

Summer Link: A Counseling Intervention to Address the Transition from High School to  
College in a Large Urban District

Lindsay Daugherty  
RAND Corporation  
Lindsay\_Daugherty@rand.org

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**Abstract**

While college enrollment rates have grown over the past 25 years, enrollment rates for low-income students continue to lag behind those of students from wealthier families (Baum et al, 2010). Recent studies have shown that summer melt has a significant impact on enrollment rates as students with demonstrated intentions to enroll in college don't end up following through with their plans (Castleman et al., 2012; Castleman & Page, 2012). Summer melt is a particularly common problem for low-income minority students (Castleman & Page, 2011). Counseling interventions to provide outreach and counseling to college intending students have shown the potential to have a significant impact on summer melt. This study evaluates the impact of an intervention in a large urban district in the Southwest that provided two hours of outreach and counseling to students who reported that they planned to attend college and had applied and been accepted to at least one college. To estimate the program's effects, difference-in-difference analysis was used to identify the effect of the program. Results indicate that the intervention increased the probability of enrollment for college intending students by 9 to 11 percentage points. The program's impact was greatest for four-year college intending students who had completed financial aid forms, finished college entrance exams, and been accepted to a four-year college. In addition to evaluating the effect of the program, I discuss a number of key implementation decisions and the impact they may have had on the success of the program. Recommendations are made for future research to identify "best practices" for summer counseling interventions intended to address summer melt.

## 1. Introduction

The share of U.S. students enrolling in higher education has increased steadily in recent decades, yet college enrollment rates of low-income minority youth continue to lag behind those of their middle- and upper-class white peers (Baum et al., 2010). Disparities in college enrollment are particularly large for four-year colleges and enrollment immediately after graduation (Thomas & Perna, 2005). These differences in enrollment rates persist even when controlling for academic achievement, indicating that there are access issues and/or variation in preferences leading to differences in postsecondary outcomes (Ellwood & Kane, 2000).

One phenomenon that disproportionately impacts low-income, minority students and depresses college enrollment rates is *summer melt*. The term summer melt describes students who demonstrate strong intentions to enroll in college at the time of graduation but do not end up enrolling in the fall as planned. This is a substantial issue for students across the country, with rates of summer melt estimated to range between eight and forty percent (Castleman & Page, 2011). Potential reasons for not enrolling in college immediately include financial constraints, family responsibilities, more attractive work opportunities, and informational barriers. These barriers are particularly large for low-income minority students who are less likely to have family and peer networks that are informed about the college enrollment process (Arnold et al., 2008).

This paper examines the impact of a summer counseling intervention in reducing summer melt for students in a large urban district. Several other studies find that summer counseling interventions have a significant impact on rates of summer melt for students with strong college intentions (Castleman et al., 2012; Castleman & Page, 2012). This study builds on earlier work in two ways. This implementation represents the first near district-wide summer counseling intervention on a significantly smaller per-student budget than previous interventions, so the results speak to the effect of these types of interventions as they are scaled up and implemented on a budget that is more sustainable for the average school district. Second, while previous interventions targeted the strongest college-intending students, students who planned to attend four-year colleges and had already submitted a deposit to their college of choice, this intervention targeted a wide range of students with varying strength of intentions to enroll in college. While some students had plans to attend a four-year college, had been accepted to a

four-year college, and had completed important steps toward eventual enrollment, other students targeted by the intervention had only applied to the local community college through a district-wide program that requires students to do so. This variation in strength of student intentions to enroll in college provide an opportunity to examine differences in the impact of summer counseling interventions on rates of melt for different types of students.

The student population served by this intervention was also significantly different from those served in other interventions. Many of the students had plans to attend two-year colleges and had not demonstrated these intentions in any way other than submitting an application, while other studies targeted four-year college intendees who had not only applied and been accepted, but had also paid a deposit to their college of choice. In addition, a large percentage of students targeted by the program were Hispanic (62%). College decision-making may be somewhat different for Hispanic students and their families, and interventions to affect these decisions may therefore need to be carefully tailored.

Results indicate that Summer Link increased the probability of college enrollment by 9 to 11 percentage points for college intending students. The impact was strongest for graduates who intended to enroll at a four-year university and had demonstrated their intentions by applying to and being accepted to a four-year college, completing financial aid forms, and taking college entrance exams. The estimated effect of the program on two-year college intendees was significantly smaller and non-significant across most of the models. These results hold while controlling for demographics, academic achievement, use of pre-graduation counseling services, and school-level fixed effects. The estimates are likely lower-bounds estimates of the true impact of the program because of measurement error that results in downwardly biased results.

This paper is organized as follows. Section 2 reviews the existing literature on barriers to college enrollment and summer melt and provides a thorough description of the district's intervention. Section 3 discusses the data on college plans, use of counseling services, and college enrollment and provides descriptive statistics. Section 4 describes the difference-in-difference strategy used to estimate the effect of the intervention. Results are provided in Section 5, followed by a discussion of results in Section 6 and concluding thoughts in Section 7.

## 2. Background

### 2.1 Existing Research

While college enrollment rates have grown over the past 25 years, enrollment rates for low-income students continue to lag behind those of students from wealthier families. In 2008, college enrollment rates for students in the bottom two income quartiles were 55% and 57%, compared to 80% for students in the highest income quartile (Baum et al., 2010). Academic readiness, as measured by level of coursework and achievement, is argued to be the strongest predictor of postsecondary outcomes (Adelman, 1999). Yet the gap in college enrollment persists when controlling for academic achievement levels (Ellwood & Kane, 2000). This suggests there are a number of other barriers to enrollment for low-income students beyond lower levels of academic achievement.

Financial constraints are one obvious explanation for lower enrollment rates among low-income students. Long and Riley (2007) find that after accounting for the expected family contribution (EFC), grants, and loans, the average full-time student faced unmet financial needs of \$6,726. The percentage of college costs covered by Pell grants for low/middle income families has decreased substantially over time, covering only 40% of costs at the average four-year college in 2001, compared to nearly 80% of costs in 1975 (Mercer, 2005). The declining role of grants relative to loans as a source of financial aid is important, because college enrollment decisions are more sensitive to grants than other types of financial aid (Long, 2008).

A number of studies have shown that loans, grants, and scholarships have a significant effect on the likelihood that students will attend college (Corwell et al., 2007; Dynarski, 2002; Kane, 2003). The effects of financial aid should theoretically be greater for low-income students who do not have the personal resources to pay for college in the absence of financial aid. However, in many cases the effects of financial aid have been found to be lower for low-income students because the processes to apply for financial aid are complex, and low-income families have the least information about how to pay for college (ACSFPA, 2005; Kane and Avery, 2004; Long, 2008). In addition, aid has increasingly shifted from need-based to merit-based aid, and this type of aid is less likely to be given to low-income students because of lower levels of academic achievement (Dynarski, 2000; Long, 2008).

Family-related factors can influence student decisions on college enrollment in several ways. Increased parental involvement leads to higher rates college enrollment because this involvement (e.g. talking to student about college, visiting college) conveys norms and expectations to the student (Perna & Titus, 2005; Rowan-Kenyon et al., 2008). Engberg and Wolniak (2010) find that students who have family and friends that want them to attend college are 26% more likely to attend a two-year college and 38% more likely to attend a four-year college. In addition, parental education influences college enrollment decisions because parents with greater knowledge about the college application and enrollment process and are able to better help the student through the process. Students who discuss school and college plans with parents are 58% more likely to attend a two-year college and 77% more likely to attend a four-year college (Engberg & Wolniak, 2010).

Peer influences can also contribute to decisions on college enrollment. Social networks are key to shaping the preferences of students and providing students with information on college. Peer effects work through channels similar to parental effects, both conveying norms and expectations to the student and providing the student with a social network that has valuable information about the application and enrollment process. Students who are enrolled in courses with children of college-educated parents are more likely to enroll in four-year colleges themselves (Choi et al., 2008). In addition, researchers have found that the number of friends who plan to college is strongly related to whether the student enrolls in and graduates from college (Bedsworth et al., 2006; Engberg & Wolniak, 2010). A study that focuses specifically on Hispanic peer groups finds that without a strong college-going network, students have little understanding of what the college-going experience is and view college enrollment as unrealistic (Venegas & Tierney, 2005).

While there is an abundance of literature on the college choice process, college enrollment, and barriers to college enrollment, relatively few studies focus on the summer between graduation and college enrollment as a critical period in bridging college aspirations into college enrollment. Roderick et al. (2008) was one of the first studies to bring attention to the issue of aspiring college-goers failing to enroll college. Examining the college-going patterns of Chicago Public School (CPS) students, the study finds that more than 90% of students aspired to a complete college degree, but only 61% enrolled in college by the fall after

graduation. Disadvantaged students with college aspirations were particularly likely to fall out of the college enrollment process.

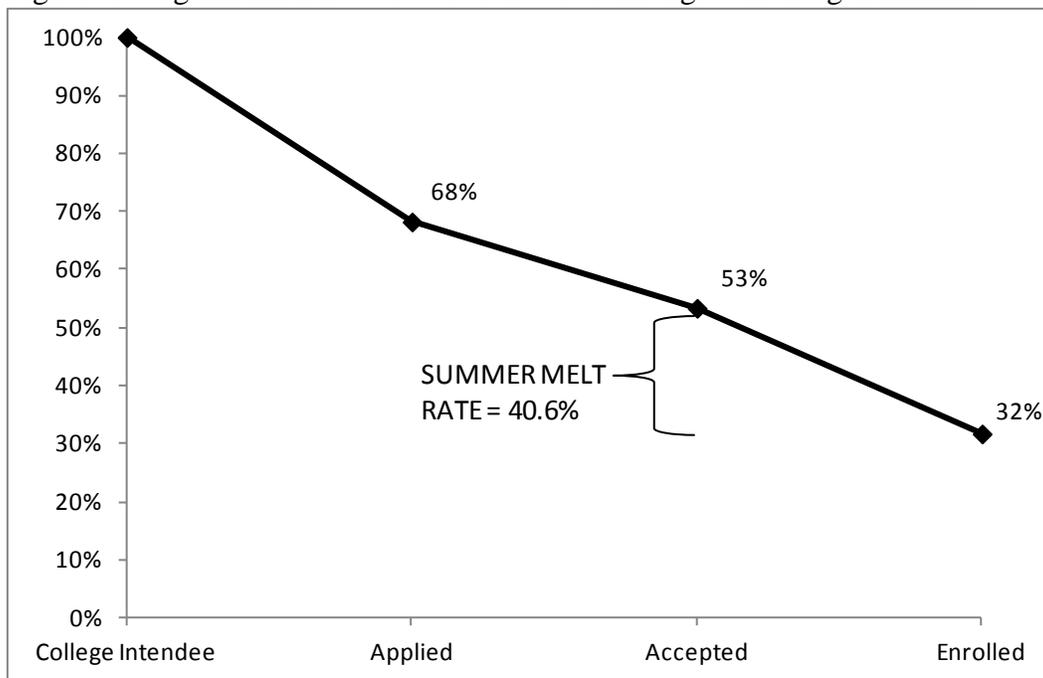
Recent studies have begun to look deeper into the issue of summer melt to understand the extent of the problem and the potential causes. Using several different data sources, Castleman and Page (2011) find that the rate of summer melt varies from eight to forty percent depending on the population examined. The study finds that students who do their own college research, talk with parents, and have many friends intending to go to college are less likely to end up as summer melt, while students who plan to attend a community college are more likely to end up as summer melt. Arnold et al. (2009) uses qualitative data to identify the causes of summer melt and find that students don't follow through with college plans because of gaps in financial aid, misguided information from relatively thin and ill-informed social networks, and a lack of knowledge about key deadlines and requirements for application.

Counseling interventions to address these financial and informational barriers have the potential to ease student transitions to college and significantly reduce rates of summer melt. Until recently, summer "bridge" programs primarily focused on academic preparation. The research indicates that these bridge programs are successful in improving college academic performance and rates of persistence (Ackerman, 1990; Garcia, 1991; Gold, 1992). In 2008, a pilot study in Providence, Rhode Island was the first to test the effectiveness of an intervention that focused primarily on non-academic preparation for college enrollment (Castleman et al., 2012). The study randomized the intervention across 162 graduates from seven high schools. Students in the treatment group received a set of heterogeneous interventions including financial guidance and advocacy and interactions with currently enrolled students to learn about the college experience. Researchers found that the enrollment of students in the treatment group was 16 percentage points higher than the control group, indicating that the intervention was successful in helping students to overcome summer melt. In summer 2011, larger-scale randomized interventions were implemented in two large urban districts. Early findings on the effects of these interventions suggest that they were also successful in reducing rates of summer melt (Castleman & Page, 2012).

## 2.2 Summer Melt in the Study District

Similar to districts examined in previous research, the data for the district in this study indicates that summer melt impacts a substantial number of students. In the district's 2010 Senior Exit Survey, approximately 82 percent of graduates reported plans to attend college after graduation. However, as Figure 1 indicates, only 68 percent of these college intendees reported applying to at least one college, and only 53 percent reported acceptance to at least one college. This group of students who've expressed a desire to attend college and have reported applying and being accepted to at least one college are considered to have strong college intentions. The rate of summer melt is defined as the percentage of these strong college intenders who do not enroll in college by October 1<sup>st</sup> of the fall following graduation. In 2010, the rate of summer melt for the study district was 40.6 percent. This rate is near the top end of estimates from previous studies.

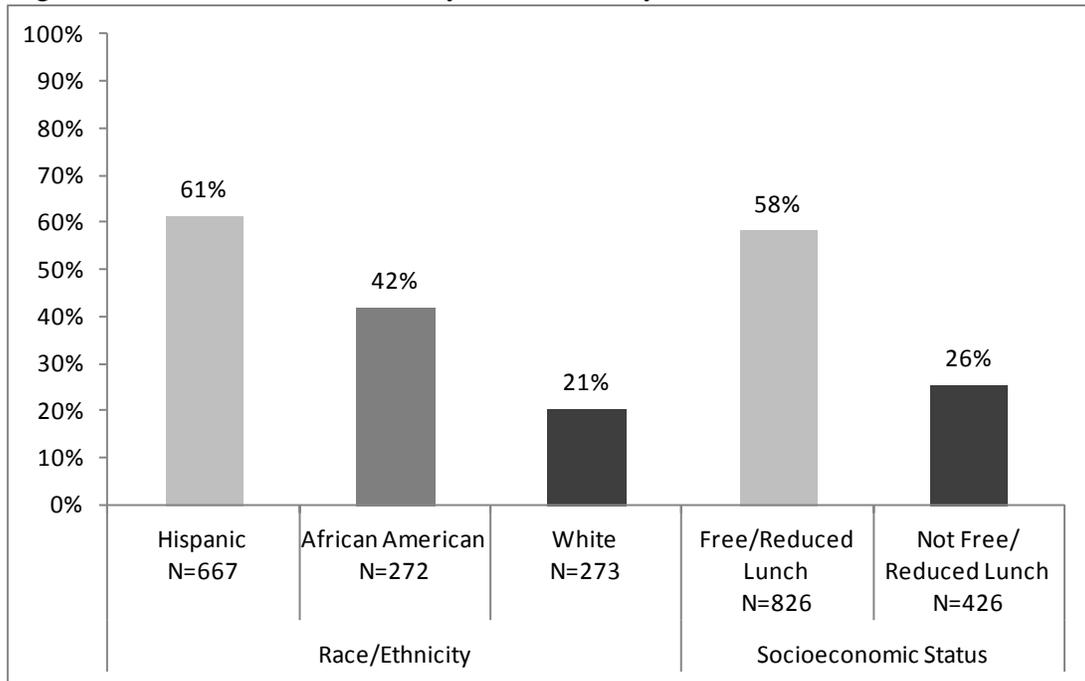
Figure 1. Progress toward Enrollment for 2010 College-Intending Graduates



Previous studies argue that rates of summer melt are higher for low-income minority graduates because these students face additional obstacles in the transition to college enrollment and often lack the networks to overcome these barriers. The same patterns appear to be true for the study district. In 2010, summer melt rates were greater than 50 percent for Hispanic

graduates and 35 percent for African American graduates, compared to only 17 percent for White graduates. Low-income graduates were more than twice as likely as their higher-income peers to succumb to summer melt.

Figure 2. Rates of Summer Melt by Race/Ethnicity and Socioeconomic Status

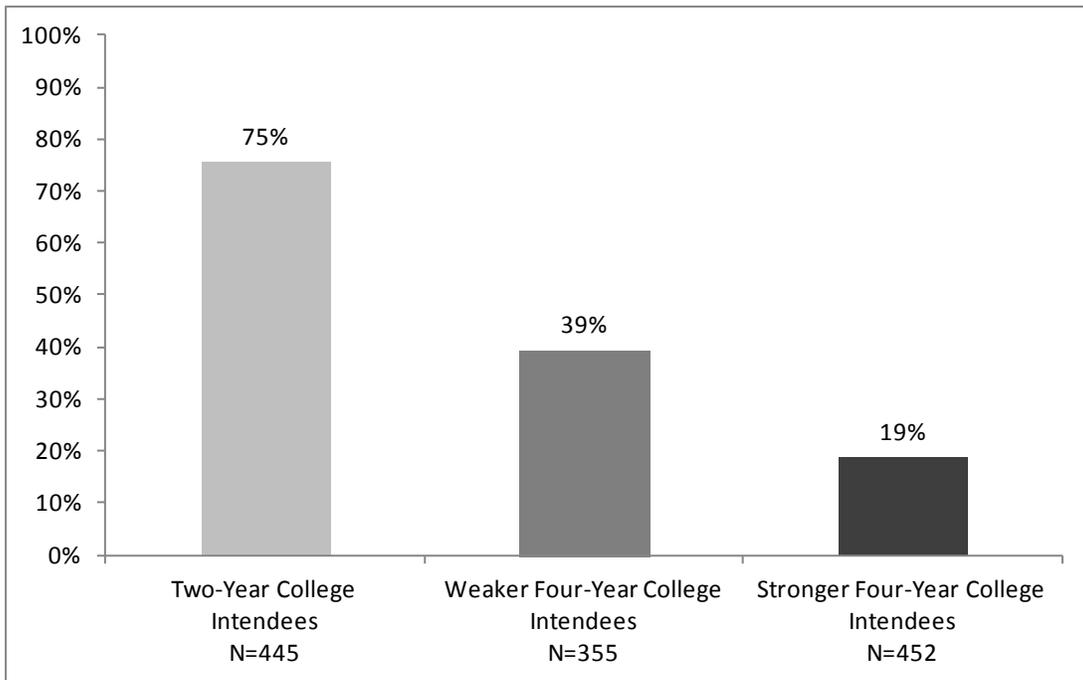


Rates of summer melt also differ by the type of college the graduate plans to attend and the efforts the graduate has taken prior to graduation to follow through with these plans. For the purpose of analysis, graduates from the district are broken into three groups:

- 1) Graduates who plan to attend a two-year college;
- 2) Graduates who report plans to attend a four-year college but haven't taken at least one of three key steps to enrollment:
  - Applied and been accepted to a four-year college
  - Taken the SATs or ACTs
  - Completed the FAFSA/TASFA
- 3) Graduates who report plans to attend a four-year college and have completed three key steps toward four-year enrollment.

Figure 3 indicates that two-year college intendees are extremely likely to succumb to summer melt, with only one-quarter of these graduates actually enrolling at college in the fall after graduation. Weaker four-year college intendees, those who haven't completed at least one of the key steps to enrollment, have a rate of summer melt that is approximately half of the rate for two-year college intendees. The most committed four-year intendees are the least likely to succumb to summer melt with a rate of 19 percent.

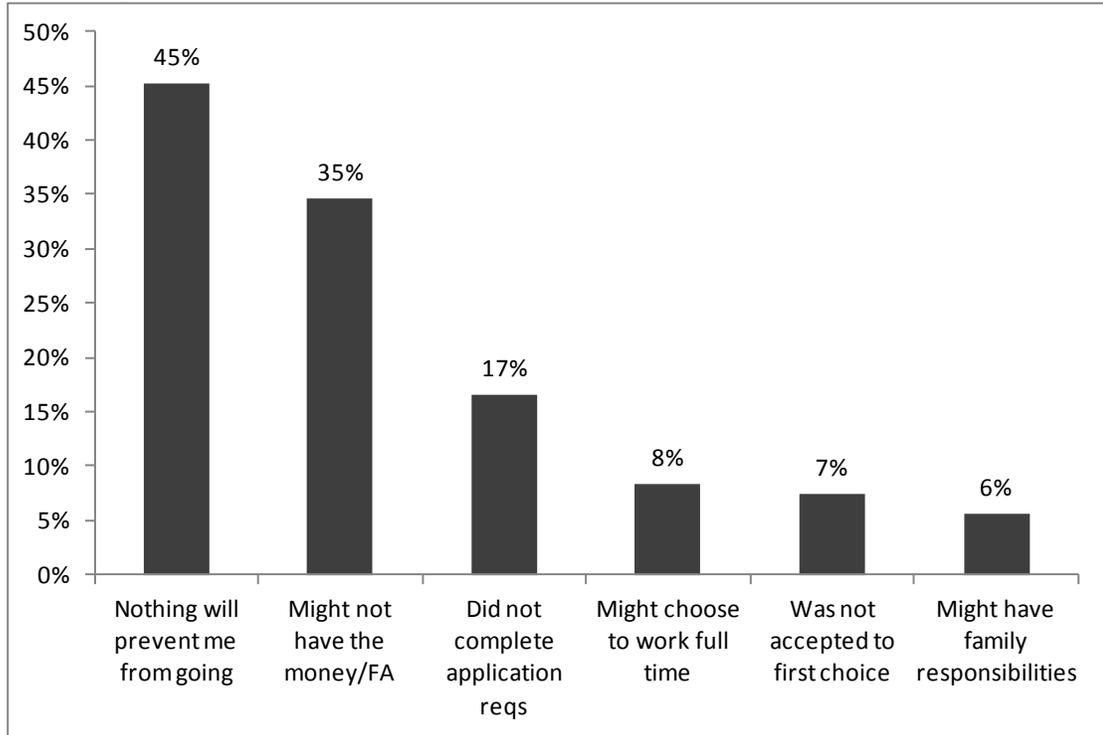
Figure 3. Summer Melt Rates by College Intentions and Demonstration of Commitment to Enrollment



In anticipation of the summer counseling intervention, an item was added to the Senior Exit Survey to determine what barriers college-intending students expect to potentially interfere with their enrollment plans. Figure 4 presents the frequency of anticipated reasons for summer melt. Nearly half of college intendees said that there was nothing would prevent them from attending college. Of the 55 percent who did anticipate barriers to immediate enrollment, nearly two-thirds reported that a lack of money and financial aid to cover college costs would be the biggest issue. The second biggest anticipated was a failure to complete all of the application requirements. Somewhat fewer students reported that not being accepted to their first-choice

college was a reason for potentially not attending college, or that work and/or family responsibilities would act as barriers to enrollment.

Figure 4. Reasons for Potentially not Attending College Immediately among College Intending Students



### 2.3 Summer Link: The District’s Summer Counseling Intervention

In response to research identifying the district’s relatively high rate of summer melt, district administrators developed a summer counseling intervention marketed as “Summer Link.” Through the Summer Link program, counselors, teachers and other school staff actively reached out to graduates who had demonstrated college intentions to assist with whatever additional guidance and counseling needs they faced over the summer. The intervention was funded internally, with two hours of counseling budgeted for every graduate who reported on the Senior Exit Survey that they planned to attend college, had applied to college, and had been accepted to at least one college.

More than 1,400 students across eleven high school campuses were targeted by the intervention. Two high schools chose not to participate in the intervention. Twenty-six

counselors and advisors were trained in mid-June and counseling was provided to students between June 22nd and July 29th. Assistance provided by counselors and advisors included:

- Reviewing checklists of “important steps to enrolling in college” for the graduate’s planned college of attendance
- Helping graduates to complete financial aid applications
- Sending transcripts to college
- Talking with students about textbooks
- Helping graduates to register for housing and parking
- Assisting with application forms,
- Providing emotional support to graduates and their families.

To support Summer Link advisors in their work, individual case files were provided for each student with important information on college plans, FAFSA completion, test scores, and potential barriers to immediate college enrollment. Campuses collected current contact information (phone numbers and email addresses) from seniors to provide counselors with more reliable means of contact. The district also developed Facebook pages for each campus’s Summer Link program to allow advisors to make announcements about office hours and important deadlines, provide links key to college advising websites, and communicate with individual students to determine needs for assistance.

Of the 1,422 students who were targeted by Summer Link, more than 500 graduates received substantial assistance with college enrollment. According to counselor logs, 505 graduates received at least 10 minutes of assistance, 205 graduates received at least 30 minutes of assistance, and 31 students received more than two hours of assistance. These numbers likely underestimate the total number of graduates served because at least three of the advisors did not keep detailed counselor logs for at least some portion of the Summer Link counseling period. Graduates who were provided with counseling were primarily those targeted by the program (those completing a Senior Exit Survey and reporting plans to attend college), but in some cases advisors provided assistance to graduates who did not complete a Senior Exit Survey and graduates from the previous cohort. Unfortunately no data was kept on these interactions, so the degree of contamination cannot be estimated.

The most common area where advisors provided assistance was financial aid (158 graduates). Advisors helped graduates to complete the FAFSA and TASFA, follow up on financial aid forms after they were submitted, apply for scholarships, transfer scholarships or financial aid to another college when plans changed, and advisors called colleges to lobby for financial aid. Advisors also spoke with graduates about the possibility of graduates taking a reduced course load to keep costs manageable or changing plans from a four-year university to a community college. The need for additional help with financial aid was anticipated, because this was one of the major themes in the Senior Exit Survey. More than a third of seniors who reported plans to attend college on the survey said that if they did not attend in the fall it would be because they “might not have the money or financial aid.”

Another common area of assistance was transcripts (149 graduates). Advisors printed transcripts and mailed them to colleges, reviewed the transcripts with students, and for one campus where there was a common error on transcripts, advisors wrote letters to colleges to explain the error. Advisors also assisted with placement testing (63 graduates), including sending TAKS scores to colleges, calling to check whether graduates had completed placement testing through the College Access program with Tarrant County College (TCC), and helping graduates to plan for summer placement testing. In addition, 48 graduates only needed emotional support and reassurance when dealing with anxiety about college. Other areas where graduates required assistance include: preparing for orientation, figuring out housing, filling out applications and other forms, choosing courses and majors, and navigating college websites. A small number of graduates who spoke with advisors reported that they had no need for assistance. Even for these graduates who were on-track with the enrollment process, advisors typically offered encouragement and offered to go through a checklist of “steps to enrollment” to ensure that graduates had completed all important tasks.

### 3. Data and Descriptive Statistics

#### 3.1 Data

This paper uses data from a large urban district in the Southwest. In order to estimate the effect of the summer 2011 intervention, college enrollment data for 2011 graduates are compared to graduates from the previous graduating cohort. Student-level data on college intentions, use

of guidance/counseling services, and steps toward college enrollment is provided through the district’s Senior Exit Survey. This survey data is supplemented with district data on student demographics, school membership, high school exit-level test scores, and college preparation exam data (SAT and ACT). College enrollment data is provided by the National Student Clearinghouse (NSC), a non-profit organization that is now the nation’s leading source for postsecondary degree and enrollment verification. Files are linked using social security numbers and state identifiers.

The Senior Exit Survey is a yearly district-led effort, with surveys distributed through high school counseling departments in the last two weeks of May. The survey includes questions on student high school experiences, use of guidance and counseling services, plans for college, and college preparation efforts. Copies of the 2010 and 2011 surveys can be found the Appendix. The response rate across two years of survey data is 71 percent, with a somewhat higher response rate in 2011 relative to 2010 (74.6 percent versus 66.4 percent). Table 1 presents some summary statistics comparing survey respondents to graduates who did not respond to the survey. Survey respondents are more likely to be Hispanic and less likely to be African American. Respondents are also more likely to qualify for free/reduced lunch.

Table 1. Summary Statistics for Survey Respondents

	Senior Exit Survey Non-Respondent	Senior Exit Survey Respondent
Male	0.475	0.492
Hispanic	0.510	0.563**
African American	0.286	0.229***
White	0.174	0.186
Other	0.029	0.022
Free/Reduced Lunch	0.495	0.585***
Enrolled in college	0.337	0.390***
Enrolled at a four-year university	0.193	0.235***
Enrolled at a two-year university	0.144	0.155***
Enrolled at a Texas university	0.303	0.334***
Enrolled at a public university	.0304	0.333**
N	2,161	5,202

The district often makes small year-to-year changes to the Senior Exit Survey to improve existing items, throw out bad items, and add additional items to address new areas of interest.

Between 2010 and 2011, one of the items used to identify college intending students and target these students with the Summer Link intervention underwent a significant change that makes analysis of summer melt across years more complicated.<sup>1</sup> This potentially problematic item asks students, “Please indicate the colleges you applied to for admissions and the current status with each college/university.” In the 2010 survey, seniors were asked to look up IPEDs identifiers for the colleges they applied to. The district suspected that this extra effort required to identify colleges was leading students to underreport college application, so in the 2011 survey the item instead listed the 13 most popular colleges and allowed students to fill in three additional colleges.

In 2011, rates of reported applications and acceptances increased significantly relative to what was reported by 2010 survey respondents (Table 2). More than 80 percent of seniors reported applying to at least one college in 2011, compared to only 59 percent on 2010 seniors. Reports of acceptances to at least one college were also significantly higher in 2011. The differences appear to be driven by students reporting applications/acceptances to both four-year and two-year colleges. While some of this increase may have been due to actual increases in application rates, the change in the item is likely responsible for some portion of the increase. One reason that the item wording may have increased reporting is the reduced effort that students were required to make to identify the colleges. Another potential reason for higher reports of applications is that students may not have considered applications to two-year colleges as true applications since the process is different from the four-year college application process. Because the 2011 item included names of local community colleges, students were subconsciously “prompted” to include two-year applications and acceptances. This may help to explain why the increase in reports of two-year applications and acceptances between 2010 and 2011 was somewhat greater than the increase in reports of four-year applications/acceptances.

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<sup>1</sup> The efforts to address the measurement error from this change are addressed in the Methodology section.

Table 2. Student Reports of Applications/Acceptances by Year

	2010 Survey	2011 Survey
Applied to at least one college	0.590	0.815***
Accepted to at least one college	0.445	0.584***
Applied to a four-year college	0.414	0.510***
Accepted to a four-year college	0.290	0.350***
Applied only to two-year college(s)	0.177	0.306***
Accepted only to two-year college(s)	0.155	0.233***
N	2,548	2,997

NSC data includes semester-level observations for each NSC-reporting institution that a student attends, including date of enrollment and completion, level of enrollment (e.g. part-time, full-time). Because NSC data is only available for graduates, the analysis is conditional on graduation. October first in the fall after graduation is the cut-off used to identify enrollees, so graduates who enroll in college after this date or drop out prior to this date are considered non-enrollees. Students enrolled both part-time and full-time on these dates are considered college enrollees. More than 92 percent of higher education institutions in the United States report to the NSC. There are only two colleges who enroll a significant number of the district’s students and do not report to the NSC. Enrollees at these two colleges make up only a small portion of college enrollees from the district (less than 3 percent), however, the failure to identify these students as college enrollees does lead to slight overestimates of college melt rates.

### 3.3 Descriptive Statistics

Table 3 provides descriptive statistics on student demographics, academic achievement, college guidance service use, steps to college enrollment, and college enrollment. These statistics are broken down separately for the eleven schools who received the intervention and the two schools that did not receive the intervention. Summary statistics are based on the combined 2010 and 2011 data, and are based only on graduating survey respondents.

Summary statistics indicate that the majority of graduates in the district are low-income and non-white. Graduates from non-intervention schools are nearly four times as likely to be white, and only about half as likely to qualify for the free/reduced lunch program. Graduates from non-intervention schools are also more likely to be college-ready. However, a significant

portion of graduates from all schools are not college ready, particularly in math. Graduates from the schools that received Summer Link were more likely to have used pre-graduation college counseling services and attended district-provided college events. This is likely to be due in part to the fact that these students have fewer college-informed resources outside of the school.

Table 3. Summary Statistics for Intervention and Non-Intervention Schools (2010 and 2011 Survey Respondents)

	Intervention School	Non-Intervention School
Male	0.491	0.488
Hispanic	0.617	0.457***
African American	0.247	0.113***
White	0.106	0.398***
Other	0.031	0.032
Free/Reduced Lunch	0.802	0.468***
College Ready Math	0.514	0.641***
College Ready Reading	0.685	0.840***
Used a Go Center	0.484	0.385***
Attended a financial aid workshop	0.109	0.079***
Attended college night	0.172	0.156***
Took a placement exam	0.360	0.266***
Attended a Super Saturday	0.088	0.047***
Completed the FAFSA/TASFA	0.525	0.521
Took the SAT/ACT	0.317	0.428***
Plan to attend a four-year college	0.440	0.669***
Plan to attend a two-year college	0.346	0.205***
Enrolled in college	0.187	0.498***
Enrolled at a four-year university	0.051	0.314***
Enrolled at a two-year university	0.137	0.184***
Enrolled at a Texas university	0.152	0.423***
Enrolled at a public university	0.164	0.421***
N	3821	1384

Note: College readiness is indicated by a score of 2200 or higher on the state exit exam \*\*\* Significantly different from students at intervention schools at the  $p < 0.01$  level \*\* Significantly different at the  $p < 0.05$  level \* Significantly different at the  $p < 0.10$  level

Graduates from Summer Link schools are less likely to plan to attend four-year colleges and are more likely to plan to attend a two-year college. And while these students are less likely to have taken the SAT or ACT, they are no less likely to have completed the FAFSA or TASFA. Summer Link school graduates are also less likely to enroll in all types of colleges, particularly four-year universities. The models I include in this paper's analysis include controls for each of these significant areas of difference for graduates from participating and non-participating schools. Beyond the impact of these student characteristics and school-specific differences, I assume that the estimated difference in trajectories for Summer Link schools versus non-participating schools are due to the Summer Link intervention. No other major district initiatives believed to impact college-going were introduced in the 2010-11 school year that would have contributed to differences.

## 4. Methods

### 4.1 Research Design

The goal of this paper is to estimate the average effect of the outreach provided through Summer Link on the enrollment rates of college intending students. The empirical challenge faced is that students who received the intervention are likely to be different from those who didn't receive the intervention; in particular the two schools that chose not to participate in the intervention are the highest performing schools in the district and those with the lowest rates of summer melt. In addition, district-wide college enrollment rates for 2011 graduates cannot simply be compared to enrollment rates for 2010 graduates, because a variety of changes may be taking place over time that could generate yearly changes in enrollment rates. Student cohorts may have different characteristics, the district may have introduced new programs impacting college-going, labor market conditions are likely to change, and college costs may be changing. Each of these factors may impact changes in enrollment rates over time. Difference-in-difference analysis provides a method of controlling for these year-to-year changes by comparing the changes for graduates not receiving the intervention to those who were targeted with the intervention.

To formalize these ideas considering the following model for some outcome,  $Y_i$  (e.g. enrolled in college the fall after graduation):

$$(I) \quad Y_i = \theta SL_i + \delta P_i + \lambda T_i + X_i \beta + e_i$$

Where  $CI_i$  is an indicator for whether a student is college intending (student plans to attend college, has applied to at least one college, and has been accepted to at least one college),  $T_i$  is an indicator for whether a student graduated in 2011,  $P_i$  indicates whether a student was a senior at one of the schools targeted by the Summer Link program ( $P_i=1$ ,  $T_i=1$ ),  $X_i$  is a vector of demographic characteristics, and  $e_i$  is a random disturbance term. The coefficient  $\delta$  represents the difference in enrollment rates for students at the participating schools relative to non-participating schools and the coefficient  $\lambda$  represents the time component.

In order for these difference-in-difference models to provide unbiased estimates of the intervention's average impact on college enrollment, the unobservables represented in the error term  $e_i$  must be independent of the group variable ( $P_i$ ) and have the same distribution over time. To increase the likelihood that this is true, I control for a number of key observable characteristics that may affect the probability of college enrollment and are also related to the group and/or time variables. I control for potentially confounding variables through the following 4 models:

$$(II) \quad Y_i = (2) + \rho EE_i$$

$$(III) \quad Y_i = (2) + \rho EE_i + CC_i \tau + e_i$$

$$(IV) \quad Y_i = (2) + \rho EE_i + CC_i \tau + \pi FA_i + \eta SAT_i + \omega 4YR_i + e_i$$

$$(V) \quad Y_{is} = (2)_{is} + \rho EE_{is} + \pi FA_{is} + \eta SAT_{is} + \omega 4YR_{is} + \alpha_s + e_{is}$$

Where  $EE_i$  is the student's exit exam score to control for academic achievement,  $CC_i$  is a vector of indicators for self-reported use of other pre-graduation college counseling services,  $FA_i$  and  $SAT_i$  are indicators of completing the FAFSA/TASFA and taking the SAT/ACT to control for college preparation efforts,  $4YR_i$  is an indicator of intentions to attend a four-year college, and  $\alpha_s$  represents fixed effects for each of the district's 13 high schools to control for school-level differences in college preparation and counseling.

## 4.2 Addressing Measurement Error in Determinants of College Intentions

As mentioned previously, one of the major issues impacting the ability to measure the effect of the intervention is a change to a key item for determining whether a student is college-intending (CI<sub>i</sub>) and whether a student was targeted by the Summer Link intervention. The format of the item in the 2010 survey demanded significantly more work on the part of the respondent, and therefore likely created a significant amount of measurement error. College intending students who are most likely to have skipped this question may have been less motivated to report their applications and acceptances (e.g. didn't get into desired colleges) or may have applied only to two-year colleges and did not understand these applications to be appropriate to report. Given the analysis of summer melt rates by college type and strength of intentions, these students may be expected to have relatively high rates of summer melt. Excluding these students as college intending leads to an underestimate of summer melt rate for 2010 graduates, which will downwardly bias the estimates of the intervention's effect.

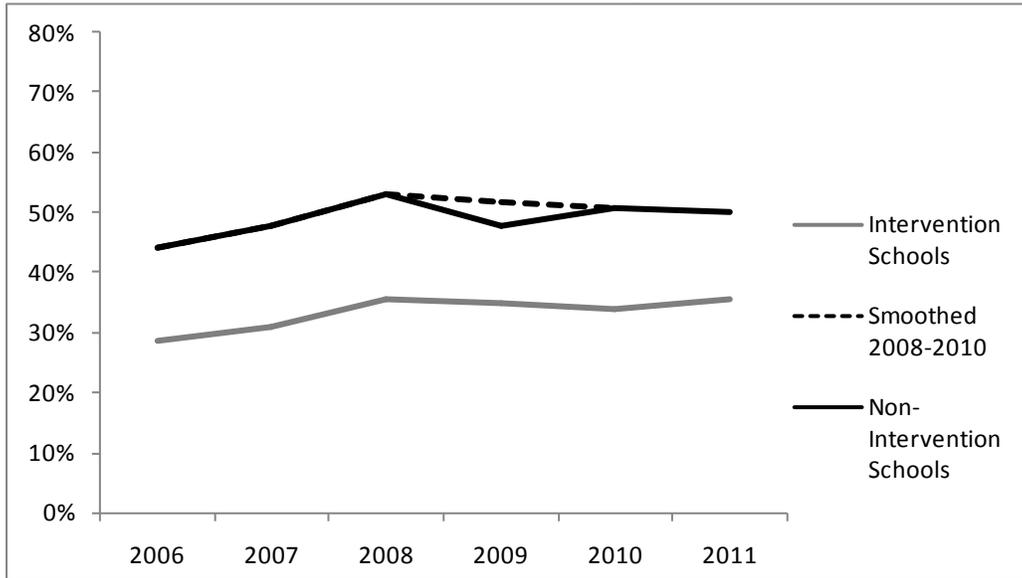
An alternative to allowing for the measurement effect on the college-intending indicator variable is to redefine college intentions. This method will be used for the analysis in this paper. In 2011, 85 percent of students who reported that they planned to attend college also reported that they'd applied and been accepted to at least one college. Redefining college intending to represent all students who reported plans to attend college regardless of whether they were accepted to at least one college allows a method of avoiding changing definitions of college intentions over time. This survey item remained identical between 2010 and 2011. This method will downwardly bias the estimates of the intervention's average effect on enrollment because an additional two hundred students will be included as "treated" when in fact they were not targeted by the intervention. The estimates from these strategies are likely to be lower-bounds estimates of the true effect of the intervention on the students who received the Summer Link outreach.

## 4.3 Limitations of Difference-in-Difference Methods

The primary limitation of this study's estimation methods is the strong assumption that college enrollment rates would have changed at the same rate across schools that received the treatment and those that did not. Due to limitations in Senior Exit Survey data on college intentions, the analysis includes only one year of data before the intervention. However, data on

college enrollment for many years before the intervention was in place. Figure 5 presents enrollment rate trends over time for the eleven intervention schools and the two non-intervention schools. While the intervention schools have overall lower enrollment rates, the trends in enrollment over time are nearly identical for the two groups of schools, with the exception of a small dip in 2009 enrollment for the non-intervention schools. This provides some assurance that the change in enrollment rates would have been similar in the absence of the intervention.

Figure 5. College Enrollment Rates Over Time by Intervention Status



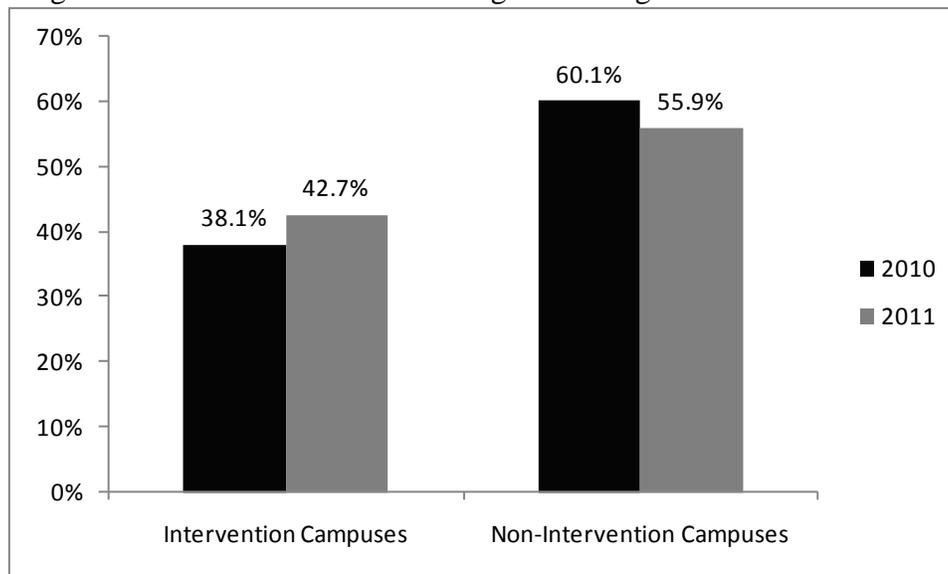
A more recently noted limitation of difference-in-difference analysis noted by Bertrand, Duflo and Mullainathan (2004) is that serial correlation can lead to significant underestimation of standard errors. The authors argue that the three main reasons for particular issues with serial correlation in difference-in-difference analysis include: (1) long time series with many years of data used; (2) dependent variables that are highly serially correlated over time; and (3) treatment variables that change very little over time. To address the possibility of underestimated standard errors due to serial correlation in summer melt rates within schools, I cluster standard errors at the school level.

## 5. Results

### 5.1 Yearly Changes in Enrollment and Summer Melt

Cohort differences in college enrollment rates for college intending students at both intervention and non-intervention schools are presented in Figure 6. In the schools that received Summer Link, enrollment rates increased by 4.6 percentage points. Alternatively, the non-participating schools saw enrollment decline by about 4 percent. The difference between yearly changes is approximately 9 percentage points, suggesting that the Summer Link program may have had a positive impact on enrollment rates. In order to achieve a better estimate of the true impact of the program, the next section uses student-level analysis to control for other differences that may have driven enrollment changes over time.

Figure 6. Enrollment Rates for College Intending Students



### 5.2 Estimates Accounting for Observable Differences

The two schools that chose not to participate in the intervention are markedly different from the eleven that participated in Summer Link. The non-intervention schools have fewer low-income minority students, higher test scores, and higher college enrollment rates. In order to ensure that the estimates of the program's impact are unbiased, observable differences between the treatment and control groups must be accounted for. Table 4 presents the results for each of the five models. Model I controls only for demographics, Model II adds additional

controls for academic achievement, Model III adds controls for use of pre-graduation college counseling services, Model IV accounts for completion of important enrollment tasks and type of college planned for, and Model V adds school-level fixed effects.

The estimates of Summer Link’s effect on the probability of enrollment range from nine to eleven percentage points, with high levels of significance across all models. Some of the models indicate that enrollment rates for college intending students were lower in 2011 than 2010, but when FAFSA/TASFA completion, college entrance exam completion, and type of college a student plans to attend are accounted for, the year-to-year enrollment differences disappear. This is likely due to the fact that a significantly larger number of two-year college intendees self-identified in 2011 due to the revisions in a key survey item. Estimates also show that college enrollment rates are substantially lower for Summer Link schools relative to non-participating schools, a pattern that was shown previously in Table 3 and Figure 5.

Table 4. Difference-in-Difference Estimates of the Impact of Summer Link

	I	II	III	IV	V
<b>Summer Link</b>	<b>0.091**</b> <b>(0.031)</b>	<b>0.070**</b> <b>(0.030)</b>	<b>0.095***</b> <b>(0.031)</b>	<b>0.113***</b> <b>(0.029)</b>	<b>0.110***</b> <b>(0.030)</b>
2011 Graduate	-0.040** (0.014)	-0.031 (0.025)	-0.055** (0.025)	0.002 (0.025)	0.001 (0.025)
Link School	-0.124*** (0.036)	-0.076*** (0.023)	-0.096*** (0.024)	-0.115*** (0.023)	-0.140*** (0.041)
Demographics	Y	Y	Y	Y	Y
Test Scores		Y	Y	Y	Y
Use of pre-graduation counseling			Y	Y	Y
Completed FAFSA/TASFA				Y	Y
Took SAT/ACT				Y	Y
Four-Year College Intentions				Y	Y
School Fixed Effects				Y	Y

\*\*\* Significant at the  $p < 0.01$  level, \*\* Significant at the  $p < 0.05$  level

### 5.3 Subgroup Analysis

One important issue that has not yet been addressed in studies of interventions designed to address summer melt is what population of students can be most effectively targeted by proactive outreach and last-minute assistance with enrollment requirements and financial aid issues. Students who are relatively far along in the enrollment process (e.g. have completed

financial aid forms and have been accepted to a college of choice) and those who plan to attend four-year colleges are likely to have smaller needs for assistance, such as figuring out where to get housing and getting advice on where to buy books. Students who are only thinking of two-year colleges and/or those who only submitted an application to the local community college through a district program may have more significant barriers to overcome in order to follow through with their enrollment plans, such as managing anxiety about whether to attend college, identifying funding, and making sure to complete all enrollment requirements without the clear guidance and oversight that is often available from four-year colleges. It is reasonable to expect, therefore, that the intervention would be more successful with graduates who are further along in the enrollment process.

On the other hand, if students are too far along in the enrollment process and have access to a variety of other networks to receive help following through with enrollment (e.g. parents, college advisors, peers), there may be little added benefit to the outreach from Summer Link staff. It is likely that students least far along in the enrollment process have a number of needs for assistance from Summer Link advisors, so these students may have additional areas in which to benefit that would result in a greater impact on enrollment from the intervention relative to their peers who've shown stronger college intentions. Table 5 indicates that this is not the case. Graduates who plan to attend four-year colleges were more greatly impacted by the Summer Link program than two-year college intendees, and four-year college intendees who had also completed financial aid forms, taken college entrance exams, and were accepted to a four-year college saw the largest effect from the summer counseling. This supports the hypothesis that students with clearly defined college plans who have already followed through with most enrollment requirements see the greatest benefits from an additional two hours of proactive outreach and counseling in the summer between graduation and college enrollment.

Table 5. Impact of Summer Melt by College Intentions

	I	II	III	IV	V	N
All College Intendees	0.091** (0.031)	0.070** (0.030)	0.095*** (0.031)	0.113*** (0.029)	0.110*** (0.030)	3,994
Two-Year College Intendees	0.025 (0.056)	0.032 (0.056)	0.037 (0.058)	0.060 (0.058)	0.051 (0.058)	1,519
Four-Year College Intendees	0.092** (0.037)	0.065* (0.036)	0.095*** (0.036)	0.119*** (0.035)	0.115*** (0.036)	2,475
Strongest Four-Year Intendees	0.117** (0.054)	0.111** (0.053)	0.124** (0.054)	- -	0.105* (0.056)	727

\*\*\* Significant at the  $p < 0.01$  level, \*\* Significant at the  $p < 0.05$  level, \* Significant at the  $p < 0.10$  level

## 6. Discussion

### *Impact on College Enrollment*

Results indicate that the Summer Melt program did have a significant impact on summer melt and resulted in an increase in college enrollment rates for college intending students. By targeting students with proactive outreach, support for following through with college intentions, and assistance with barriers to enrollment, the counseling program helped graduates to overcome the hurdles that had prevented the previous cohort(s) from following through with plans for college enrollment. However, evidence suggests that there were limits to what advisors were able to do to assist students. The program had the greatest effect for four-year intending students who'd completed financial aid forms and entrance exams and had been accepted to a four-year college. The effects for two-year college intendees were significantly lower and were only marginally significant. These two-year college intending students may have had such significant barriers to overcome and/or may have changed their plans about wanting to attend college, and the minimal amount of advising services that were provided through the Summer Link program appear to have been insufficient to have an impact on college enrollment.

The lack of results for two-year college intendees suggest that summer counseling programs with limited resources should be targeted to graduates with four-year college intentions and graduates who have signaled college interest by completing important steps toward college enrollment. If districts intend to provide sufficient help to address barriers for two-year college intending students, the interventions may need to be more time-intensive, start earlier, provide additional services, or otherwise be tailored to address the expanded needs of these students. In developing the Summer Melt program, a number of key decisions were made that likely had

important implications for the success of the counseling efforts on encouraging students to follow through with college plans and subsequently decreasing summer melt. A description of these implementation decisions and discussion of their potential impact on student enrollment decisions follows.

### *Key Implementation Decisions*

#### A) Budgeting

The district decided to fund the program internally in order to maximize the freedom of control over how the program was implemented. This decision was largely driven by the relatively short timeline within which the program was developed and implemented, however, the desire to act as sole manager of the implementation was also a significant justification for the funding choice. The program was budgeted at \$48 per student, a significantly lower budget than previous interventions (Castleman et al., 2011; Castleman & Page, 2012). The budget covered two hours of advisor time for each student, including time to prepare for student contact, time spent contacting students, and time allocated to advising students in need of assistance, as well as two dollars per student for materials and/or postage.

Even with a relatively small per-student budget, the Summer Link program is targeted to a large number of students and is therefore a relatively costly intervention for a large urban district in terms of overall budget. For the 1,422 students targeted in summer 2011, the full budget for the program was nearly \$70,000, and this cost excludes the in-kind value of time spent developing, coordinating, and evaluating the program. Had all 13 high school campuses participated in the program, the cost would have been nearly \$100,000. In a relatively tight budget environment for most large urban districts, this significant cost for a program serving students who have already graduated and may therefore be seen as lower-priority compared to currently enrolled students may be difficult to justify.

To address the limitations within district budgets for summer counseling interventions, it may be useful for districts to partner with postsecondary institutions, college advising organizations, and financial aid providers to develop collaborative

interventions that spread the costs across several key stakeholders in the college advising organizations, and financial aid providers to develop collaborative interventions that spread the costs across several key stakeholders in the college enrollment process. Beyond fundraising, partnering with other stakeholders may result in additional resources in terms of time, staff, and institutional knowledge and could result in a better-designed and more effective intervention. For example, financial aid advising can be a complex process, and it is likely that financial aid providers and financial aid staff from postsecondary institutions could provide more detailed and informed assistance to students with difficult situations and large funding gaps.

However, there are also potential issues that can arise with summer counseling interventions that are provided by collaborating stakeholders. Stakeholders may have different priorities that impact the advising they provide. Postsecondary partners have incentives to focus assistance on graduates planning to enroll at their institutions, and because it is unlikely that all district-enrolling institutions participate in the program, some graduates may receive reduced or less-enthusiastic advising. In addition, the institutions have little incentive to discourage students from enrolling, even if the decision is not particularly wise in terms of academic preparedness or financial ability. Involving too many stakeholders may also push up the overhead for the program and put downward pressure on the funding going directly to advising. And finally, students may respond more readily to advisors that they are familiar with, and particularly with students most vulnerable to summer melt, there may be a hesitancy to access services provided by unfamiliar organizations and staff that is perceived as outsiders.

## B) Staffing

As noted in the previous section, staffing decisions may be closely linked to the decision of which organizations will collaborate in providing funding for the summer counseling intervention. There is likely a tradeoff between using individuals who are familiar to graduates and therefore more likely to get responses to phone and email contact attempts and employing advisors who are trained to provide services for complex issues in a wide variety of areas. The advisor who would be most appropriate for

providing emotional support to students who are anxious about the time and effort required for successful college-going is likely different from the advisor who could provide the most effective financial aid counseling. However, there may be benefits to having a single person acting as each student's primary source of advising, and it is unclear whether different types of advisors could be successfully targeted to students by anticipated need without providing uneven advising coverage across students and/or discouraging some students from receiving services through mismatched advisors. A potential compromise between the extremes of providing a familiar advisor with limited knowledge and training and providing a highly qualified but unfamiliar advisor would be to have familiar student liaisons who were the first to reach out to students to identify advising needs and get students "in the door," and then more specifically trained advisors to which students could be referred for varying needs.

Even within the wholly district-provided summer intervention, there were important decisions to be made about advisors. Counselors seem to be the most logical choice for advisors given their training in college advising and ability to access important college-going resources. However, in large urban districts, counselors are often overwhelmed with responsibilities over the summer including course scheduling, training, and existing summer bridge programs, and are therefore unable to take on additional duties. Another common finding in the study district is that counselors often felt so overworked during the school year that the opportunity to have a break over the summer was highly valued and something many were unwilling to forgo. Teachers and other school staff may have greater ability and desire to participate as advisors over the summer, though they are also likely to have less training and knowledge in college-related advising. Teachers and school staff (e.g. front office staff) may also be more familiar to students and more likely to encourage take-up of the advising services.

The study district decided to provide flexibility to high school campuses to determine which staff members would be providing the advising for Summer Link. There was a mix of providers among the 26 advisors, including 11 counselors, seven teachers, and eight other school staff members, including office staff, academic advisors, and after-school program providers. Campuses had anywhere from one to five advisors

depending on interest, availability, and the number of college intending students, and typically teams had a mix of staff member types. There is no clear evidence of one particular type of staff being more effective than others in providing successful advising to students. There were counselors, teachers, and other school staff members among the group identified as particularly effective with certain students (both according to anecdotal evidence and logs of students serviced). Principals appreciated the flexibility to provide the staff they thought would be most interested in and effective at providing college advising.

On the other hand, the variability in provider types likely resulted in additional heterogeneity in the services provided to students, and there is a strong argument for identifying advisors within a particular department to facilitate training and ensure consistency across the intervention. Communication with staff members prior to the program's start was inconsistent and minimal, and this was largely due to the decentralized nature of the staffing process. Many staff members were not advised of the training, resulting in a need for three additional follow-up trainings in late June, when counseling should have been significantly underway. In addition, availability and interest were more often determinants of staffing than ability and knowledge, and this may have been to the detriment of students needing complex advising in some cases. To ensure the most effective intervention possible, staffing decisions should be carefully considered and made with considerations of both staff interests and student needs.

### C) Timeline

The study district chose to begin the counseling intervention in late June and completed the program in the last week of July. This was a somewhat shorter timeframe than the summer advising programs developed in other areas (Castleman et al., 2012; Castleman & Page, 2012). The timeline was largely determined by the time constraints of advisors, as many were under contract through June and beginning in August and therefore had commitments that prevented them from providing advising during these times. Depending on the number of college intending students at a campus and the number of advisors, caseloads ranged from 68 hours to 184 hours. Advisors were

required to be on campus at least 60 percent of their time, but were also allowed to contact students from home in order to allow them to respond to students more quickly and to contact students at varying times to ensure that students were aware times the advisors would be on campus.

There are a variety of reasons why it may have beneficial to start the program earlier and/or carry the program into late August or beyond. Graduates may have been more likely to return to campuses for advising if it began immediately after graduation when students were more in the habit of visiting the school each day. It may even have been ideal to start the advising prior to graduation so that students were more familiar with advisors and tied into the program before graduating and potentially being distracted by other priorities. In addition, many of the important steps to enrollment such as campus orientations happen earlier in the summer so the contacts from advisors may have been too late to remind/encourage students to attend. Financial aid forms in particular must be submitted early to ensure students qualify for all possible aid, so advising after graduation is likely too late to address issues with form completion.

Similarly, there may be a need for college advising late in the summer, especially as students start to receive their financial aid packages and near deadlines for critical tuition payments. Because financial aid awards and tuition costs are often complicated and non-transparent, students and their families may be caught by surprise in early August and may need to make some quick decisions about whether or not it is feasible to follow through with college plans. In the Boston intervention, financial aid advisors found that there was a significant uptick in advising requests in early August (Castleman & Page, 2012). In addition, if advising was available to students after the college classes began, there are a variety of additional unforeseen transition issues that advisors may be able to assist with. That said, if resources are limited (particularly if the intervention is provided solely by the district and funded at relatively low levels), intervention stakeholders must decide which period is most essential for ensuring successful follow-through with college enrollment plans. This may provide an additional justification for partnerships with non-district providers to spread the workload across stakeholders in a sensible way.

#### D) Data and Support Materials

There were a number of materials and some critical data elements that played an instrumental role in helping to support the Summer Link program. Advisors received a “case file” for each of their students including contact information, college plans, data on FAFSA completion, SAT/ACT and exit exam scores, and anticipated barriers to enrollment. The use of a Senior Exit Survey in the study district was critical in providing most of this information. By preventing advisors from spending valuable time tracking down student information, these case files freed advisors to maximize the time they spent interacting with students. In addition, a number of support materials including checklists with important college enrollment steps and deadlines, informational sheets on the importance of college, and how-to guides for contacting students helped to ensure that advisors were well-prepared to address a variety of student issues in a relatively short time. By emailing these support materials directly to graduates, many of the targeted students may have received indirect assistance that was not tracked by counselor logs that focused primarily on advising efforts that resulted in more significant interactions.

According to feedback provided by advisors, the most important data element in facilitating successful summer counseling efforts was current student contact information. District records on student phone numbers and addresses are often incomplete or incorrect, and there is no information gathered at the district level on electronic contact information. In an effort to collect current contact information, cards were distributed to all campuses with space for students to list current phone numbers and email addresses. Principals were advised to distribute the cards to students at graduation rehearsal to ensure that most or all of students provided information, and this data was entered into student files to be included in the case file documents. However, due to the decentralized nature of implementation and communication through a variety of channels, some high schools were not successful in collecting student contact information. The five campuses that did not collect current student contact information were restricted to contacting students through data on file with the district, and advisors at these campuses all acknowledged significant difficulties getting in touch with students. In future years of

implementation, the district has determined it to be critical to ensure that contact information is collected from all students in the district.

#### E) Communications and Marketing

Previous sections suggest that there may have been some gaps in communication between the intervention coordinator, campus principals, and Summer Link advisors. Barriers to effective communication include the short time frame within which the program was developed and implemented and the decentralized nature of the program's intervention. While decentralized implementation allows principals to tailor the intervention to the specific needs of their campus and gives them the freedom to ensure the best possible advisors be put into place, it adds additional risk that key information will not be communicated and increases the likelihood that implementation will be uneven across the district, resulting in some students that may be underserved. If implementation is going to be decentralized, it is critical that a structured communication plan and network be put into place to streamline the delivery of critical knowledge and allow for some oversight. Strong attention to communication becomes even more important when multiple stakeholders partner together to deliver the intervention.

In addition to communication among coordinators and providers, the plan for communicating to students about the intervention is also extremely important. Publicizing the program ensures that students know what services are available to them and increases the likelihood that they will access them in times of need. Graduates may be hesitant to respond to contact efforts from advisors if they are unclear about why they are being contacted, and providing students with an understanding of the summer intervention prior to advisor outreach decreases the likelihood that advisors will spend limited advising time trying to get in touch with and explain the program to district graduates. In addition, by carefully constructing the marketing of the program to eliminate the stigma associated with having college enrollment issues and deliver the message that advisors are there to advocate for students rather than judging them for not following through with plans, students may feel more comfortable accessing the program's services.

The efforts to contact students by phone and email were discussed in the previous section, though these were not the only techniques for reaching out to students. Unique Facebook pages were developed for each high school campus, and at some campuses these pages played a significant role in facilitating student outreach and providing graduates with information on advisor office hours and key deadlines for college enrollment requirements like placement testing, orientation, and financial aid. By creating communities where graduates can receive information both from advisors and from other college-intending students, Facebook pages can serve as valuable platforms for summer counseling interventions. Many students are less likely to check email or phone messages than Facebook messages, so the pages have strong potential for communicating with hard-to-reach students. In addition, some advisors used mail to contact students that could not be reached by phone, email, or Facebook. Had all schools collected current student contact information, mail contact would likely not have been necessary. However, it is unclear whether mail contact was a successful means of communication for the Summer Link program.

This study contributed to the literature on summer bridge interventions by demonstrating summer counseling interventions can help to reduce summer melt even when they are scaled up to the district level on a relatively short timeline under minimal budget. In addition, the study's ability to look at subgroups of students with differing types and strength of college intentions answered the question of which students are most effectively targeted with these interventions. However, further research is necessary to determine how interventions addressing the transition from high school to college can be most effectively implemented. In particular, the following six questions warrant rigorous research to identify best practices: (1) Which stakeholders can most effectively at providing summer bridge programs? (2) Is it more important to have familiar advisors or better trained and more knowledgeable advisors, or can there be an effective combination of both types of providers? (3) Can two-year college intendees benefit from more intensive summer counseling interventions? (4) Should different types of advising be targeted to different types of students? (5) What type of help do students need? (6) What are the most effective methods for reaching out to and communicating with students.

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