Notes: Present Value (PV) based on 6 years participation (K–5), discounted back to kindergarten using 3.5% discount rate, expressed in constant 2013 dollars using Boston average prices. Model 1 assumes community partners served City Connects and other schools equally, 0% of community partners' costs incorporated. Model 2 assumes community partners served City Connects schools exclusively, 100% of community partners' costs incorporated. Model 3 incorporates a certain percentage of community partners' costs based on partners' self-reported service between City Connects and other schools.

Table 6
Benefits of City Connects

Academic Gain	Monetary Translation	Estimated Monetary Gain Per Student
Increase in overall per student math achievement in 8th grade by 0.3 SD	Lifetime social impacts associated with higher cognitive scores leading to higher school completion rates[a]	$9,490
Increase in cohort HS graduation rate by 7% points	Lifetime social impacts associated with being HS graduate[b]	$18,220
Average		$13,850

Notes: Present value at kindergarten using 3.5% discount rate, in 2013 dollars. [a]Belfield and Levin (2009, Table 3). [b]Belfield and Levin (2007, Table 17).

Table 7
Benefit-Cost Results of City Connects

	Per Student
Total Costs: Intermediate Estimate	$4,570
Benefits: Average Estimate	$13,850
Net Present Value (B-C)	$9,280
Benefit-Cost Ratio (B/C)	3.03

Notes: PV estimates at kindergarten (d=3.5%), 2013 dollars. See Tables 5 & 6.

APPENDIX I
TECHNICAL APPENDIX

1. INGREDIENTS AND PRICING FOR CITY CONNECTS
AND COMMUNITY PARTNERS

The cost analysis of this study followed the ingredients method. Total costs of the program were first broken down into four categories: personnel, materials, facilities, and other. Then specific ingredients used by schools, the City Connects central office, and community partners were identified during site visits in June 2014 and subsequent telephone interviews. Researchers interviewed the City Connects administrative team at Boston College and school staff and City Connects school site coordinators at two sampled school sites, as well as representatives from a sample of community partners. Finally, the market price for each ingredient was obtained from the United States Bureau of Labor Statistics for personnel and online sources for other ingredients. To emulate program replication, the study used market prices. This is because the relevant cost metric is the market cost of obtaining particular ingredient of comparable quality for replication.

Prices were converted to 2013 dollars for consistency.

1.1 City Connects at school sites

1.1.1 Personnel

City Connects Administrators

The cost of time for City Connects central staff at Boston College was included to the extent that central staff activities related to implementation of the City Connects program at the school level. Costs were divided across City Connects school sites, weighted roughly by student population by apportioning costs according to the number of SSCs at each school. All the assumptions about the workloads have been reviewed by Boston College staff.

The **Executive Director** oversees the City Connects program. This position was matched with a market price of $105,140, which is the mean annual salary for a postsecondary administrator in Boston in 2013, according to BLS. Based on communication with City Connects, we assign 20% of the Executive Director's time to program implementation. The director oversees 30 School Site Coordinators (SSCs) in total. To calculate the share of the portion of the director's work that contributed to the program in the two schools included in the sample, 20% is divided by 30 to get the per SSC cost. That figure is multiplied by 2 to get the site level cost (both sites have 2 SSCs). By utilizing the number of SSCs rather than sites, the cost is weighted by enrollment, given that the SSC to student ratio is 1:400.

The **Director of New Practice** works closely with the Executive Director to develop the program, coordinate with districts, and expand to new school and district sites. This position is also responsible for communication with Superintendents. The market price for this position is $98,420[7] according to BLS. Based on communication with City Connects, we assign 50% to implementation (the other 50%

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7 Basic salary: Elementary school administrator, Annual Mean 2014.

is spent on general administrative tasks, fundraising, etc.). Again, we divide this time across 30 SSCs and multiply by 2 to reach the total amount of time spent on each site.

The **Director of Implementation** oversees Program Managers and supports implementation across all sites. The market price for this position is $72,186, which is the average annual salary for faculty in public postsecondary institutions in 2009-2010, according to NCES *Integrated Postsecondary Education Data System*.[8] We attribute 80% of the time allocation for this position to the support of implementation, scaled by the number of SSCs to estimate a cost per site.

The **Implementation Systems Coordinator** supports implementation across all sites, supporting 30 SSCs across Boston and Springfield. This position also has a major role in supporting the Student Support Information System (SSIS) and in data collection as well as in documentation of practice. We assume that the market price and fringe benefits are the same as for the **Technology Specialist**. We assign 80% of this position to implementation, scaled by the number of SSCs.

Program Managers each oversee 15 SSCs and support implementation across a set of sites. The market price for this position is $64,870, which is the average annual salary for an educational counselor in Boston 2013, with 80% of this position allocated to implementation of the program. We divide the workload by 15 and multiply by 2 to estimate the time spent on each site.

The **Technology Specialist** is responsible for uploading student data and supporting SSIS. About 50% of this position supports implementation through SSIS and other technology support. The market price for this position is assumed to be $61,770, which is the mean salary for computer user support specialists in Boston 2013, according to BLS. The specialist's benefits were 22.4% of salary, which is equivalent to average benefits level for service industry workers in the private sector, according to BLS.

The **Administrative Coordinator** performs general administrative tasks. The market price for this position is assumed to be $56,830 (the average salary for executive secretaries and executive administrative assistants in Boston 2013, according to BLS) with 80% of time allocated to implementation, scaled by the number of SSCs.

For all these staff members, except for the Technology Specialist, we assign a benefit rate of 28.5% of salary, which corresponds to "Average benefit expenditure for full-time instructional faculty on 9-month contracts in degree-granting postsecondary institutions" according to the Department of Education—National Center for Education Statistics—*Digest of Education Statistics 2012*.[9]

School Site Coordinators

There are two school site coordinators at each school site in our sample. All SSCs were full-time Boston College employees with Master's Degrees. The SSCs at these sites have backgrounds in general and special education. However, the typical background of SSCs is in school counseling or social work. We assume their salary to be around $55,240/year, which is equivalent to the average salary for school social workers in Boston in 2013 according to BLS, and the benefits to be 47.93%[10] (average benefits for full time public K–12 school staff in 2013, according to BLS).

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8   http://nces.ed.gov/ipeds/
9   http://nces.ed.gov/programs/digest/d12/
10 Public Grades K–12, State/local government employee: Elementary/secondary, Full-time annual rate, 32.4% of total compensation, BLS-NCS, converted to 47.93% of salary for ease of interpretation.

SchoolStaff

School staff involved in program implementation at schools sites includes principals, assistant principals, and classroom teachers. The principals and assistant principals at the two sites had different involvement in the program. At one site, only one of the two assistant principals actively worked with the City Connects school site coordinators. We assume the principal's salary to be around $98,420, which is average salary for elementary and secondary school education administrators in Boston in 2013 according to BLS, and the benefits to be 66.67%[11] of salary. The assistant principals' salary is assumed to be $73,181, which was the average salary for a principal's assistant at K–6 schools in 2010 according to the U.S. Census Bureau[12], with benefits of 66.67% of salary.

There were 45 regular classroom teachers at both school sites in 2013. They attended the Whole Class Reviews at the beginning of the year for up to 90 minutes, and assigned students to tiers based on need, individually or with the school site coordinators at the end of the year for about 45 minutes for all the students in a class.[13] Therefore, their total time spent on City Connects at the school site was about 135 minutes each year for each teacher. According to BLS, their salary was assumed to be $68,160/year, which is the average salary for elementary school teachers (excluding special education) in Boston 2013, and their benefits were 47.93% of salary.

1.1.2 Materials

The materials and equipment involved in the program at school sites generally include phone, computers, office desks, VPN/internet, printer, and cabinets. We obtained the prices of these items from online sources including *Amazon, IKEA,* and *Wal-Mart.* Electronic devices are amortized over a life expectancy of four years at a 3.5% interest rate, whereas furniture (desks and cabinets) is amortized over 10 years at the same rate.

1.1.3 Facilities

The implementation of the program involves the use of classrooms, a conference room, and an office at school sites.

During the implementation of the program, classrooms were mainly used for Whole Class Reviews. The classrooms were also used for classroom observations, but this time was not included in our analysis as it was not incremental (the students were in regular class during the observation, similarly to the children in classrooms in the comparison schools). The Whole Class Reviews happen once a year for each class and last about 45 to 90 minutes. A conservative estimate would yield a time usage of classrooms of about 67.5 hours (45 x 90 minutes). Assuming a typical classroom has 900 square feet of space, the total usage of classrooms would be 60,750 sq. ft. hrs. The price of a classroom was obtained from *Peter Li Education Group*, using the national median price for a new K–12 school (per

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11 Public General, State/local government employees: Office and administrative support; Annual rate 2013, 40% of total compensation, BLS-NCS. This was converted to 66.67% of salary for ease of interpretation.

12 http://www.census.gov/en.html#

13 This process, Triangle for Tiering, refers to the school site coordinators putting each student into one of four tiers based on their evaluation of each student over the four dimensions (academic, social emotional, family, and health). The four tiers are: Tier 1: Strengths and minimal risk; Tier 2a: Strengths and mild risk; Tier 2b: Strengths and moderate risk; Tier 3: Strengths and severe risk.

sq. ft.) in 2012, uprated by 33% to adjust for land acquisition and furnishing costs. The price was annualized over 30 years at a 3.5% rate of interest.

Conference rooms were used for multiple purposes including conference calls, lunch, Whole Class Reviews, etc. They may also be used for Individual Student Reviews. Meetings with community partners also occasionally take place in conference rooms. According to the interviews during site visits, the usage of the conference rooms was between 3-4 hours per week in 2013. Assuming 300 sq. ft. of space, the total usage of conference room would be 43,200 sq. ft. hrs. (300 sq. ft. × 4 hrs./wk. × 36 wks.) using a conservative estimate. The source of pricing and the annualization is the same as for a classroom.

Finally, the SSCs occupied a small office space at each school site of about 216 sq. ft. They used the office throughout the academic year for general purposes, for meeting students, and for storage of items donated by partners. Pricing and annualization were performed in a similar manner as for classrooms and conference rooms.

1.1.4 Other inputs

The implementation of the program at the school sites involved parental time through meetings and phone calls with SSCs and school faculty. According to the data provided by Boston College from their service database, family time investment at the two sites ranged between 111.25 and 115.25 hours in school year 2013–2014. Note that these were the hours parents spent interacting with SSCs and therefore were considered to be incremental costs of City Connects, above and beyond the time parents would have invested in school activities without City Connects. We assigned the Boston minimum wage to the time cost of parents given the large percentage of low-income families at each school site (around 80%).

1.2 Community partners

1.2.1 Personnel

Three types of personnel were involved in the services provided by community partners: the administrative staff at the partner agency, volunteers, and school staff. Administrators may include the program manager/director, a training director, a relationship coordinator, and/or an administrative worker. Their workload was determined via phone interviews, while the prices, in Boston prices, were obtained from similar occupational categories according to BLS-Occupational Employment Statistics. Overall, the program manager salary was found to be around $66,640/year, which corresponds to the average annual salary for social and community service managers in Boston.

Many community partners used volunteers for their services. According to the ingredients method, although the services provided by volunteers did not incur a direct monetary cost, the value of their services or opportunity cost must be accounted for. If volunteers are not obtainable for replication, equivalent services must be obtained at market cost. Therefore, we assigned volunteer costs based on the specific volunteers' tasks. For instance, the average price for teaching assistants in Boston in 2013 ($29,450/year, or $20.45/hour) was applied to those volunteers that provided tutoring or mentoring services. Boston minimum wage was assigned to volunteers doing simple/low-skill tasks. In a sensitivity analysis, volunteers' costs were estimated based on their educational and professional background. For college student or younger volunteers, we calculated the cost using Boston minimum

wage in 2013 ($8.00/hour), whereas for college graduates and professionals, we used the average wage for persons with a bachelor's degree ($29.08/hour).[14]

1.2.2 Materials

Materials used by community partners varied with the services provided. Some partners that provided academic support to students used textbooks and computers, while others provided health interventions that required specialized equipment, such as portable dental units. Some partners provided students with backpacks and clothes. All prices for these items were obtained from online commercial sources, such as *IKEA* and *Amazon*.

1.2.3 Facilities

When community partners used school space to deliver services, the costs were included in the same way as described above. This study does not include community partners' office space.

1.2.4 Other inputs

Transportation reimbursement costs for community partner personnel and students were included as indicated during interviews. In those cases, the cost was estimated using comparable transportation costs, such as Boston public transportation fare. In the few cases where staff from community partners commute in their own vehicles, we applied rental prices based on the usage and type of vehicles.

Although most of services provided by community partners were free of charge to schools, some partners charged parents and students a fee. In those few cases, these payments were counted as cash transfers.

Some community partners utilized parental time in serving students. Parental time was valued at minimum wage (as discussed above).

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14 Average of median annual wage for person with bachelor's degree $59,263, adjusted for inflation with CPI calculator to $60,489.42 $US 2012 (Source: U.S. Census Bureau, Current Population Survey, 2012 Annual Social and Economic Supplement) $29.08 per hour.

2. EXTRAPOLATING COST TO COMMUNITY PARTNERS

The abundance of community partners, about 70 for each school, made it infeasible for the research team to estimate the costs for each of them using the ingredients method. As an alternative, Boston College selected 14 sample partners based on CBCSE criteria (discussed in the report) and City Connects' categorization of services.

City Connects classifies services into three broad categories according to the intensity of the intervention. Category 1 is "Prevention and Enrichment," which includes services such as before school programs, summer programs, and arts enrichment programs. Category 2 is "Early Intervention," and includes services such as social skills interventions, psycho-social group services, and adult mentoring programs. Category 3, "Intensive/Crisis Intervention," includes the most severe category of services such as violence intervention, mental health counseling, and special education evaluation.

The research team interviewed individuals from ten of the 14 partners, five partners at each school site. These five partners covered all three categories of services. The costs for these ten sampled community partners were estimated using the ingredients method. Then, the costs of the sample were extrapolated to obtain the total costs for all community partners serving each school site.

One key assumption for the extrapolation is that the sampled community partners, altogether, were representative of all community partners in terms of their costs. If this assumption holds, the extrapolation can be performed using the services for the sampled partners as a share of the total number of services provided by all community partners at a school site. For instance, if partners A, B, C, D, and E provided 40% of all services at school site 1, then the total cost for all community partners serving school site 1 was calculated as the total cost for partners A, B, C, D, and E divided by 40%. Cost Model 2 combines this cost with the costs of City Connects at each school site, which assumes that all community partners provided services to City Connects schools exclusively, and therefore, all costs were incremental and should be included in the total cost of City Connects. The sampled services represent 52% of total services at Site 1 and 28% of total services at Site 2.

Under a less extreme assumption, Cost Model 3 assumes part of community partners' costs were incremental to City Connects. Specifically, some partners served City Connects schools exclusively, while others served all schools equally, and still other partners lie between these extremes, serving City Connects schools and other schools differently (usually in terms of service intensity and resource utilization). This complicates the cost extrapolation in that the total cost of the sampled community partners should be weighted by the percentage of their costs that are estimated as incremental before mapping out to all community partners. Note that this weighting and extrapolation requires a more extreme version of the representativeness assumption noted above; sampled community partners do not just need to be representative in terms of the types of services they provide and their cost structures (e.g., fixed vs. variable costs), but also in terms of the share of their costs that are incremental.

The percentage of incremental cost was estimated based on self-reported service information from sampled community partners during their interview with the research team. Representatives from sampled community partners were asked if they served only City Connects schools or if they served all BPS schools. They were also asked to describe the services and relationship with the two types of schools to better understand if there was any difference between the City Connects schools and other (if served) BPS schools. This information was converted to a percentage of incremental cost for each sampled partner. Using the previous example, if partner A served City Connects schools only, partner B served all schools equally, and 30%, 40%, and 50% of partner C's, D's and E's cost were incremental

to City Connects schools, respectively, then the total cost for these partners should be (100%A + 0%B + 30%C + 40%D + 50%E). This weighted sum of sampled partners' cost will be extrapolated to total costs for all partners by dividing it by 40%, which is the share of services for the sample partners together.

Again, note that the extrapolation relies heavily on the assumption that sampled partners are representative in terms of their costs, particularly the percentage of incremental cost. The share of costs that are incremental ranges from 0% to 100% across partners at both sites. The average share of service costs that are incremental across partners, weighted by the amount and cost of services, is 70% at Site 1 and 32% at Site 2.

3. ESTIMATING THE TOTAL COST OF CITY CONNECTS: FORMAL ASSUMPTIONS OF MODELS 1, 2, & 3

Formal assumptions associated with each of the three models used to estimate the total incremental cost of City Connects are provided below to conceptualize how the models address differences in changes over time between treatment and comparison schools in service costs.

Definitions:

C_{T1}: Service costs at treatment schools, post-City Connects

C_{T0}: Service costs at treatment schools, pre-City Connects

C_{c1}: Service costs at comparison schools, post-City Connects

C_{C0}: Service costs at comparison schools, pre-City Connects

(1) *City Connects = Core Cost + ($C_{T1} − C_{T0}$) − ($C_{C1} − C_{C0}$)*

The total incremental cost of City Connects, as expressed by Equation (1) above, comprises the core cost of City Connects and the difference between the incremental service costs at treatment and comparison schools. Among the components on the right side of the equation, only the *Core Cost* and C_{T1} are known to the research team. However, there is very limited information available on the services at treatment schools before they participated in City Connects, or services at comparison schools during any time period. Given the lack of information, the research team made different assumptions regarding these three cost components. These assumptions are reflected in the three cost models below. Note that in all three models, we assume that services provided by schools themselves are consistent across treatment and comparison schools, before and after City Connects, and therefore are never incremental. Conversely, services provided directly by City Connects personnel are always assumed to be incremental, and are therefore included as part of the *Core Cost*.

3.1 Model 1

Model 1 assumes that service levels across treatment and comparison groups are the same. Any changes in overall service levels that occurred contemporaneously with City Connects are the same at treatment and comparison schools. The difference in average overall service levels between treatment and comparison schools is 0, before and after City Connects comes in. The implication is therefore that any measured effects of City Connects are due to more efficient allocation of services, as opposed to increasing the total service level. Therefore the core cost represents the total incremental cost of City Connects. In this notation:

(2) $C_{T1} − C_{T0} = C_{C1} − C_{C0}$
(3) *City Connects = Core Cost*

3.2 Model 2

Model 2 assumes that service level at treatment schools after City Connects represents all the additional services these schools are receiving relative to comparison schools, over time. Therefore, the total

incremental cost of City Connects becomes the sum of the core cost and the service cost of treatment schools after City Connects.

(4) $(C_{Ti} - C_{To}) - (C_{Ci} - C_{Co}) = C_{Ti}$
(5) *City Connects = Core Cost + C_{Ti}*

Equation (4) can be rearranged algebraically into:

(6) $C_{Ci} - C_{Co} + C_{To} = 0$

In words, Equation (6) states that any changes in the comparison schools are offset by pre-existing services at the treatment schools. The simplest case in which this would occur is when there are no services at comparison schools (before or after City Connects), and no services before treatment at treatment schools, so that:

(7) $C_{Ci} = C_{Co} = C_{To} = 0$

3.3 Model 3

Model 3 is situated between these two extremes; it assumes that:

(8) $C_{Ti} - C_{To} > C_{Ci} - C_{Co}$

(9) *City Connects = Core Cost + $(C_{Ti} - C_{To}) - (C_{Ci} - C_{Co})$*

In other words, changes in service levels after City Connects are greater in treatment schools than comparison schools, so that some share of the service costs are incremental. Therefore, the total incremental cost of City Connects captures both the core cost and these incremental service costs.

4. SENSITIVITY TESTING

Appendix Table A1 below lists the results of sensitivity testing for costs, benefits, Net Present Value, and the benefit-cost ratio.

4.1 Sensitivity of Costs

The cost estimates rely on two shadow prices for ingredients that were varied in sensitivity testing. The first sensitivity analysis of costs involved the inclusion or exclusion of school staff's time spent on Student Support Team meetings. The Student Support Team meetings were an existing school activity that usually included school psychologists, teachers, principals, nurses, and occasional community agency staff members. This meeting was led by or attended in part by the SSCs from City Connects. The school staff time for this meeting was not included in the main analysis because the Student Support Team is a standard practice in BPS. Therefore, the Student Support Team was not included as an incremental cost of City Connects. However, considering that part of City Connects' effectiveness derives from improving the efficiency of student support work, City Connects schools may utilize Student Support Teams more than other schools. If City Connects were implemented in school districts where student support teams are not prevalent, including the school staff time spend on Student Support Team meetings may be more appropriate and conservative.

The second sensitivity analysis of costs used an alternative price for volunteer time. In the main analysis, volunteer time was valued according to the task performed (teaching assistant). The sensitivity analysis uses volunteers' educational and professional background to estimate a shadow price for their time (i.e. minimum wage for high school/college students and senior volunteers, average salary for college graduates). Pricing volunteer time according to the qualifications and experience of the volunteers resulted in a lower price for the time because a large proportion of volunteers were priced at minimum wage. This sensitivity analysis may reflect differences in volunteer quality that could have contributed to the effects.

4.2 Sensitivity of Benefit-Cost Analysis

As discussed in the main text, the benefits ranged from $9,490 to $18,220 per student. If those values are paired with the total cost estimates from cost models 1 and 2, an upper and lower bound can be estimated for the program. The upper bound, or optimistic scenario, utilizes the lowest cost from model 1 and the highest benefits from attainment. The benefit-cost analysis results are very large with a Net Present Value of $16,680 and a benefit-cost ratio of 11.8. The lower bound utilized the highest result from a sensitivity test of total costs from model 2 and the benefits from achievement only. This test produced results very close to the break-even analysis where the benefits are nearly equal to the costs. These range estimates indicate that the benefit-cost ratio is almost certain to exceed 1.

Table A1
Sensitivity Analysis

Total Cost of City Connects (PV)	Per Student
Preferred Specification (Model 3)	**$4,570**
Total Cost Model 1	$1,540
Model 1 Variation: School Staff Support Team Included	$1,670
Total Cost Model 2	$9,070
Model 2 Variation: School Staff Support Team Included	$9,200
Model 2 Variation: Volunteer Price Based on Experience	$7,190
Model 3 Variation: School Staff Support Team Included	$4,690
Model 3 Variation: Volunteer Price Based on Experience	$4,390
Benefits	
Preferred Specification (Average)	**$13,850**
Achievement	$9,490
Attainment	$18,220
Net Present Value (Benefits-Costs)	
Preferred Specification	**$9,280**
Upper bound	$16,680
Lower bound	$290
Benefit to Cost Ratio	
Preferred Specification	**3.0**
Upper bound	11.8
Lower bound	1.0

Notes: Present Value (PV) estimates include six years of participation and are values at kindergarten (d=3.5%). 2013 dollars in Boston prices.

5. INTERVIEW PROTOCOL

City Connects Benefit-Cost Study
Interview Protocol

To the interviewer: This document will serve as a guide for you to conduct interviews with individuals affiliated with programs and evaluations included in our study. Some of the interviews will be iterative, meaning that you will develop additional questions as you obtain answers to the questions suggested below. Please take clear notes and be sure to be kind and considerate. Smile! It will come through in your voice.

Document Check
Be sure that you have given the individual a copy of the informed consent document and request a signed copy of the participant's rights form on file.

Introduction
City Connects Cost-Benefit Analysis
City Connects (CC) is a long-term project of Boston College that evaluates the needs of school-age children and links them to appropriate opportunities that are available both inside and outside of the school. CC places full-time social workers and counselors in schools, staff who are trained to work with each teacher in identifying the strengths and challenges of every child. Then, the project identifies appropriate services in the school district, community, or local area that respond to the child's needs such as family counseling, social work, health services, academic programs, social and emotional programs, and so on. We are performing a cost-benefit analysis of City Connects to determine the ingredients or resources necessary to achieve measured results, as well as the short-term and long-term benefits of the programs.

Participation in the interview is voluntary, and you may decline to answer any question that makes you uncomfortable. The research team will follow strict security guidelines to protect the confidentiality of your responses. However, if your responses indicate an immediate threat of harm to yourself or others, we will have to report that. All responses will be anonymous and confidential. This research has been approved by the Teachers College IRB under protocol number #14-312.

Describe the Ingredients Method
Our main interest is to figure out what resources (or "ingredients") were used to implement the program at the sites included in the evaluation, e.g., amount of volunteer time tutoring students, training, and materials needed to deliver the program. Our intention is to identify all of the ingredients needed for successful replication.

Program name:
Site served: Interview date:
Start time: End time:
Interviewer name: Tel. number called:
Interviewee name: Current position:

Opening Questions

Please describe how the program operates generally. What kinds of services are provided? Where are these services taking place? How are participants referred to the program?

We show that XX students were served at XXX school. How many schools and students were served by the program in total? How many were served through City Connects?

Do you serve other BPS schools? Have you historically been involved with schools or did the relationship begin with City Connects?

Did you modify the process to accommodate City Connects and XXX school specifically?

Personnel

The questions listed below are intended to gather detailed data on personnel. We are interested in any personnel involved in the program—planning, implementing (i.e. actually delivering the services), supervising, volunteering.

Director (ask for all additional personnel based on description of program)
- What was the director's role in the program? (meetings, professional development, scheduling, etc.) How much of the individual's time was spent on the program last year?
- What were the director's qualifications? (e.g., degree, years of experience) Is the director on staff full-time and does the position include benefits?

Other community partner personnel
- What was the individual's qualification? (e.g., degree, years of experience)
- How was he/she recruited? What training did he/she receive? How many times per week did he/she come to the school? About how much time per week did he/she spend on the program? How long was the commute? Was this person volunteer or some Work Study students? How many of such personnel work with students from XXX school?

School-site personnel
- Did the program involve any coordination with the principal, teachers or specialist at the school site? If so, how many of them were involved and how often did your people meet with them and for how long?
- Were there any other types of school-level personnel involved in the program?
- Were there any other volunteers or personnel?

Materials and equipment
- Were there specific materials used in the service or in training? How many of each were required? Who provided these materials? Who paid?
- Did the program require the use of computers? If so, how many computers were required, for how long, and how often?
- Did the program receive any contributed donations of materials, supplies, or equipment? If so, what donated materials were used by the program?
- Was there a difference between the materials used by City Connects schools and other schools?

Facilities

- What space was utilized by the program? How often? About how large? Was the space devoted to the program?
- Did the space include any computers or other technology used by the program?

Other questions

- Did the program involve any travel or transportation reimbursement for personnel or students?
- Did the program require any inputs from students' families? For example, how often do parents come to attend workshops and other parent involvement activities? id the program charge any fees to the participants? Or does the school or city connects provide funding for the program?
- Were there any other aspects of the program—including resources paid for by the school and other donated goods and services—that we haven't covered? (For example, was there a party or end of year celebration?)
- Is there anyone else we should contact in your organization who might be able to give us further information about the ingredients and costs of implementing the program?

APPENDIX II
SUMMARY OF CITY CONNECTS OUTCOMES

Summary of City Connects Educational Outcomes for Cost-Benefit Estimation

Outcome Measure	Source	Treatment Sample	Comparison Sample	Method	Treatment Dosage for Reported Effect Size	Effect Size
Likelihood of school dropout at age 16+	Walsh et al. (2014a)	All students who attended a City Connects public elementary school in Boston during years **2001–2007** and reached high school by 2011 (N=2,265).	All students who attended elementary school in Boston during the same time frame but never attended a City Connects school (N=19,979).	Discrete event history analysis; repeated measures nested within students using hierarchical logistic regression. Student-level characteristics as model covariates.	6 years of City Connects in grades K–5	The impact of treatment on dropout is equal to a log odds ratio of **−0.689**, or an **48%** reduction in odds of dropout. Transformation from log odds to a Cohen's d type effect size can be achieved by multiplying the log odds by the ratio of root 3 to pi (Borenstein, Hedges, Higgins, and Rothstein, 2009); the impact of City Connects on reducing the odds of dropout is equivalent to an effect size of −0.380.
Massachusetts Comprehensive Assessment System standardized raw scores	Walsh et al. (2014b)	All students who attended a City Connects public elementary school in Boston during years **1999–2006** and reached 3rd to 8th grade by 2008 (N=1901 or less for 6–8th grade outcomes, varies by grade).	A representative sample of Boston public school students who never participated in City Connects and who attended elementary school during the same time period as treatment students in: 1) one of seven randomly-selected schools that never implemented City Connects; or, 2) four schools later implementing City Connects. (N=2794 or less for 6–8th grade outcomes, varies by grade).	Propensity score-weighted linear regression models with standard errors adjusted for school-level clusters. Baseline and current student characteristics as model covariates.	Analyses conducted based on treatment sample with 1–6 years of City Connects in grades K–5, but effect sizes are based on maximum dosage, 6 years of City Connects	Grade 6: ELA = **0.15**, Math=**0.18** Grade 7: ELA = **0.33**; Math=**0.33** Grade 8: ELA = **0.33**; Math=**0.45** NOTE: Effect sizes are based on student-level models (standard errors adjusted for school clustering)