

# GROW DETROIT'S YOUNG TALENT

## KEY FINDINGS:

**AUTHORS:**

Brian Jacob

Kelly Lovett

Max Gross

1. Roughly 15 percent of eligible Detroit youth apply to participate in Grow Detroit's Young Talent, the city's summer youth employment program.
2. Applicants come from slightly more advantaged neighborhoods and schools, and Black and female youth are more likely to apply than others.
3. Two years after participation, GDYT youth are more likely to remain enrolled in school, less likely to be chronically absent, more likely to take the SAT, and more likely to graduate high school.
4. The benefits of participation are largest for youth who enter high school with the weakest academic skills.

# INTRODUCTION

Even as the U.S. economy has climbed out of the Great Recession, the labor force participation of low-skill workers has lagged. In many high-poverty urban areas, more than half of low-educated men have exited the labor market.<sup>1</sup> In Detroit, 22 percent of youth ages 16 to 24 are not in school and not working or actively looking for work.<sup>2</sup> These youth are disconnected at a crucial time for establishing career pathways and transitioning from education to work.

Grow Detroit's Young Talent (GDYT), a summer employment program for young adults, seeks to introduce youth to the world of work, build skills, and provide career opportunities to disrupt this pattern. The program was created by the Detroit Youth Employment Consortium (DYEC), a private-public partnership dedicated to advancing Detroit youth's

educational and career development through increased quality and access to employment opportunities. Through summer employment, GDYT seeks to provide work readiness and other "soft-skills" that employers seek, as well as create pathways to professional networks, adult mentors, and future opportunities.

In early 2017, the Youth Policy Lab at the University of Michigan established a partnership with the agencies in Detroit that manage the City's summer youth employment program — Connect Detroit and the Detroit Employment Solutions Corporation (DESC). Our goal is to provide these agencies with technical assistance, helping them leverage existing administrative data to better understand the impacts of the program. This brief presents our initial findings.

“ In Detroit, 22 percent of youth ages 16 to 24 are not in school and not working ”



# GDYT PROGRAM STRUCTURE

GDYT employs 14- to 24-year-olds for 20 hours per week for six weeks from July through August, at hourly wages of \$8 to \$9.50 depending on age and job type. The program has grown steadily in the past three years, from approximately 5,000 participants in 2015 to 8,000 youth in 2017.

Youth selected for employment receive 24 hours of work readiness training before and during their summer employment, and employers receive training, a liaison, and a tool kit developed by the program. Surveys and interviews are used to match youth with their potential employers and free public bus access is offered for commuting to and from jobs.

In 2017, over 15,000 youth applied to GDYT. Of those, just over 5,200 worked in GDYT-subsidized positions and another 1,923 worked in positions fully funded by affiliated companies. Youth who worked in GDYT-subsidized positions were placed into one of three developmental tiers.

## TIER 1

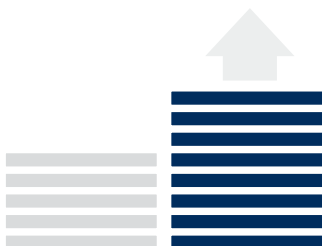
**Tier 1 (Career Exploration)** comprises the youngest youth, who typically have no previous work experience. About 60 percent of Tier 1 youth are placed with community-based organizations (CBOs), while the remaining 40 percent work in the Junior Police Cadet and Fire Cadet programs. In both contexts, youth work experiences involve service, team projects, job shadowing, and/or community beautification projects.

## TIER 2

**Tier 2 (Ready for Work)** roles are generally for youth with some previous experience, who are placed with a host employer or in a vocational training experience. One component of Tier 2 work programs is Industry-Led Training (ILT), an apprenticeship-like program for youth 16 or older who express interest in certain high-growth potential career sectors, including hospitality/ food service, customer service, child care, IT, construction, advanced manufacturing, and healthcare. Most ILT youth work towards completing an industry-recognized credential.

## TIER 3

**Tier 3** positions, known as Career Pathways Internships, are a competitive employer placement. These youth participate in a career fair and typically interview with one or more prospective employers before being placed. At least ninety different companies and organizations hire youth for Career Pathways internships each year, including Detroit Manufacturing Systems, Detroit Public Schools Community District, Touchpoint Support Services, and Wayne State University.



“ GDYT has grown steadily, from approximately 5,000 participants in 2015 to 8,000 youth in 2017 ”

## How do we track participation and outcomes for GDYT youth?

GDYT staff provide data to the Youth Policy Lab, which includes application information for all youth who applied through the online portal, and payroll data for all youth who worked in positions for which payroll was managed by GDYT staff. The Youth Policy Lab received these records for three cohorts of youth: summer 2015, summer 2016, and summer 2017. During the 2017 application window, from February to March, 15,137 youth applied to participate in summer youth employment. These applications represent about 15 percent of the estimated 98,000 youth aged 14-24 in the city.<sup>3</sup>

The Youth Policy Lab matched application records to administrative data from the Michigan Department of Education and the Center for Educational Performance and Information. Our matching process connected 94 percent of applicants to public education records.<sup>4</sup> Public education records include information on school enrollment, test scores, residency, graduation or completion, and attendance.

## Who applies to GDYT?

We compare applicants to two other groups of youth. First, we compare applicants to the set of all Detroit

youth attending a Michigan public school (charter or traditional, in Detroit or a nearby district). This allows us to better understand which type of youth are more likely to apply to the program. Second, we compare applicants to a more tailored set of youth — namely, individuals attending the same high school who are also the same grade level and share the same race/ethnicity and gender. This comparison group allows us to see how applicants differ from non-applicants who “look similar” to applicants.

There are a few notable differences between applicants and comparison youth from the same high school. Applicants are significantly more likely to be female than comparison youth; 59 percent of applicants were female, compared to only 52 percent of comparison group youth (see Figure 1 and Table 1). Applicants are slightly more likely to be Black or African-American than other youth in their high school and Detroit youth as a whole; 90 percent of applicants are Black or African-American, relative to 85 percent of the broader Detroit youth population.

Applicants live in neighborhoods where the poverty rate averages 32 percent, which is slightly lower than the 35 percent neighborhood poverty rate for all Detroit youth, though similar to the rate for comparison group youth. Applicants themselves are more likely to be low income than comparison youth. However, applicants have nearly identical poverty rates to Detroit youth as a whole.

Figure 1: 2017 GDYT Participants are largely clustered within neighborhoods

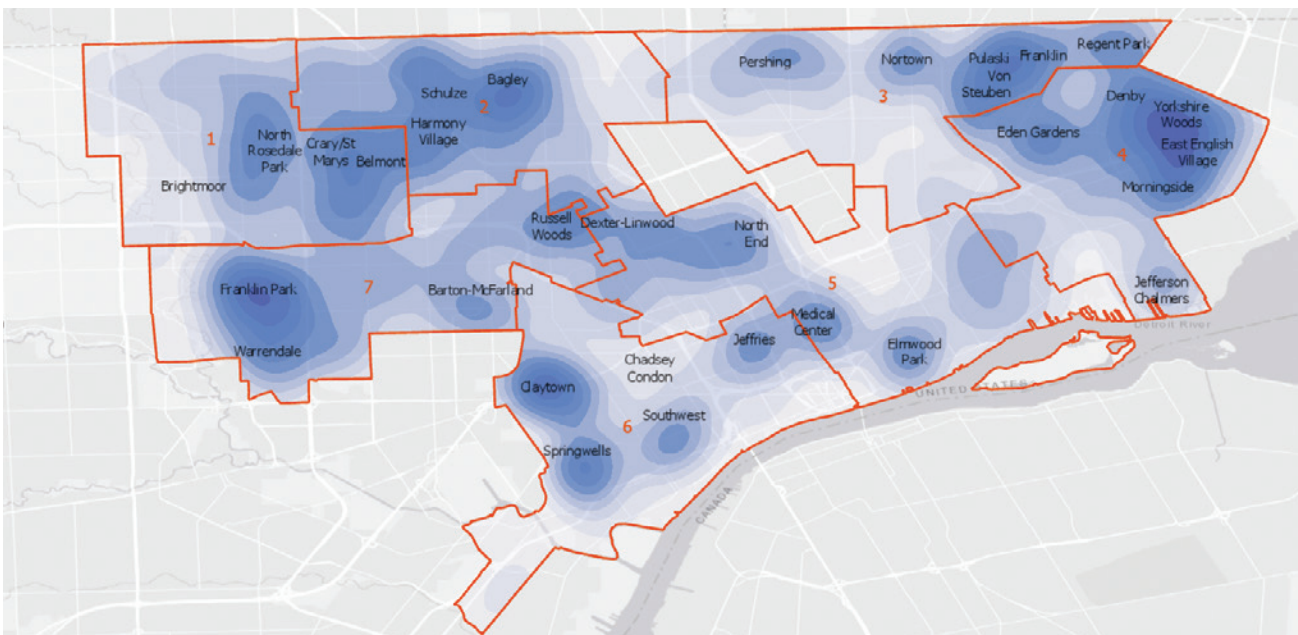


Table 1: Pre-participation characteristics of the 2017 cohort

	Detroit HS Youth	Comparison Group Youth	Non-selected applicants	Participants
Neighborhood poverty rate	34.9%	31.3%	32.3%	32.2%
Black or African-American	85.0%	88.1%	89.7%	89.9%
Female	50.4%	52.3%	58.9%	55.9%*
Low income	81.9%	77.6%	81.7%	80.5%
Math proficiency	9.1%	10.5%	10.4%	10.4%
Reading proficiency	34.1%	36.0%	36.1%	36.7%
Chronic absenteeism	40.8%	44.3%	42.0%	37.5%*

\* Indicates statistically significant difference between participants and non-selected applicants.

Applicants have similar educational characteristics to both comparison youth and Detroit youth as a whole in the school year prior to participation. Applicants do not have significantly different proficiency rates on either math or reading 8th grade tests. They have slightly lower chronic absenteeism rates than comparison group youth, but are chronically absent at rates very similar to the Detroit average.<sup>5</sup>

“Participants in GDYT are significantly less likely to be chronically absent before they participate than non-selected applicants”

### How are participants in GDYT different from applicants?

Of the 15,000 youth who applied in 2017, 5,260 were hired in positions paid through GDYT. The participants were mostly younger; 39 percent were 14-15, 37 percent were 16-18, and 15 percent were 19-24. Though females are more likely to apply to the program, males are more likely to be matched to jobs; as a result, 56 percent of the 2017 cohort was female despite representing 59 percent of applicants (see Table 1). These patterns are consistent across all three cohorts.

Participants are drawn from across the city of Detroit, but appear to cluster in certain neighborhoods (see Figure 1). While many of the community-based organizations are located in neighborhoods near where participants live, nearly all Industry-Led Training and Career Pathways worksites are located either in the downtown area or the surrounding suburbs. This presents a transportation challenge to some youth; participants are provided with bus passes, but the public transportation system in the city is not very robust.

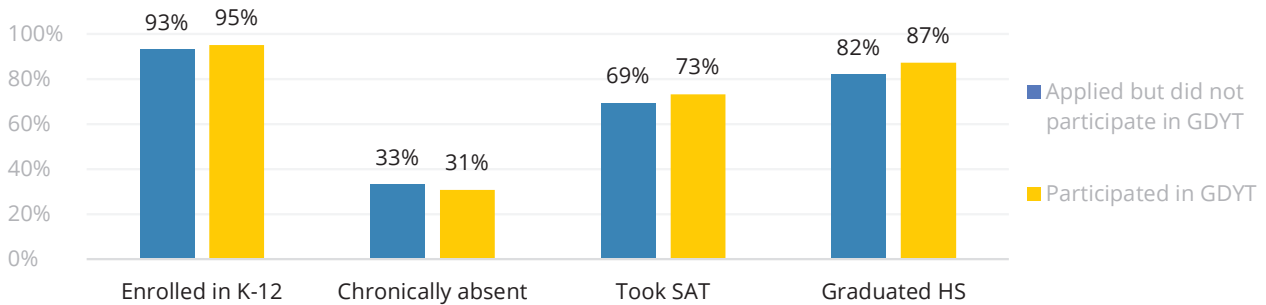
Participants are also significantly less likely to be chronically absent in the school year before they

participate than non-selected applicants. While 42 percent of non-selected applicants are chronically absent, only 37.5 percent of those who are selected to work are chronically absent.

### Challenges to understanding the impact of summer youth employment

Assessing the true impact of GDYT is difficult due to the nature of summer youth employment programs. First, youth choose whether or not to apply to the program. If we assume that youth who are interested and motivated to apply for a job are different than youth who do not apply, it would be unfair to compare the outcomes for applicants to non-applicants. For example, we might expect motivated applicants to already work harder and achieve at higher levels in school. Second, employers and community-based organizations can select specific youth among the applicant pool to participate. If employers are selecting the ablest applicants (whether it be in terms of academic aptitude, work ethic, or another factor), then we would expect participants to outperform non-selected applicants regardless of GDYT. On the other hand, if employers such as CBOs select youth who they believe “need it most” because of difficulties they face at school or home, then we might expect just the opposite.<sup>6</sup>

Figure 2: Participants in the 2015 cohort have better post-participation outcomes than non-selected applicants



Therefore, in order to assess the impact of program participation, we must try to account for both confounding factors: self-selection on the part of youth and employer-selection. To account for youth self-selection, we focus our analysis on the set of youth who applied for GDYT. This allows us to account, or control, for the hard-to-observe factors that lead young people to apply to GDYT. To account for differences between successful and unsuccessful applicants, primarily arising from employer selection, we estimate statistical models that control for student demographics, prior academic achievement, and neighborhood characteristics. As a further point of comparison, we also examine the educational outcomes of Detroit youth who did not apply to GDYT over this period. Appendix B provides technical details on our analysis.

Our outcome analysis is limited to the 2015 and 2016 cohorts because post-participation data is not yet available for youth who participated in summer 2017.

### How does participation in GDYT influence academic outcomes?

Though summer employment is typically expected to support youth development in work readiness and career aspirations, there is reason to believe it may improve educational outcomes as well. For example, if a youth develops a stronger sense of career pathways that require higher education, he or she may be more motivated and focused in school. In fact, we find some statistically significant differences in the outcomes for participants and non-selected applicants.

In the two academic years following employment for the 2015 cohort, 95 percent of participants remained enrolled in a public high school in Michigan, compared to 93 percent of applicants who were not selected to work (see Figure 2 and Table 2). In addition, participants have slightly lower chronic absenteeism rates than non-selected applicants; 31 percent of participants were chronically absent, 2 percentage points lower than the non-selected applicant group.

Table 2: Participants in the 2015 cohort have better post-participation outcomes than non-selected applicants

	Sample	Comparison group youth	Non-selected applicants	Participants	Difference
Enrolled in K-12	Students in 11th grade or earlier in app year	90.4%	93.1%	95.0%	1.9*
Chronically absent	Students enrolled in post-years 1 and/or 2	33.1%	33.0%	30.7%	-2.3*
Took SAT	9th and 10th grade applicants	64.3%	69.2%	73.3%	4.1*
Graduated HS	10th and 11th grade applicants	78.4%	82.0%	87.3%	5.3*

\* Indicates statistically significant difference between non-selected applicants and participants. No significant effect on SAT score; modest effect on college enrollment

Higher enrollment and attendance rates for participants likely contribute to a higher rate of SAT test-taking. All Michigan students are expected to take the SAT their junior year, although a significant proportion never take the test because they miss school or are no longer enrolled. Of youth in the 2015 cohort who were entering their 10<sup>th</sup> or 11<sup>th</sup> grade year, 73 percent took the SAT within the next two years. Only 69 percent of non-selected applicants in the same age range took the test.

Most importantly, participants are over 5 percentage points more likely to graduate high school within two years of participation than non-selected applicants. Only 82 percent of non-selected applicants graduated high school, whereas 87 percent of youth who worked in GDYT graduated within two years. These patterns emerged in our analysis of the 2016 cohort as well.

We also explore outcomes for youth separately by key demographic characteristics, including gender, grade level, and prior achievement. Perhaps surprisingly, there were few significant differences in post-participation outcomes for males and females (see Figure 3). The exception was the impact of participation in GDYT on chronic absenteeism. For males, chronic absenteeism rates did not change in the two school years after participation; for females, chronic absenteeism decreased by over 4 percentage points.

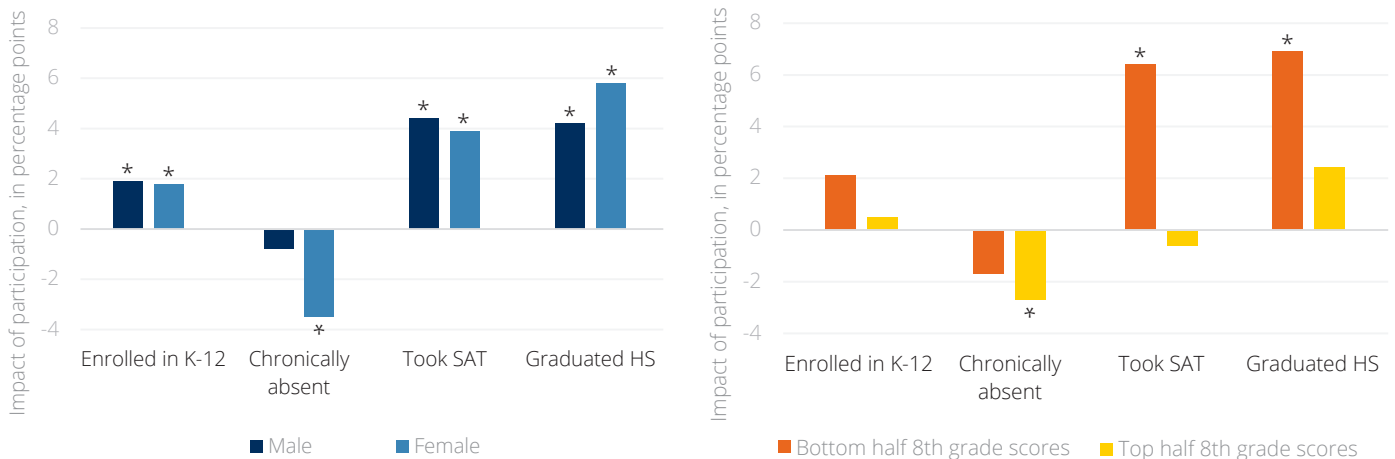
Specifically, about 32 percent of males were chronically absent in the two years after participation, regardless of participation in the program. Among females, 34 percent of non-selected applicants were chronically absent, compared to about 30 percent of workers.

There were significant differences between post-participation impacts for low- and high-achieving youth (see Figure 3). The benefits of participation were concentrated among youth who scored in the bottom half of 8<sup>th</sup> grade math test scores.

Of non-selected applicants who scored in the bottom half on the 8<sup>th</sup> grade math test, 91 percent remained enrolled in the two years after they applied. Participants with similar math scores were 2 percentage points more likely to be enrolled, at 93 percent overall. In addition, 71 percent of participants took the SAT compared to only 64 percent of non-selected applicants.

“Only 82 percent of non-selected applicants graduated high school within two years, compared to 87 percent of youth who worked in GDYT”

Figure 3: Impacts for the 2015 cohort are similar for males and females, but vary significantly by prior achievement level



\* Indicates statistically significant impact of participation

Remarkably, participants in the bottom half of math scores were 7 percentage points more likely to graduate high school in the two years after participation. Though this is a huge increase, the graduation rate of about 82 percent for these participants still does not compare to the rate for youth in the top half of math scores, 94 percent of whom graduate high school.

Youth in the top half of 8<sup>th</sup> grade test scores did not experience gains on any of these three metrics (enrollment, SAT taking, and graduation). However, they did experience a 2.7 percentage point decrease in chronic absenteeism, from 28.5 percent to 25.8 percent.

### Are youth returning to GDYT every summer?

The tiered system of GDYT job placements is designed to support youth through developmental stages of work readiness. A youth is expected to benefit most from summer youth employment if he or she can participate for multiple years, building job skills and a career pathway towards an independent work experience.

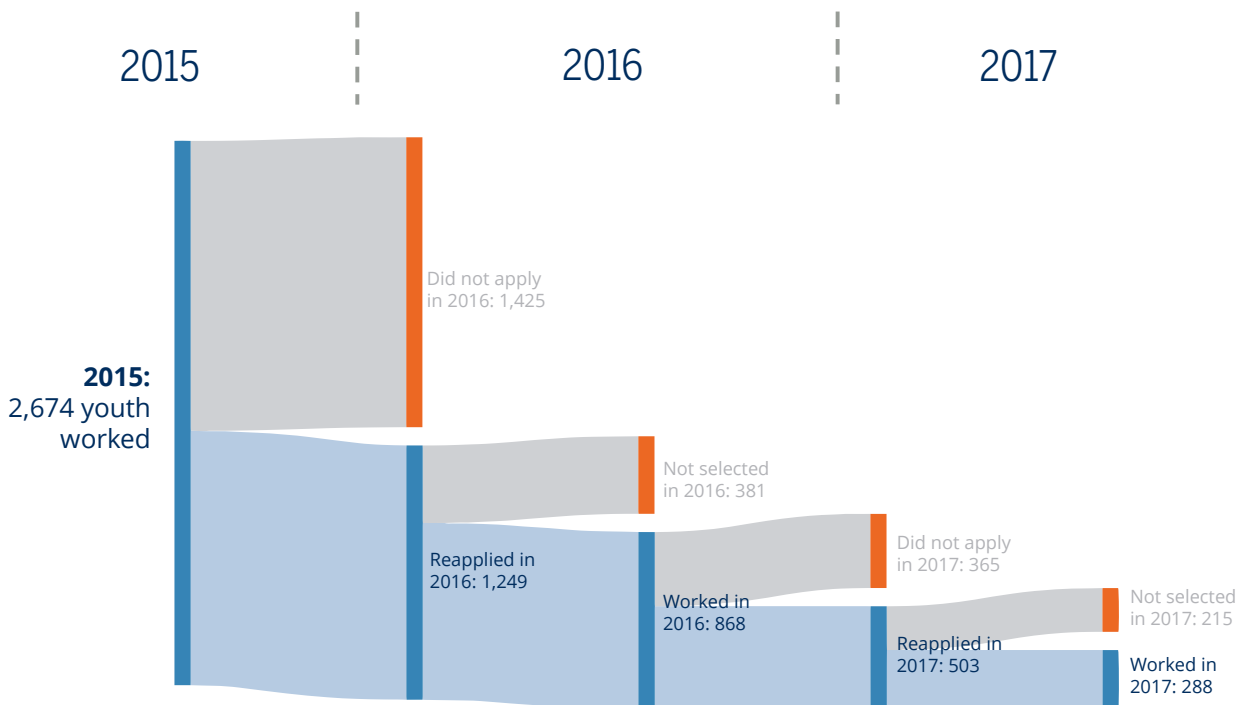
“ Participants in the bottom half of math scores were 7 percentage points more likely to graduate high school in the two years after participation ”

However, we find that only a small proportion of youth are engaged across all three summers. Of the 2,674 youth who worked in 2015, slightly fewer than half applied again to work in 2016 (see Figure 4). Of those, 868 were hired again in 2016, or about 33 percent of youth who worked in 2015. Only 288 of the workers who started in the summer of 2015 worked all three years.

GDYT expanded substantially in 2016, from about 2,600 workers to approximately 5,400 workers. Yet only 52 percent of 2016 workers applied again in 2017. Only 1,265 youth worked again in 2017, or 23 percent of youth who worked in 2016.<sup>7</sup>

With our existing data, it is not possible to fully understand the reasons for this drop off. Each year, about half of the youth who work do not reapply the

Figure 4: Reapplication patterns for the cohort of youth who worked in 2015





following year. Some of these youth may be finding full-time or more permanent employment, or may be attending summer school. Others, however, may be choosing not to reapply for other reasons. For the youth who do reapply, only about two-thirds are rehired for the following summer.

Therefore, it is not clear that GDYT is currently serving as a pipeline to progress youth through each tier and onto full-time employment. In fact, of the 11,057 youth who appear in payroll data in the past three summers, 82 percent only worked once.

### **How do the impacts of GDYT compare with summer youth employment programs elsewhere?**

It is important to consider these findings in the context of what we know about summer youth employment programs in other cities. Until recently, there has been little convincing evidence on how such programs influence youth outcomes. Most research struggles to account for the self-selection and employer-selection that make it difficult to estimate program impacts. However, new studies in Chicago, Boston, and New York City have used an experimental research design, which allows them to account for both of the selection issues and therefore more accurately analyze the impact of participation in an SYEP.<sup>8</sup>

The results of this new research are encouraging. These studies find that participation in a summer work experience significantly reduces the rate of

arrest and incarceration among high-risk youth. In Chicago, for example, participation in summer youth employment reduced violent crime arrests by 42 percent. Interestingly, this drop was driven primarily by a decrease in arrests after the end of the summer employment program. This suggests that the decline in violent crime was not a result of employment “keeping youth off the streets.” It appears that youth are gaining skills or perspectives as a result of employment that reduce the likelihood that they will engage in violent crime even after they are no longer working.

The Boston and NYC studies find positive impacts on short-run academic outcomes, such as test-taking, and Boston youth saw improvements on survey-based measures of work readiness, social skills, community engagement, and academic aspirations.

On the other hand, it is still unclear whether such programs have significant long-term impacts. For example, research on the NYC program suggests that there are no effects on educational attainment, employment, or earnings five years after program participation.

These findings are consistent with the improvement in educational outcomes that we observe in the first and second years after participation. They also suggest the need for more analyses using employment and criminal justice data to assess other potential program impacts. Finally, they demonstrate the importance of observing youth outcomes for multiple years after program participation.

# CONCLUSION

**The labor market continues to present particular challenges for young, low-income, and less educated workers, and especially for youth of color. This issue has spurred a growing interest in alternative pathways for young adults to obtain career skills and employment, and summer youth employment programs in particular have received growing attention.**

In Detroit, the Grow Detroit's Young Talent program has provided over 15,000 work opportunities to youth in the last three years alone. Preliminary analysis suggests that youth who participate experience better education outcomes in the first two years post-participation than their peers.

The Youth Policy Lab is working with GDYT staff and city officials to continue to evaluate the program and explore

unanswered questions. We will pursue additional data collection via administrative data or surveys, in order to explore criminal justice and workforce outcomes for participants. We will also take advantage of improved data collection by the GDYT program to examine the impact of working at jobs of different types or progressing through the job tier system.

These initial post-participation findings for the 2015 and 2016 cohorts are encouraging. They suggest that the investment that Grow Detroit's Young Talent is making in the city has at least short-term positive impacts. These impacts seem to be greatest for youth who score in the lower half of the 8<sup>th</sup> grade math score distribution, which indicates that the program could be used to target low-achieving students and drastically improve their likelihood of persisting in K-12 education and graduating high school. For these students, the payoff of participation in GDYT continues long after they receive their last paycheck.

## Endnotes

- 1 Council of Economic Advisors (2016). Investing in Higher Education: Benefits, Challenges, and the State of Student Debt. Retrieved from [https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160718\\_cea\\_student\\_debt.pdf](https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160718_cea_student_debt.pdf)
- 2 U.S. Census Bureau (2016). Selected characteristics, 2016 American Community Survey 1-year estimates. Retrieved from <http://factfinder2.census.gov/>
- 3 Author's calculations based on Michigan Department of Education administrative records for Detroit residents.
- 4 Michigan Department of Education administrative data comprises educational records for all youth at publicly-funded schools in the state. As such, private schools and schools out of state are not available in our data, while charter schools and traditional public schools are.
- 5 For the purposes of this brief, chronic absenteeism is defined as missing 10 percent or more of school days. In Detroit this would mean missing 18 days, or over three weeks of school.
- 6 There is another dimension of selection which we don't discuss in detail here: whether youth who are offered a job accept the position and show up for work on the first day. In 2017, approximately 131 youth were assigned a job but never ended up working—about 2.5 percent of youth who initially were invited to participate. These youth may drop off because they find another job, they have to attend summer school (which overlaps significantly with the GDYT schedule), or they decide they'd rather not work for another reason.
- 7 This drop-off is not driven by youth aging out of the youth employment program. The majority of participants are younger than 18, and removing older youth from the sample does not affect the overall trend.
- 8 This includes the following work: Heller, S.B. (2014). Summer jobs reduce violence among disadvantaged youth. *Science*, 346(6214)1219-1223. Retrieved on June 18 from [www.sciencemag.org](http://www.sciencemag.org); Modestino, A.S. (2017). How Do Summer Youth Employment Programs Improve Criminal Justice Outcomes, and for Whom? Federal Reserve Bank of Boston Community Development Discussion Paper, No. 2017-01, June 2017; Schwartz, A.E., Leos-Urbel, J., & Wiswall, M. (2015). Making Summer Matter: The Impact of Youth Employment on Academic Performance. National Bureau of Economic Research. Retrieved on June 18 from <http://www.nber.org/papers/w20810>; and Valentine, E.J., Anderson, C., Hossain, F., & Unterman, R. (2017). An Introduction to the World of Work: A Study of the Implementation and Impacts of New York City's Summer Youth Employment Program. Prepared for U.S. Department of Labor Chief Evaluation Office, MDRC, April 2017.

**The Youth Policy Lab would like to thank our partners at Connect Detroit and Detroit Employment Solutions Corporation for their support of this work.**

### About the Authors

**Brian Jacob** is the Walter H. Annenberg Professor of Education Policy and Professor of Economics at the University of Michigan. His current research focuses on urban school reform, youth workforce development and program evaluation.

**Kelly Lovett** is a project manager with the Youth Policy Lab. Her work unites data, partnerships, and issues in youth education and workforce policy.

**Max Gross** is a doctoral candidate in economics at the University of Michigan. His current research focuses on the intersection of human services and education as well as barriers faced by community college students.

---

University of Michigan Youth Policy Lab  
5201 Institute for Social Research  
426 Thompson  
Ann Arbor, MI 48104  
(734) 615-3802  
🐦 @YouthPolicyLab  
[youthpolicylab.umich.edu](http://youthpolicylab.umich.edu)

© 2018 by the Regents of the  
University of Michigan

### Youth Policy Lab Mission

The Youth Policy Lab at the University of Michigan conducts applied research in the areas of education, health care, juvenile justice and workforce development to improve opportunities for young people in Michigan and beyond. We partner with state and local agencies, nonprofits and policymakers to develop and evaluate interventions for youth ages 0-25. Leveraging the collective expertise of faculty across the UM, we help organizations use individual-level client data to ascertain needs, identify promising strategies, refine service-delivery models and conduct rigorous outcome evaluations.

# TECHNICAL APPENDIX

## Appendix A - Data

We draw on several data sources for the analysis. This appendix describes these data sources, how we linked data across sources, and how we constructed the measures used in our analysis.

### A.1. Application and Participation Data

For information on application to and participation in GDYT, we rely on files provided to us by the agencies that administered the program over this time period, Connect Detroit and Detroit Employment Solutions Corporation (DESC). For all three of the 2015-2017 cohorts, applications were submitted, processed, and managed in a system called PYNDEX. We received all partial and complete application records that were submitted during the February 1 to March 31 application window each year. Including incomplete applications and duplicates, we received over 89,000 youth records (see Table A.1).

We also obtained payroll data, which took various forms during this period. In 2015 and 2016, multiple organizations maintained payroll records using different data management systems. Some of these payroll systems were unreliable and crashed repeatedly over the course of the summer. Therefore, we are missing important data about placements, positions, and hours worked. We consider any youth that appeared in any payroll data source to be a worker, but do not use additional payroll information (such as hours or worksite) from this period due to inconsistencies across record keeping systems. In 2017, all youth who were paid by GDYT were contained in a single payroll system, which includes information on job placement, hourly rate, and hours worked.

The vast majority of incomplete applications each year remain at the first stage of the application. In this stage, the applicant enters their first name, last name, and email address. The system then requires that the applicant click a link sent to the provided email

before progressing to the next stage. In 2017, 97% of incomplete applications stalled at this stage. Records that are stalled at this stage do not contain sufficient information to uniquely identify youth, and so are immediately dropped from the sample.

Complete application records include 165 fields, though 97 of those fields are missing for 80% or more of the youth with *complete* applications. The fields we rely on from the application for the purposes of our analysis include personal identifiers (first and last name, suffix, birth date, gender, race/ethnicity), home address, and referral code, which indicates whether they came into the program with a referral to a specific worksite. Other fields, including current GPA, family income, and school enrollment status, were not reliable enough across the three application years to consider in our analysis.

### A.2 Educational Data

We obtained administrative education records from the Michigan Department of Education and the Center for Educational Performance and Information.<sup>1</sup> The records include information on all youth in the public school system in Michigan, including public charters. The data include enrollment, demographics, test scores, and graduation, but do not include transcript information such as course enrollment and grade point average. In addition to K-12 records, we also have access to college enrollment information for youth at both in-state and out-of-state colleges and universities who attended Michigan public schools at some point during their K-12 education.

### A.3 Record Linkage

We began by cleaning and de-duplicating the application data described above. The cleaning process involved standardizing capitalization and removing non-alphabetic characters from names, removing suffixes from first and last name fields, recoding variables for

ease of analysis, merging application data to payroll records, and examining patterns of missing data. De-duplication was required because many youth applied multiple times; in fact, many youth believe that multiple applications will increase one's likelihood of acceptance, and some youth applied as many as 18 times. The data was de-duplicated initially based on an exact match on first name, last name, and date of birth.

We then matched the cleaned application data to records from the Michigan Department of Education provided by the Center for Educational Performance and Information (CEPI). CEPI maintains a record linking algorithm to reconcile records submitted by districts with their existing administrative records. The algorithm, which is quasi-probabilistic, comprises a series of 17 match rules which are weighted to calculate a "matching percent."

The fields used for the match are: first name, middle initial, last name, suffix, date of birth, and gender. The middle initial and suffix are not required, but all other fields must be complete in order to be submitted for a match. For youth who were missing gender, we imputed a gender of female in order to submit the record for a match. Therefore, all youth had to have a first name, last name, and date of birth at minimum to be eligible for linking to education data.

The algorithm considers many common transcription errors or record inconsistencies, including flipping or truncating hyphenated last names, referencing a table of synonymous spellings for first names, transposing first and last names, generating Soundex matches, and matching on opposite gender value.<sup>2</sup>

The matching percentage generated by the algorithm is used to classify each potential pair (between a submitted name and a record from CEPI data collections) in one of three categories: exact match, nonmatch, and requires resolution. The potential matches that require resolution are then individually reviewed by a researcher to determine if the match is accurate. During this manual review phase, additional fields are available to determine whether the match is likely. For example, youth in our sample are within a certain age range and reside in Detroit. Records that did not conform to those two norms were not considered matches if a resolution decision was otherwise uncertain.

The matching was done on three separate occasions as additional data became available across the summer of 2017. In each of three rounds of matching, approximately 85% of records were an exact match, 12% required resolution, and 3% were definite non-matches. After all three rounds of matching and manual resolution were complete, we were able to match 96% of our applicant sample to state education records. Based on some self-reported school enrollments in the application data, we suspect that fewer than 1% of applicants attended private schools in the Detroit area, meaning we were unable to match 3% of the sample for other reasons.

An additional round of deduplication was performed after the record linking process was complete. Because the linking algorithm was quasi-probabilistic, we were able to eliminate additional duplicate records that hadn't previously been identified as duplicates due to slight differences in spelling or typing errors across records.

## A.4 Variable Construction & Sample Definition

Most variables used in the analysis have relatively standard definitions. However, a few merit additional explanation, which can be found in the table below.

<b>Neighborhood Poverty Rate</b>	The fraction of families in a census block group which live below the poverty level.
<b>Low-income</b>	A binary indicator of whether a student is eligible for free or reduced price lunch.
<b>Math/Reading Proficiency</b>	A binary indicator of whether a student scored above the proficiency threshold determined by the State of Michigan on their 8 <sup>th</sup> grade standardized math/reading test. If the test was taken before 2012, the proficiency threshold is adjusted to be consistent with the more strict proficiency standards which were implemented in 2012.
<b>Chronic Absenteeism</b>	A binary indicator of whether a student had an attendance rate less than 90%.

Youth are defined as applicants for the summer youth employment program if they completed all seven stages of the application or if they started, but did not complete, the application yet still had a summer job through the youth employment program. In total, there were 31,628 unique applicants across the three cohorts and 12,157 unique workers (See Table A.2 for sample characteristics).

Across the three years, 0.09% of youth who applied for the program were missing data on their gender and 0.02% were missing data on their race. In order to construct match groups for these youth, we impute gender to be female and race to be black, because 94% of youth applicants are black and 57% of applicants are female.

## Appendix B — Analysis Methodology

### The goals of our analysis are twofold:

- 1) To assess how GDYT applicants compare to potential applicants — that is, other Detroit youth who were eligible for the program — in terms of baseline (i.e., pre-participation) characteristics
- 2) To assess how participation in GDYT influences short-run educational outcomes

There are three potential sources of selection bias that we attempt to account for: the self-selection of youth into the applicant pool, the employer selection among applicants, and self-selection of youth chosen by employers into actually working or not. We do not have data on job offers so we cannot distinguish between the second and third channels of selection bias, but highlight them for the purpose of conceptual clarity.

### B.1 Analysis of Baseline Characteristics

In order to explore how GDYT applicants differ from eligible non-applicants in terms of baseline characteristics, we compare applicants to a matched comparison group of youth who are similar in terms of age, race, gender, and school attended. Specifically, the match group for each applicant consists of all non-applicants of their race and gender who were in their grade and in the same school in the year prior to application. For example, the match group for an 11<sup>th</sup> grade, black, female student in School A who applied to GDYT for Summer 2015 consists of all of the other black, female 11<sup>th</sup> grade students in School A in 2014-15 who did not apply for GDYT. For applicants who were not enrolled in a K-12 school at the time of application, we create a match group based on the last school they attended. Consider, for example, a Latino male student who graduated from School B in June 2014, and was not enrolled when he applied for the Summer 2015 GDYT program. His match group would consist of Latino males who were in grade 12 in School B in the 2013-14 school year who did not apply for GDYT in Summer 2015.<sup>3</sup>

The baseline characteristics for applicants and their matched comparison groups are measured in the match year, except for the measures of math and reading proficiency, which are measured in 8<sup>th</sup> grade. We include baseline math and reading proficiency only for youth who reached 8<sup>th</sup> grade in their match year. Youth missing baseline measures are excluded from the analysis for that measure.

For youth  $i$  in match group  $j$ , we use the following fixed effects regression model to identify differences in baseline characteristics between the matched comparison youth, applicants and participants separately for each application year  $t$ :

$$y_{ijt} = \beta_0 + \beta_1 \text{Applicant}_{ijt} + \beta_2 \text{Worked}_{ijt} + \gamma_j + \epsilon_{ijt}$$

where  $y_{ijt}$  is a baseline characteristic of youth  $i$ ,  $\text{Applicant}_{ijt}$  is a binary variable equal to 1 if youth  $i$  applied for the program in application year  $t$  and  $\text{Worked}_{ijt}$  is a binary variable equal to 1 if youth  $i$  participated in the program in application year  $t$ . Importantly, a youth cannot have worked without being an applicant, so  $\text{Worked}$  can only take on a value of 1 if  $\text{Applicant}$  is also equal to 1.  $\gamma_j$  represents a match group fixed effect. When race or gender is the baseline measure, the match group is recreated without including that characteristic so that there is variation in the measure within match groups. For example, when race is the baseline measure, an applicants' match group consists of their classmates in the same school and grade and of the same gender in the match year, regardless of their race. We cluster standard errors by the school that a youth attended in their match year.

With this specification,  $\beta_0$  reports the average baseline measure within each match group for comparison youth who did not apply for the program,  $\beta_1$  represents the difference in baseline measures between applicants and comparison youth and  $\beta_2$  represents the difference between participants and applicants.



As a part of our baseline analysis, we also include average characteristics from a sample of Detroit high school-aged residents. This sample includes the universe of students who live within the Detroit school district boundaries and are enrolled in a public high school (charter or traditional, in Detroit or a nearby district) during the 2014-2015 school year, regardless of program participation. Note that this sample includes data from a single year, whereas some metrics for the applicant group, like 8<sup>th</sup> grade test scores, are observed in the year the youth was of the eligible age rather than a single academic year.

## B.2 Analysis of Post-Participation Outcomes

We analyze the effect of program participation on four different outcomes: continued enrollment in K-12, chronic absenteeism, took the SAT, and graduated high school. Each of these outcomes is defined only for a subset of youth, as described below.

Enrolled in K-12 is measured only for youth who were in grade 11 or below in a Michigan public school in 2015. For 11<sup>th</sup> graders in 2015, it is equal to 1 if they continued to be enrolled in a Michigan public school in the 2015-2016 school year and 0 otherwise. For 10<sup>th</sup> graders or below in 2015, it is equal to 1 if they were enrolled in both 2015-2016 and 2016-2017, 0 if they were not enrolled in either year and 0.5 if they were enrolled in only one of the two years.

Chronic absenteeism is similarly defined only for youth who were enrolled in 11<sup>th</sup> grade or below, yet is conditional on being enrolled in a Michigan public school for at least one year after the program. It takes on 3 possible values, 1, 0.5 and 0 depending on whether the student was absent greater than 90% of the possible days in both, one, or neither of the 2015-2016 and 2016-2017 school years respectively.

Took SAT is calculated as whether the student took the SAT within 2 years of the application year. It is

defined only for students in 9<sup>th</sup> or 10<sup>th</sup> grade in 2015, because all Michigan students take the SAT as part of the Michigan Merit Examination during their 11<sup>th</sup> grade school year. Similarly, graduated high school is measured as whether the student graduated from high school within 2 years of the application year, and is defined only for 10<sup>th</sup> and 11<sup>th</sup> graders in 2015 who had not already graduated from high school.

For youth  $i$  in match group  $j$ , we use a similar fixed effects regression model as before to identify differences in outcomes between applicants, participants, and their matched comparison youth separately for each application year  $t$ :

$$y_{ijt} = \beta_0 + \beta_1 \text{Applicant}_{ijt} + \beta_2 \text{Worked}_{ijt} + \beta_3 X_{ijt} + \gamma_j + \epsilon_{ijt}$$

where  $y_{ijt}$  is one of the four outcome measures, **Applicant** and **Worked** are binary variables for whether a youth applied and worked for the program, and  $X_{ijt}$  is a vector of youth characteristics measured in the match year or earlier included as control variables.  $\gamma_j$  again represents match group fixed effects and we again cluster standard errors by the school that a youth attended in their match year.

The variables that we include in  $X_{ijt}$  represent controls for academic services, socio-demographic characteristics and prior academic performance. Specifically, we include indicators for receipt of special education services, limited English proficient status and low income, all measured in the match year, as well as linear and quadratic terms of a youth's age in 2015, and 8<sup>th</sup> grade standardized math and reading scores. We also control for an interaction term between their standardized math and reading scores. Lastly, it includes information about a youth's census block group measured in the match year, including the percent of individuals who earned at least a Bachelor's degree, the percent of families living below the poverty level, the percent of housing units occupied by the owner, and the percent of the civilian population 16 years or older who are in the labor force.

In the case of missing data on the control variables, we use indicator variable adjustments. We create an indicator for each control variable equal to one if that control is missing and set the original variable to zero instead of missing. With this approach, youth do not drop out of the analysis if they are missing data for a control variable.

As seen in Figure 4, in addition to our main outcome analysis, we also perform an analysis of how the effects of participating in the program differ by subgroup. We compare male and female youth and youth who scored above and below the median on their 8<sup>th</sup> grade math test. For the latter subgroup analysis, the median 8<sup>th</sup> grade math score is calculated as the median score from the sample of 2015 applicants and their matched comparison groups.

**Table A.1.** Application and payroll records, by year

Year	Raw Applications	Complete applications	Deduplicated applications	Total raw payroll records	Deduplicated workers
2015	21,054	12,678	11,830	City Connect: 1,871 DESC: 1,439 Police Cadets: 572 UNI: 95	2,807
2016	25,362	12,925	12,600	City Connect: 1,500 DESC: 5,074 Police Cadets: 1,694 UNI: 87	6,873
2017	42,687	29,489	15,136	PYNDEX: 5,130 UNI: 170	5,260

**Table A.2:** Selected Characteristics of Applicants and Participants

	2015		2016		2017	
	Applicants	Participants	Applicants	Participants	Applicants	Participants
<b>Total Number</b>	12,233	2,807	14,096	6,873	15,137	5,260
<b>Matched to Education Data</b>	94%	90%	92%	87%	95%	95%
	% of Applicants	% of Participants	% of Applicants	% of Participants	% of Applicants	% of Participants
<b>Demographics</b>						
Black	95%	90%	94%	92%	94%	91%
Hispanic	3%	7%	4%	5%	4%	6%
White	2%	3%	2%	2%	2%	2%
Asian American	1%	0%	0%	0%	1%	0%
Female	58%	55%	57%	55%	56%	54%
Limited Eng. Prof.	3%	5%	3%	4%	3%	5%
Special Education	13%	15%	14%	14%	15%	16%
Poor	85%	85%	84%	83%	85%	84%
<b>Age</b>						
Under 14	3%	3%	4%	4%	3%	2%
14-18 Years	81%	74%	76%	74%	83%	81%
19-21 Years	10%	11%	10%	10%	10%	12%
22-24 Years	4%	4%	5%	5%	4%	5%
<b>Enrollment Status</b> (HS or College)						
Enrolled	85%	81%	81%	79%	78%	76%
Not enrolled	10%	9%	11%	8%	17%	19%
<b>Neighborhood Characteristics</b>						
BA Degree or Higher	14%	13%	14%	13%	14%	14%
Below Poverty Line	34%	35%	34%	35%	34%	34%
Owner Occ. Housing	43%	42%	43%	42%	43%	42%
Employed (Age 16 +)	76%	76%	77%	76%	76%	76%

Note: Some categories will not sum to 100% due to data that is missing or records not matched to education data.

## Endnotes

- 1 This research result used data collected and maintained by the Michigan Department of Education (MDE) and/or Michigan's Center for Educational Performance and Information (CEPI). Results, information and opinions solely represent the analysis, information and opinions of the author(s) and are not endorsed by — or reflect the views or positions of — grantors, MDE and CEPI or any employee thereof.
- 2 Additional details on the 17 steps in the matching algorithm are available upon request.
- 3 In most cases, an applicant's "match year" corresponds to the year in which they applied to GDYT, or the year they graduated from or dropped out of a Michigan public K-12 school. In some rare cases, though, the match year represents the year that an applicant switched from public school to private school or moved out of state. This would be the case if, for example, an applicant attended a Michigan public school until 6th grade, moved out of state for the remainder of their schooling and then moved back to Michigan following their high school graduation. As a result, 0.98% of applicants in 2015, 0.86% in 2016 and 1.17% in 2017 have match groups that consist of their classmates when they were in 6th grade or below even though they were much older when they applied. 80% of applicants had a match year equal to the year of their application, 11% had a match year within 2 years of their application year, and 9% had a match year greater than 2 years before they applied.