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Policy Research Brief

Effects of Foster Care and Juvenile Justice Involvement on Early Adult Outcomes: A Study of Cleveland's Youth

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INTRODUCTION

The transition to adulthood can be challenging for many individuals, but youth that have been involved with various public systems face additional hurdles in completing their education, finding employment and managing their everyday lives. Using linked administrative data from multiple agencies, this policy brief looks at what is happening to Cleveland's youth from 9th grade until age 21 and how involvement in the child welfare and juvenile justice systems affect their success. We find that system-involved youth are at elevated risk compared to their non-involved peers for poor high school performance and attendance, unemployment, homelessness and incarceration in local jail. This study begins to quantify the various points at which Cleveland youth are touched by public systems along their paths toward adulthood. This type of information can be used to estimate potential savings in public spending and human suffering that might be achieved through targeted prevention programs with this population.

Background

Youth in big cities face a number of challenges in transitioning to a productive adulthood. High school drop-out rates often exceed 50 percent (Swanson, 2008) and millions of youth are neither in school nor working in their early adult years (Brock, 2010; Danziger & Ratner, 2010). Youth that have been involved with the child welfare system in their teens are particularly at risk for later difficulties in completing their education and getting a foothold in the labor market (Massing & Pecora, 2004; Pecora et al., 2006). Additionally, many youth that have been in foster care have difficulties managing on their own as adults, as evidenced by their high rates of homelessness (Courtney & Dworsky, 2006; Courtney et al., 2007; Kushel, Yen, Gee, &

Courtney, 2007; Park, Metraux, & Culhane, 2005) and frequency of encounters with the criminal justice system (Brandford & English, 2003).

Youth who receive child welfare services are also at-risk for delinquency and involvement with the juvenile justice system (Herz, Ryan, & Bilchik, 2010; Maschi, Hatcher, Schwalbe, & Rosato, 2008). It is estimated that between 9 to 29 percent of youth involved with child welfare services also become involved with the juvenile justice system (Herz, 2010), sometimes referred to as 'crossover' or 'dually-involved' youth. By definition, 'crossover youth' refer to maltreated children who go on to show delinquency, whereas 'dually involved youth' refer to those who are simultaneously involved with child welfare and juvenile justice systems (Herz, 2010; Herz et al., 2010). Regardless of the order, individuals who become involved in both systems appear to have needs that are more numerous and complex, but may be less likely to receive comprehensive and coordinated care because of agency boundaries (Herz et al., 2010).

Communities are realizing that youth who have been in foster care or involved in both the juvenile justice and child welfare systems during their adolescence face significant challenges as they mature (Osgood, Foster, & Courtney, 2010). In Cleveland and Cuyahoga County, there is growing concern about how system involved youth can be helped to succeed as they move into adulthood. According to the Cuyahoga County Department of Children and Family Services (CCDCFS) data, approximately 30 percent of the youth who entered foster care in recent years were between the ages of 13 and 17. These teenage youth are more likely than younger children to experience placement instability while in care and to emancipate directly from foster care instead of returning home to their biological parents or an adoptive family. Furthermore, research suggests that youth are more likely to become involved with the juvenile justice system if they have their first contact with child welfare services later in childhood/adolescence (Jonson-Reid & Barth, 2000a, 2000b; Widom, 1991). The Center on Urban Poverty and Community Development recently participated in a three city study of children in foster care crossing over to juvenile justice (the sites were Chicago, Cleveland, and New York City). For children born in Cuyahoga County 1990-1995, we found that 30 percent of those first placed in foster care after age 9 had a juvenile court filing. Compared to Chicago (12 percent) and New York (17 percent), Cuyahoga County had higher levels of juvenile court involvement in their older foster care population. Therefore, we know that older foster children in Cuyahoga County are at particularly

high risk for multi-system involvement along with the educational and employment difficulties that plague this population.

Purpose of the Study

Locally and nationally, there are major concerns that these system-involved youth are at high risk for (1) failing to graduate from high school on time or enter post-secondary educational programs; (2) experiencing high unemployment rates; and (3) experiencing problems with mental health, homelessness and involvement with the criminal justice system. Nevertheless, local agencies and policy makers lack information on the success of youth aging out of foster care or those who are dually involved with child welfare and juvenile justice systems. In particular, it is not known how the youth in the two systems compare with students who are not system-involved on their early adult outcomes and whether the individuals with problematic outcomes are concentrated in particular neighborhoods and schools. Moreover, there is a lack of information on earlier experiences and various risk factors during the early high school years that may predict problematic outcomes for youth as they transition to adulthood. Such information is vital to raise awareness of the needs of this population and to engage schools, agencies and communities in working together to improve outcomes for these individuals. Longitudinal data and data that can be disaggregated by neighborhood is needed to shape effective cross-sector programming that engages with the youth in the communities where they live.

Although research continues to document poor post-emancipation outcomes for older youth in foster care and dually involved youth, it must be noted that there is much variability in the youths' experiences. It is therefore important for agencies and community stakeholders to be able to differentiate the at-risk youth from those who are likely to thrive. Being able to identify vulnerable youth can help providers and other decision-makers better target the appropriate prevention and supportive services. This study aims to pinpoint the level of risk and explore factors that distinguish youth who do well from those who do not. These patterns can be discovered through the analysis of data from numerous agencies that are linked at the individual level through Integrated Data Systems (IDS). Data on child welfare placement and history as well as data on juvenile justice involvement is necessary. Furthermore, information on educational attainment, employment status, and homelessness and incarceration is necessary to investigate the outcomes of the youth being targeted. Typically data exist within each individual agency, but that only allows youth to be tracked through each system separately. IDS data

provides the opportunity to build a comprehensive understanding of pathways across systems and over time. In addition, the study examines systems involvement by neighborhood and school, thus providing information for developing localized strategies that can improve outcomes for youth.

RESEARCH METHODS

This is a prospective cohort study that begins with students entering the 9th grade in the Cleveland Metropolitan School District (CMSD) and follows their progress through age 21.[1] The study addresses the following research questions:

- What is the incidence of system involvement among high school age youth in Cleveland?
- How do youth aging out of foster care and youth dually involved in the child welfare and juvenile justice systems compare to youth who are not system-involved on their probability of high school graduation, matriculation in colleges and universities, employment, and incidences of homelessness and local incarceration?
- Are there risk factors that can be identified in earlier years that are predictive of problematic outcomes for system involved youth?

Population and Sample

The study population is youth who were enrolled for the first time in 9th grade in 2006-2008 and were born after January 1, 1991.[2] The majority of students in the study resided in the City of Cleveland when they entered 9th grade in CMSD, although a few children lived in suburban municipalities at 9th grade entry. Students were retained in the study after 9th grade even if they move to suburban school districts, as long as the suburb was within Cuyahoga County. These youth were followed through the 12th grade and up until their 21st birthday using administrative records. The total sample size is 10,086.[3]

Data Sources and Measures

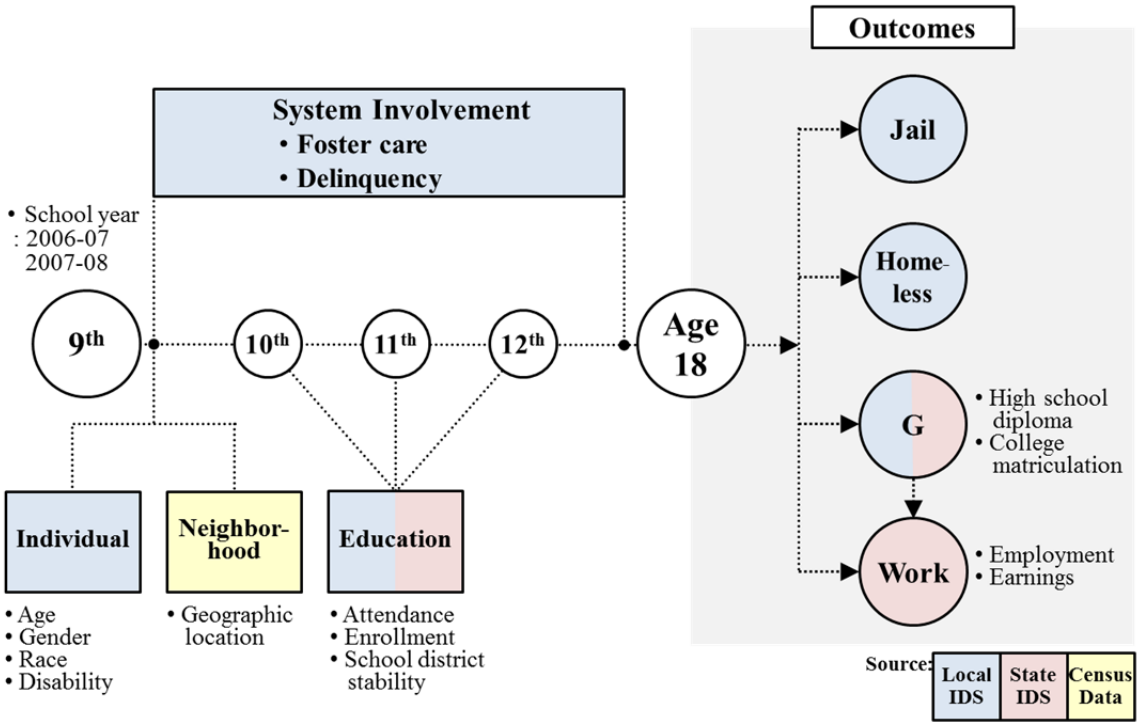
The study used administrative data sources from various agencies. Many of these had already been linked into the ChildHood Integrated Longitudinal Data (CHILD) system

[1] This tracking period can be extended to age 25 as more data become available.
[2] We were not able to get complete data on children born before 1991.
[3] 4,846 and 5,240 youth were in the school year of 2006/07 and 2007/08, respectively.

maintained by the Center (See Appendix A for details). In addition, administrative records on sample children's employment and their education records from other school districts outside CMSD were requested from the Ohio Longitudinal Data Archive (OLDA) at Ohio State University.[4]

Figure 1 below displays the longitudinal data model for the study. Demographics are captured at 9th grade. Enrollment, attendance and performance metrics are measured at grades 9-12. Involvement in the foster care and juvenile justice systems are measured continuously from the start of 9th grade until age 18. The educational outcomes are measured from 10th grade on. Employment is collected for age 18-21. Homelessness and jail days are collected from age 18-21.

Figure 1. Longitudinal data model



The data elements and their sources are listed in Table 1 below. The variables in this study are grouped into three categories: (1) demographics and school progress, (2) system involvement, and (3) early adulthood outcomes. First, demographic characteristics and school progress are obtained from school records (CMSD). Age is measured in years at 9th grade entry.

[4] As of this writing, we have not yet received employment and education records from OLDA. This policy research report will be updated when we receive these records.

Race is categorized as Hispanics, African-American, and White or others. Gender and disability are measured as dichotomous variables. With respect to school progress, chronic absenteeism at 9th grade is defined as missing 10 percent or more of school days during the time the student was enrolled in the 9th grade. CMSD stability means that the student was enrolled during three consecutive years following 9th grade.[5]

Second, information on system involvement is collected from records maintained by Cuyahoga County DCFS and juvenile court. Foster care involvement is defined as having at least one foster care spell between the first entry to 9th grade and age 18. We define juvenile justice system involvement as having at least one delinquency filing from the first entry to 9th grade to age 18.

Finally, this study uses 5 different early adulthood outcomes. Homeless services use is measured as the number of days using homeless services in Cuyahoga County between age 18 and 21. Jail involvement is defined as the number of days spent in County jail between age 18 and 21. We define high school graduation as receipt of a high school diploma at CMSD within 4 years of 9th grade entry. College matriculation is defined as enrollment in college in the U.S. within 1 year of high school graduation. Employment is measured as a dichotomous variable (between age 18 and 21) using information from wage records data maintained by the Ohio Department of Job and Family Services.[6]

[5] The student was counted as enrolled during the year if they attended at least one day.
[6] At this writing, we have not yet receive education and employment information for OLDA. The report will be updated when it comes in.

Table 1. Data providers and variables

	Data provider	Variable
Demographics and school experience	CMSD	Age, gender, race, disability
		Chronic absenteeism at 9th grade (Attendance rate<90%)
		CMSD stability (Enrolled in CMSD for 3 consecutive years following 9th grade)
System involvement (between 9th grade and age 18)	DCFS	Foster care spells
	CCJC	Juvenile Court delinquency filings*
Early adulthood outcomes (between age 18 and 21)	CMSD, OLDA	High school graduation
	CMSD	College matriculation (Clearing house data)
	OLDA	Employment/Earnings (UI wage record)
	HMIS	Homeless services use
	CCSO	Jail involvement

Note. CCJC: Cuyahoga County Juvenile Court, Ohio
CCSO: Cuyahoga County Sheriff's Office, Ohio
CMSD: Cleveland Metropolitan School District, Ohio
DCFS: Department of Children and Family Services, Cuyahoga County, Ohio
HMIS: Homeless Management Information System, Cuyahoga County, Ohio
OLDA: Ohio Longitudinal Data Archive (www.chrr.ohio-state.edu)
***=**We only selected the delinquency filings from Juvenile Court data.

Data Limitations

There are several limitations of the study data. First, the sample is drawn from 9th grade students in Cleveland Metropolitan Schools but some Cleveland children will be missing from the sample because they attended private or charter schools or were home schooled. Nevertheless, we estimate that CMSD accounts for most Cleveland students of interest. According to American Community Survey (ACS) 2007, 83.3 percent of high school students (9-12th grade) in Cleveland enroll in public school. A second limitation has to do with our ability to track students through high school, college and transition to adulthood. If students leave the State of Ohio we will not be able to track their high school progress or college enrollment and employment through administrative records. Also, for juvenile justice, foster care, homelessness and incarceration data, we will only know these events for children who were involved with Cuyahoga County

systems. Third, administrative records are limited as data sources because they do not provide information on the quality of individuals' experiences and only represent those events that are recorded by agencies. For example, HMIS records capture the use of homelessness services but we have no information on other types of homelessness such as doubling up, couch surfing, and sleeping outdoors. County jail records do not cover other types of criminal justice system involvement such as probation or state prison. Finally, we only had complete data on the sample up until age 21, but the transition to adulthood extends further into the 20s. Additional data can be collected on this sample in subsequent years to gain a fuller picture of their experiences.

Analysis

The main focus of the analysis is how system involved youth compare with their peers on their high school attendance and performance and adult outcomes. We classify youth into four groups: (1) no system involvement, (2) foster care only, (3) juvenile justice system only, and (4) dual system involvement. We tabulate the outcomes of interest for each group and provide descriptive statistics along with the statistical tests of group differences. For two of the outcomes, homelessness and jail, we are also interested in understanding the variation in the number of days youth spend in these programs. Poisson models are estimated for these outcomes, which is appropriate for a count variable such as days.

FINDINGS

System Involvement Patterns

The system involvement levels in the study sample are displayed in Table 2. The table shows the number and percent of the youth who had system involvement between entering 9th grade and reaching age 18. More than three quarters of the students experience no system involvement, 1.7 percent are in foster care only, 1.7 percent are dually involved and 20.8 percent are only involved with the juvenile justice system.

Table 2. Foster care and juvenile justice involvement of CMSD 9th grade cohorts between 9th grade and age 18

System involvement	n	%
Foster care only	175	1.7
Dually involved	174	1.7
Juvenile justice (delinquency) only	2,096	20.8
No system involvement	7,641	75.8
Total	10,086	100.0

The neighborhood locations of system involved youth are examined according to their home addresses in the 9th grade. The map in Figure 2 shows the clustering on the east and west sides of the City (See Appendix B-1, B-2 for a complete counts by neighborhood and school).

Figure 2. Density of system involvement (foster care and/or delinquency, n=2,445) between 9th grade and age 18: Residential locations at 9th grade

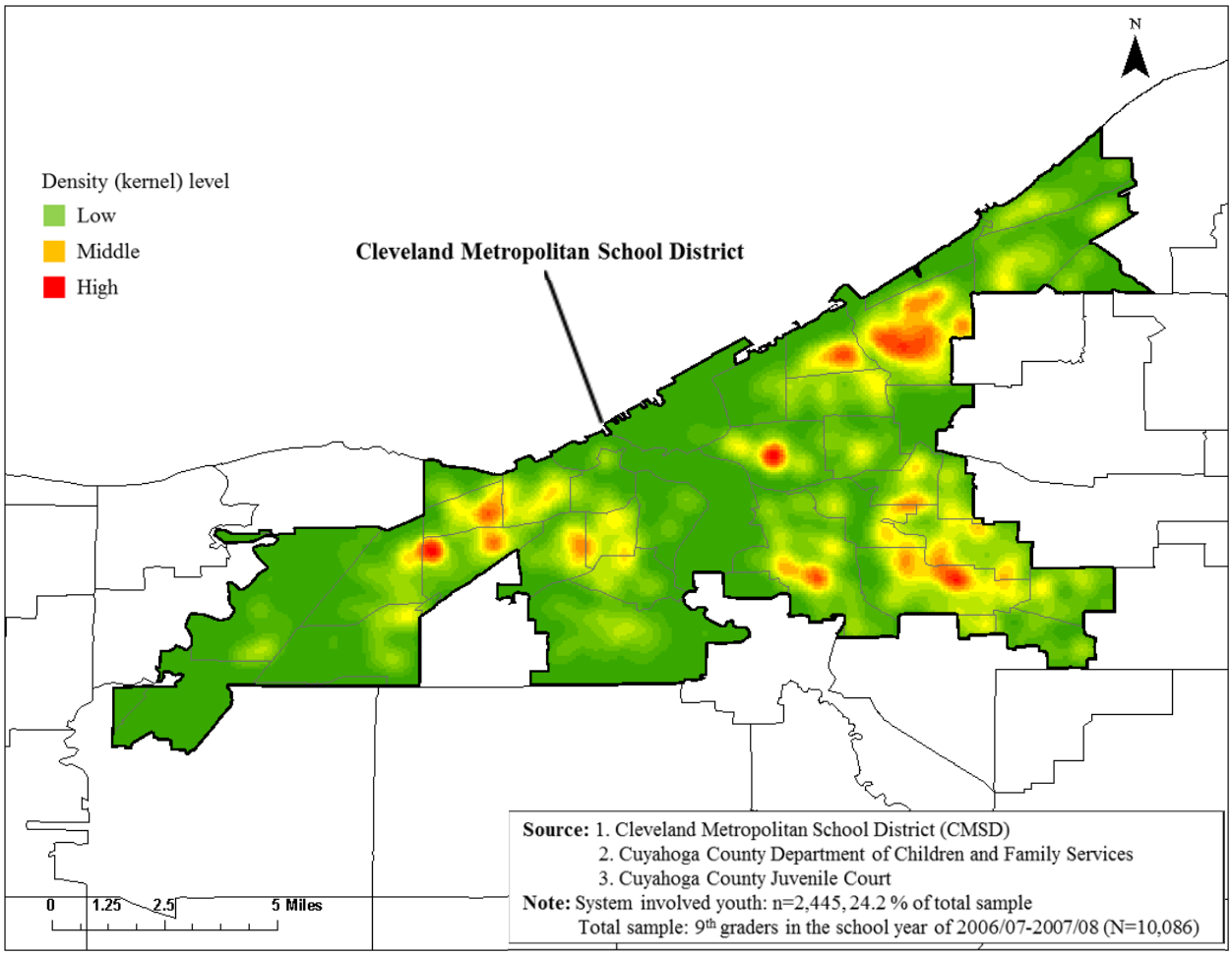


Table 3 compares youth who had no system involvement with those who had system involvement on demographic characteristics and their attendance in CMSD. System involved youth were somewhat older on average than non-system involved youth when they entered 9th grade. Males were more prevalent in the juvenile justice only and in the dually involved groups, while females were more likely to be in foster care only. African Americans were over-represented in both systems, while Hispanic youth entered these systems at lower rates than would be expected given their proportion in the student body. System involved youth were more likely than other students to be classified as having disabilities.

Table 3. Demographics and educational progress by system involvement (N=10,086)

	No system involvement		FC only		DL only		Dual		Bivariate statistics	
Variable	n	%	n	%	n	%	n	%	χ^2 / $F(df)$	p
Demographics										
Age at 9th grade [+ a]	14.72	0.56	14.95	0.61	14.80	0.56	14.69	0.51	19.7 (3)	***
Gender [a] (Male)	3,509	45.9	64	36.6	1,469	70.1	106	60.9	405.8 (3)	***
(Female)	4,132	54.1	111	63.4	627	29.9	68	39.1		
Race [a] (Hispanic)	868	11.4	5	2.9	142	6.8	3	1.7	189.9 (6)	***
(African American)	5,333	69.8	135	77.1	1,752	83.6	150	86.2		
(White or other)	1,440	18.9	35	20.0	202	9.6	21	12.1		
Disability [a] (No)	6,976	91.3	145	82.9	1,816	86.6	136	78.2	77.3 (3)	***
(Yes)	665	8.7	30	17.1	280	13.4	38	21.8		
Educational progress (CMSD)										
Chronic absenteeism [b] (No)	3,597	47.1	75	42.9	430	20.5	82	47.1	480.5 (3)	***
(Yes)	4,044	52.9	100	57.1	1,666	79.5	92	52.9		
CMSD stability [c] (No)	3,509	45.9	134	76.6	1,355	64.7	135	77.6	329.9 (3)	***
(Yes)	4,132	54.1	41	23.4	741	33.4	39	22.4		
Total	7,641	75.8	175	1.7	2,096	1.7	174	20.8		

Note. * $p<.05$, ** $p<.01$, *** $p<.001$

[+]=Analysis of variance (ANOVA) with its Mean (SD) of each group and *F*-test

[a]=Measured at 9th grade, [b]=Chronic absenteeism: attendance rate at 9th grade < 90 percent,

[c]=CMSD stability (Yes=1): Stays in CMSD for 3 consecutive years after the 9th grade

No=Non-system involved, FC=Foster Care only, DL=Delinquency only,

Dual=Dually involved in FC and DL; No, FC, DL, Dual= Between 9th grade and age 18

Educational Progress

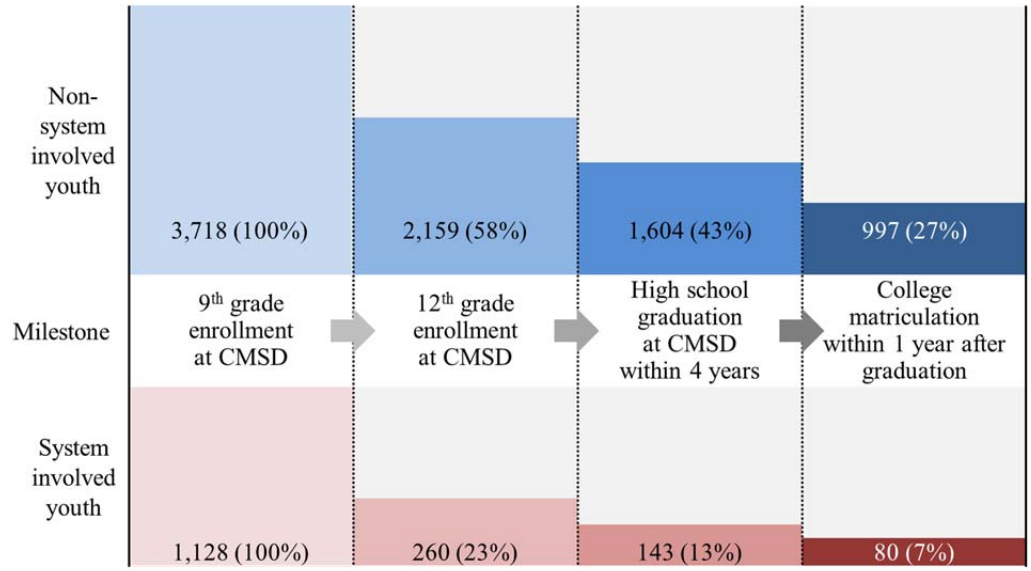
Youth were assessed on their school attendance rates in the 9th grade, as also shown in Table 3 above. The system involved youth were more likely to be chronically absent (defined as missing more than 10 percent of the days enrolled). For example, 79.5 percent of juvenile justice only youth were chronically absent at their 9th grade, while non-system involved youth had a chronic absence rate of 52.9 percent. The system involved youth were also less likely to stay in CMSD after their 9th grade entry: 23.4 percent of foster care only youth, 22.4 percent of dually involved youth, and 33.4 percent of juvenile justice only youth stayed all four years in CMSD following the 9th grade enrollment. In contrast, more than half (54.1 percent) of non-system involved youth stayed in CMSD for four years after their 9th grade enrollment.[7]

Figure 3 provides a visual representation of how the 9th grade cohorts moved through CMSD high schools and matriculated in higher education. Given data limitations[8] we focus here on the 2006-2007 9th grade cohort. As can be seen, there is a gradual loss of students over the four years of high school. For example, of the 1,128 system involved youth in our sample who start 9th grade in CMSD, only 260 or 23 percent were still enrolled in the 12th grade. This is in contrast to the non-system involved youth, 58 percent of whom were still enrolled in the 12th grade. It can also be seen that ever smaller shares of both groups go on to get high school diplomas or enroll in college. However, it must be kept in mind that some of these students may have moved to other school districts and completed their education.

[7] At this writing, we cannot be sure whether students who left CMSD were not attending school or had enrolled in another school in Ohio. We will update this information when we receive school records data from OLDA.

[8] As of this writing, we only have National Student Clearinghouse on CMSD graduates from 2005-2010 (with college enrollment dates from 2005-2011), so the analysis is limited to students that could have completed four years of high school by that date. We have requested updated information from CMSD.

Figure 3. Educational progress of 2006/07 CMSD school entry cohort*:
Non-system involved vs. system involved youth



Note. *=Only youth enrolled in CMSD 9th grade for the first time in the 2006/07 school year (N=4,846)

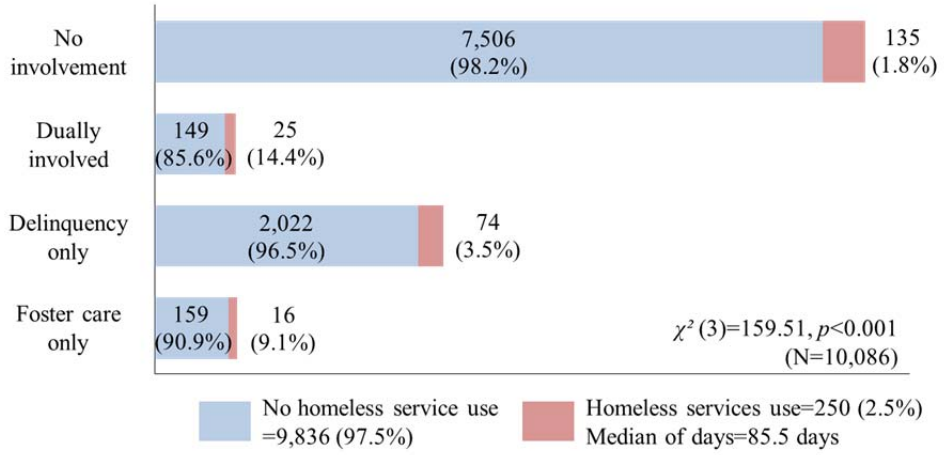
Homelessness Services Use and Jail Involvement after Age 18

Homelessness services use was evaluated for the study sample from age 18-21.[9] As shown in Figure 4, homelessness services rates are highest for dually involved youth (14.4 percent) and also quite high for foster care only youth (9.1 percent) compared to homelessness rates of only 1.8 percent among youth with no system invovlement. It should be noted that system involved youth account for a rather large proportion of the total use of homeless services by this 9th grade cohort. Of the 250 youth in the study that used homeless services between 18 and 21, 46 percent (n=115) had a foster care and/or delinquency filing in high school. The median number of homeless services days in this population (n=250) is 85.5 per user.[10] The types of services used by the youth in the study were mainly emergency shelter (used by 57.6 percent of those who were homeless) and permanent supportive housing (used by 26.8 percent of those who were homeless). The median stay for shelter users was 23 days. The median stay for permanent supportive housing users was 279 days.

[9] Additionally, it should be noted that this is an underestimate of housing problems in this population because it only counts youth who seek services from homelessness services provider. Youth who are homeless on the street, or doubled up in precarious circumstances are not counted here.

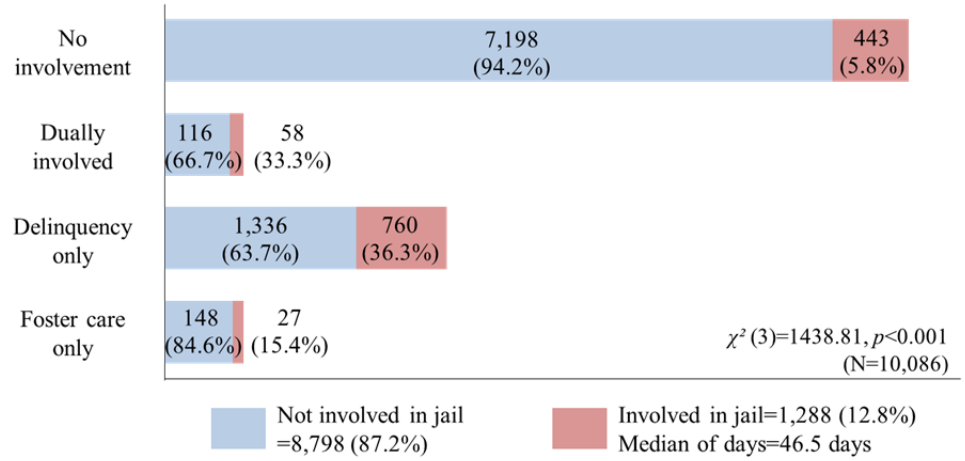
[10] It should be noted that this is an underestimate of total stays because some of the individuals were still in the midst of a homeless spell when the study ended (n=47; 18.8 percent of 250 homeless youth). In a subsequent report we will add additional years of HMIS data and adjust the calculation of the median for censoring.

Figure 4. Homeless services use of CMSD 9th grade cohorts between age 18 and 21: By system involvement between 9th grade and age 18



We also evaluated admissions to the County jail for this sample of youth. As shown in Figure 5, dually involved youth and delinquent youth had highest rates of jail admissions, but youth coming out of foster care also had elevated rates relative to the non-system involved youth. Looking at the total of the 1,288 individuals from this population that had jail episodes, the majority of them (nearly 66 percent) had system involvement in high school. The median jail stay for youth in the sample was 46.5 days by age 21.[11]

Figure 5. Jail involvement of CMSD 9th grade cohorts between age 18 and 21: By system involvement between 9th grade and age 18



[11] It should be noted that this is likely to be an underestimate of total length of stay as 5.4 percent (n=69 of 1,288) of the sample with a jail spell had not yet completed it during the study period.

Multivariate Analysis of Risk Factors for Homelessness and Jail

We also preformed several multivariate analyses to estimate the effects of system involvement on the number of days using homelessness services and the number of days in jail while controlling for other risk factors. As shown in Model 1 in Table 4, Poisson regression analysis indicates that students with foster care experience in high school have 4.4 times higher expected days of homeless services use than their peers with no foster care involvement while holding the other variables constant. Model 2 shows that delinquent students have 7.4 times higher expected days in jail than non-delinquent peers. These results suggest that youth with foster care involvement are at markedly increased risk for homelessness, while youth with juvenile justice system involvement are at particularly high risk for later jail involvement.

Table 4. Poisson regression models predicting days of homeless services use and days in jail between age 18 and 21 (N=10,086)

	Model 1 Homeless services			Model 2 Jail involvement		
Variable	β	p [a]	IRR [b]	β	p [a]	IRR [b]
Intercept	2.953		19.167	-4.121	***	0.016
Student characteristic						
Age at 9th grade (Mean=14.7, SD=0.56)	-0.227		0.797	0.361	***	1.435
Gender (Female=1, 49.0%)	0.511	*	1.667	-2.480	***	0.084
Race (Reference=White or others, 15.8%)						
African American (Yes=1, 73.1%)	1.342	**	3.825	0.791	***	2.204
Hispanic (Yes=1, 10.1%)	0.513		1.670	-0.016		0.984
Disability (Yes=1, 10.0%)	0.678	*	1.971	0.236	*	1.266
System involvement						
Foster care between 9th grade to age 18 (Yes=1, 3.5%)	1.492	***	4.444	0.462	***	1.588
Delinquency between 9th grade to age 18 (Yes=1, 22.5%)	0.661	*	1.937	2.005	***	7.425
Quasi-likelihood under the Independence model Criterion (QIC)						
Null model	-1039.219			-5434.365		
Full model	-1783.587			-15387.968		

Note. *p<.05, **p<.01, ***p<.001

[a]=p value based on Robust Standard Errors (clustered by Statistical Planning Areas (SPA))

[b]=Incidence Rate Ratios (IRR), obtained by exponentiating the Poisson regression coefficient (β)

We also performed casual mediation analysis[12] to examine whether CMSD stability mediates the relationship between system involvement and early adulthood outcomes (See

[12] For more detailed information on causal mediation analysis, see "Imai, K., Keele, L., & Tingley, D. (2010). A general approach to causal mediation analysis. *Psychological Methods, 15*(4), 309-334."

Appendix C for details). The results indicate that the effects of foster care and delinquency on homeless services use and on jail involvement between age 18 and age 21 are significantly mediated by CMSD stability. In other words, youth involved in foster care or delinquency in high school are less likely to stay within the same school district (CMSD) after the 9th grade (i.e., school district instability), which may in turn lead to an increase in homeless services use and jail involvement in their early adulthood.

CONCLUSIONS AND IMPLICATIONS

Many Cleveland youth are touched by the foster care and juvenile justice systems. Nearly a quarter (24.2 percent) of the students who entered 9th grade in Cleveland in this study were affected. While in school, these system-involved students are more likely to be absent or to switch schools and districts than their peers. By the time they should have reached 12th grade, only 23 percent of the system-involved students that started in 9th grade were still enrolled in CMSD. We do not yet know where the other 77 percent ended up. It is possible that they moved to another school district or that they dropped out of school. We have requested data on these students from OLDA, which will be able to show whether they entered other public schools in Ohio and whether they graduated. For those system-involved youth who managed to stay in the Cleveland school district until 12th grade, their graduation rates are about 20 points lower than non-system involved students (55 percent compared to 74 percent). Fifty-six percent of the system involved CMSD graduates go to college compared to 62 percent of non-system involved graduates. The disparities for the students that did not stay in Cleveland schools may be similar but we have to wait for more data.

These patterns suggest that the 9th grade is an opportune time to beging programming for this population. Knowing that some schools enroll more of the system involved population than others will be useful information for strategising about the locations of those activities (See appedix B). However, it should also be anticipated that switching schools and resdiential locations will present challenges. In particular, it appears from the data that staying in the same system can be beneficial for the chances of graduation or college enrollment, so keeping youth engaged with education during relocation may be crucial.

The elevated rates of homelessnes services use and jail epidodes are not only signs of the distress in these populations, but are signficant societal costs that might be avoided. For example,

it appears from the data that 46 percent of the homelessness service use in the sample is accounted for by foster care and/or delinquency-involved youth, even though they comprise only 2.5 percent of the sample. At a median stay of 85 days, these system involved youth (n=115) are apt to consume homeless services in emergency shelters (n=73, median=26 days) and in permanent supportive housing (n=30, median=230 days). Thus, if these system involved youth were provided the help to maintain stable housing, homelessness service used could be cut by 46 percent for this population, probably a signficant savings. Similarly, system involved youth account for the majority of jail episodes (66 percent) in this sample. Their median stay in jail is 79 days between ages 18 and 21. Prevention programs that could cut into the chances of sytem involved youth ending up in jail also have a chance of being cost effective.

Learning more about the factors and circumstances leading to the homelessness and jail time among system involved youth would be important for shaping programs. It would be useful to explore in greater detail how earlier patterns of school attendance and peformance may be predictive of these troubles. Additionally, a more indepth analysis of the frequency and type of foster care placements and delinquency filings and their relationship to youth's chances of problematic outcomes could inform prevention efforts.

Future Research and Dissemination Plan

A Place 4 Me, an initiative of the YWCA of Cleveland, is serving as a forum for dissemination of the study results. As a partner in the Jim Casey Youth Opportunity Initiative, they have brought together many organizations and groups that can work together to tackle these challenges. The study's focus on youth beginning in 9th grade is consistent with the Initiatives desire to reach youth early in order to prevent problems in early adulthood. The data also bring awareness of the neighborhoods and schools where the risk is greater, and this is expected to be helpful in the community engagement strategy. Finally, the study data might be useful as a baseline against which the Initiative will be able to track progress over time. We hope that this can be the beginning of a fruitful data partnership with the Place 4 Me Initiative.

In the fall, we will host a public forum to showcase the study findings and implications. This will be done in conjunction with Case Western Reserve's Schubert Center for Child Studies. The Schubert Center is a child policy forum and it regularly convenes individuals in the region who are interested in child policy and children's programs. As is the standard practice at Schubert forums, a panel of practitioners and policy makers will respond to the presentation and

engage in discussion with the audience. A policy brief on the study will also be electronically published as part of Schubert Center's series, placed on the web site and distributed to the mailing lists.

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Appendix A: Integrated Data Systems and Data Linkage

The data elements for this study come from three sources: ChildHood Integrated Longitudinal Data (CHILD) system, Ohio Longitudinal Data Archive (OLDA) and Northeast Ohio Community and Neighborhood Data for Organizing (NEO CANDO). All data are managed within a highly secure data center at Case Western Reserve University.

The CHILD system is a local IDS that covers children from birth through age 18 in Cuyahoga County (Cleveland). It began with the 1992 birth cohort and was originally built for the Early Childhood Initiative. Gradually, it has been expanded to address concerns about older children and youth. For this project, data center staff drew mainly on records in the system provided by Cleveland Metropolitan School District (CMSD), Cuyahoga County Juvenile Court (CCJC), Department of Children and Family Services (DCFS), the Homeless Management Information System (HMIS) maintained by the Cuyahoga County Office of Homeless Services. Data elements include family and child demographics, public assistance participation, school attendance, proficiency test passage, high school graduation, juvenile court filings, foster care spells, homelessness episodes and all residential and school addresses of the youth. Jail records from the Cuyahoga County Sherriff's Office were also linked in for this study.

This project also uses data from a statewide integrated system, OLDA maintained at Ohio Education Research Center (OERC) at The Ohio State University. OLDA creates a longitudinal record for every student in the state through linking individual student records from all Ohio schools. OLDA also includes information on the teachers and schools that can be linked with the student record. The project is requesting two sources of data through OLDA: 1.) High school records for students who leave CMSD schools after 9th grade but attend other Ohio secondary schools; 2.) Employment information for wage records data maintained by the Ohio Department of Job and Family Services. To link the Cleveland student records to the secondary education records in OLDA, we use the student state identifier (SSID), which is available through the CMSD student records in the CHILD system. To link to employment records, the students' Social Security Number (SSN) is utilized. The SSN is also available through the CHILD system. The diagram below shows the relationships among the IDS systems.

The Linking Process

Conceptually, the data linkage process proceeded as follows:

- Sample selection: CMSD student records are used to identify students enrolled in 9th grade for the first time in the 2006-7, 2007-8 school years. Their names, birthdates and CMSD IDs are used to enter the CHILD system to obtain data sources held there.
- Extraction of records from CHILD system: For each student, the CMSD ID is used to find them in the CHILD master index file, which tells us whether the student had a record in juvenile justice, child and family services, or public assistance programs. We also retrieve the unique ID assigned by the CHILD system (ECIID), the SSID and SSN. From each of these data sources that exist for the child, we extract the data elements needed for the project. We also tap into the master address file that is part of the CHILD system, to obtain the geocoded address locations that have been identified for the student from various data sources over the study period.
- Retrieval of data from OLDA: We submit the SSIDs for the students in the study to OLDA to obtain student records for any members of the 9th grade CMSD cohort that attended schools outside CMSD in grades 9-12 and any matriculation in Ohio higher education institutions. We also submit the SSNs for the students in the study to OLDA to obtain records of matriculation in Ohio higher education institutions and employment information.
- Neighborhood information: For each student address, we link in the neighborhood conditions measures from NEO CANDO via the Census Tract identifier.

At each stage of the linking, there are various identifiers that are utilized. The CHILD system is comprised of linking various local data sets which have their own identifiers. For this reason, CHILD system has produced a unique identifier for each child (labeled ECIID). By using ECIID, all of the local data sets can be linked for individuals through the CHILD system. The SSID are obtained from the CMSD record (already matched into the of CHILD system). The SSID is also in OLDA and will be used to link the student records there. The SSN (already in the CHILD system) will be the linking variable that OLDA will used to provide workforce records and higher education records. Finally, the census tract identifier is used to link CHILD system at individual-level and NEO CANDO at census-tract level. The data linking steps are diagramed in the exhibit below.

Exhibit 1. The linking process

Step	Linking Process	Data System	Key identifier
1	• Sample selection / Data preparation o Sample selection o Evaluating data quality o Checking duplication o Data cleaning	All	CMSD ID, ECIID, SSID
2	• Extraction of records from CHILD system o Linking within individual-level data o Obtaining addresses	CHILD	CMSD ID, ECIID
3	• Retrieval of data from OLDA (I) o Updating CMSD education data (NNIP partner's data, CHILD) from EMIS data of OLDA (IDS partner's data) o Linking individual-level data	CHILD, EMIS of OLDA	SSID
4	• Retrieval of data from OLDA (II) o Linking NNIP partner's data by IDS partner data (Board of Regents & Workforce data) o Linking within individual-level data	CHILD, OLDA	SSN
5	• Neighborhood information o Geocoding addresses o Linking within Census-tract level data	CHILD, OLDA, NEO CANDO	Census tract
6	• Data finalization o Evaluating the linking process o Publishing a codebook / data manual		

Note. CHILD: ChildHood Integrated Longitudinal Data system for Cuyahoga County, Ohio
CMSD: Cleveland Metropolitan School District, Ohio
ECIID: Unique identifier of CHILD system
EMIS: Ohio Education Management Information, Ohio
NEO CANDO: Northeast Ohio Community and Neighborhood Data for Organizing (http://neocando.case.edu/)
OLDA: Ohio Longitudinal Archive (www.chrr.ohio-state.edu)
SSID: Ohio State Student Identifier
SSN: Social Security Number

Appendix B-1. Tabulations by Neighborhood of system involvement, chronic absenteeism, and early adulthood outcomes of CMSD 9th grade cohort: Home address at 9th grade (N=10,086)

Statistical Planning Areas (SPA)	N	% SYS[a]	% FC[a]	% DL[a]	% DUAL[a]	% CA[b]	% HMIS[c]	% JAIL[c]
Bellaire-Puritas	294	19.7	0.3	18.7	0.7	56.8	2.0	7.1
Broadway-Slavic Village	639	28.8	1.7	26.1	0.9	62.3	2.0	17.7
Brooklyn Centre	269	19.3	1.9	16.7	0.7	53.9	1.1	7.8
Buckeye-Shaker Square	169	25.4	4.1	19.5	1.8	51.5	1.2	12.4
Buckeye-Woodhill	224	26.8	2.2	22.8	1.8	54.5	1.8	12.5
Central	316	28.2	1.6	25.0	1.6	60.1	3.8	15.5
Clark-Fulton	323	20.1	0.9	18.0	1.2	70.0	2.2	10.2
Collinwood-Nottingham	359	26.7	1.1	23.7	2.0	67.7	4.7	13.4
Cudell	265	29.1	1.1	25.7	2.3	66.8	4.9	15.1
Detroit Shoreway	309	23.6	1.3	20.7	1.6	67.0	2.3	9.1
Downtown	18	22.2	0.0	22.2	0.0	77.8	16.7	5.6
Edgewater	71	19.7	2.8	14.1	2.8	45.1	0.0	4.2
Euclid-Green	96	20.8	0.0	19.8	1.0	60.4	2.1	9.4
Fairfax	187	23.0	2.7	19.8	0.5	48.7	3.7	16.0
Garfield Heights[d]	84	28.6	1.2	25.0	2.4	40.5	2.4	15.5
Glenville	1,109	25.6	1.6	22.0	2.0	62.3	2.8	15.0
Goodrich-Kirtland Pk	56	32.1	8.9	19.6	3.6	55.4	7.1	12.5
Hough	333	24.0	2.4	20.4	1.2	52.3	3.9	13.5
Jefferson	331	20.2	0.9	17.8	1.5	53.8	2.1	10.6
Kamm's	211	20.9	1.4	19.4	0.0	56.4	1.4	8.1
Kinsman	259	29.0	2.3	25.1	1.5	62.9	1.5	15.4
Lee-Harvard	291	24.4	3.4	17.9	3.1	50.5	2.1	10.0
Lee-Seville	163	22.7	0.6	20.3	1.8	46.6	1.8	16.0
Mount Pleasant	575	22.4	1.6	19.3	1.6	55.1	2.4	12.5
North Shore Collinwood	266	21.8	2.6	16.9	2.3	55.6	1.9	12.8
Ohio City	122	26.2	0.0	24.6	1.6	68.9	1.6	13.1
Old Brooklyn	548	14.4	0.4	13.1	0.9	56.9	0.7	5.7
St.Clair-Superior	227	33.0	2.6	29.1	1.3	55.1	4.0	16.3
Stockyards	290	21.0	1.0	19.0	1.0	65.5	1.0	11.4
Tremont	166	13.9	0.6	11.5	1.8	66.9	0.6	7.8
Union-Miles	812	24.8	1.6	21.6	1.6	59.2	2.6	14.3
University	15	20.0	0.0	20.0	0.0	66.7	6.7	20.0
West Boulevard	516	20.4	2.5	14.9	2.9	54.8	2.1	10.7
Suburban	79	40.5	10.1	17.7	12.7	41.8	6.3	16.5
Unknown	94	73.4	3.2	63.8	6.4	40.4	5.3	44.7
Total	10,086	24.2	1.7	20.8	1.7	58.5	2.5	12.8

Note. [a]=Between 9th grade entry and age 18, [b]=At 9th grade, [c]=Between age 18 and 21, [d]=Portion in CMSD
SYS=Involved in FC and/or DL, FC=Foster Care only, DL=Delinquency only
Dual=Dually involved in FC and DL
CA=Chronic absenteeism at 9th grade, attendance rate <90%
HMIS=Homeless services use, JAIL=Jail involvement

Appendix B-2. Tabulations by School of system involvement, chronic absenteeism, and early adulthood outcomes of CMSD 9th grade cohort: School name at 9th grade (N=10,086)

School name	N	% SYS[a]	% FC[a]	% DL[a]	% DUAL[a]	% CA[b]	% HMIS[c]	% JAIL[c]
Cleveland School of the Arts	250	12.0	0.8	11.2	0.0	13.6	0.8	3.2
Collinwood High School	468	22.4	0.9	20.9	0.6	69.4	1.9	12.2
East High School	354	34.5	4.2	29.7	0.6	62.2	4.8	18.4
East Tech High School	396	30.3	2.3	25.8	2.3	73.0	3.8	18.4
Garrett Morgan School	112	10.7	0.0	10.7	0.0	27.7	1.8	4.5
Genesis/Option Complex	136	40.4	1.5	34.6	4.4	86.8	8.8	30.9
Ginn Academy	96	19.8	0.0	17.7	2.1	46.9	2.1	21.9
Glenville High School	711	26.0	1.6	22.8	1.7	69.3	3.1	14.8
Harry L. Eastman	41	68.3	0.0	65.9	2.4	29.3	2.4	36.6
James Ford Rhodes School	725	15.0	0.8	13.7	0.6	50.9	0.6	6.1
Jane Addams Business Careers	249	9.6	1.2	7.2	1.2	39.8	2.0	2.8
John Adams High School	661	22.5	1.5	19.8	1.2	61.7	2.0	12.7
John Hay Campus	515	7.6	1.6	5.1	1.0	12.2	1.6	2.9
John Marshall High School	1,049	21.9	0.7	20.6	0.7	60.7	3.2	10.4
Kennedy High School	419	30.8	1.9	26.3	2.6	70.9	1.9	15.8
Lincoln West High School	711	16.9	0.6	15.6	0.7	67.4	0.8	8.3
Martin Luther King Jr. Campus	273	8.8	0.7	7.3	0.7	33.0	2.9	4.4
Max S. Hayes High School	261	17.6	0.4	17.2	0.0	33.3	0.8	9.6
Parmadale School	19	79.0	31.6	5.3	42.1	0.0	0.0	47.4
South High School	463	31.3	1.9	28.7	0.7	70.0	1.9	18.8
Success tech Academy	111	12.6	1.8	9.9	0.9	28.8	1.8	6.3
Tremont Montessori	14	14.3	0.0	14.3	0.0	14.3	0.0	0.0
Whitney M. Young	165	9.1	0.6	8.5	0.0	14.6	0.0	1.8
Admin/Out of district	1,739	35.0	2.5	29.6	2.9	81.3	3.3	18.2
Treatment centers and others	148	67.6	14.9	31.8	20.9	7.4	8.1	36.5
Total	10,086	24.2	1.7	20.8	1.7	58.5	2.5	12.8

Note. [a]=Between 9th grade entry and age 18, [b]=At 9th grade, [c]=Between age 18 and 21
SYS=Involved in FC and/or DL, FC=Foster Care only, DL=Delinquency only
Dual=Dually involved in FC and DL
CA=Chronic absenteeism at 9th grade, attendance rate <90%
HMIS=Homeless services use, JAIL=Jail involvement

Appendix C. Causal mediation analysis: Mediating role of CMSD stability (4 years) on the relationship between system involvement and early adulthood outcomes (N=10,086)

Model 1: Foster care → CMSD stability → Homeless services use

	Estimate	95% CI		*p*
Total effect	12.962	8.576	18.223	***
ACME (average)	0.775	0.315	1.431	***
ADE (average)	12.187	7.896	17.477	***
Prop. Mediated	0.060	0.023	0.087	**

Model 2: Delinquency → CMSD stability → Homeless services use

	Estimate	95% CI		*p*
Total effect	3.331	0.888	4.453	**
ACME (average)	0.303	0.094	0.560	**
ADE (average)	3.028	0.673	3.959	*
Prop. Mediated	0.091	0.045	0.341	**

Model 3: Foster care → CMSD stability → Jail involvement

	Estimate	95% CI		*p*
Total effect	7.274	2.035	9.091	**
ACME (average)	1.156	0.718	1.667	***
ADE (average)	6.118	0.812	7.497	*
Prop. Mediated	0.159	0.105	0.659	***

Model 4: Delinquency → CMSD stability → Jail involvement

	Estimate	95% CI		*p*
Total effect	24.255	21.787	26.030	***
ACME (average)	1.163	0.785	1.531	***
ADE (average)	23.092	20.615	24.812	***
Prop. Mediated	0.048	0.032	0.063	***

Note. $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

95% CI: Bootstrapped 95% Confidence Intervals

ACME=Average Causal Mediation Effect (effect of system involvement on early adulthood outcomes through CMSD stability: Indirect effect via mediator)

ADE=Average Direct Effect (direct effect of system involvement on early adulthood outcomes)

Total effect=ACME+ADE

Prop. Mediated=Proportion of total effect mediated by CMSD stability (mediator)